

**Energy 'access' for sustainable development: Enabling
modern energy practices in rural communities**

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Preface

The considerable challenges to ensuring resource sustainability, equitable wellbeing and meaningful livelihoods, counterpose the taken-for-granted ways we consume and act in everyday life. The mechanics and interplays between dimensions within what are simultaneously global and embodied phenomena have long fascinated me. The energy access problematic is archetypal of this. The focus on energy access and sustainable development in this thesis is thus a journey to explore the sorts of interdependencies that underscore common routines and outcomes and undermine or enhance sustainable development. This perspective is a culmination of years of reflection upon such interdependencies. It led me to, over ten years ago now, embarking upon a geography undergraduate degree that allowed me to research both physical and social phenomena and how they interact. This interest was taken further during work for a sustainable development INGO in India and experiences in that vast subcontinent that highlighted to me the imperative of how the social and material may interact in myriad and improvising ways to enable or constrain aspects key to social needs and possibilities. The specificities of use, distribution, commodification, control and impacts on natural resources and capabilities were prime examples of this. Examples included the practices employed in rural India to access and manage water and its implications on school attendance, agricultural methods and livelihood resilience, and the impact to daily roles, health, practices and work patterns influenced by the lack of modern energy services in the Indian and Nepali Himalaya as well as central cities.

The underlying ingredients of consumption patterns and energy resources in these phenomena and wider outcomes led me to complete a master's degree from the University of Edinburgh in Sustainable Energy Systems. During this period, the UNDP's new set of development goals consolidated my drive to further understand the role of energy in shaping everyday life and sustainability. This led me to the research and development imperative of the means for all citizens to be able to achieve their energy needs and development enhancing ends through the socio-technical provision, use and management of modern energy services. It is from this angle I started examining the imperative in considerably more depth. The evolution of this focus throughout the research reflects the ongoing nature of energy access and sustainable development and the story presented in this thesis.

Abstract

Modern energy services are a foundation for sustainable development. As recently acknowledged by the multilaterally supported UNDP's 'energy access for all' objective, it is a missing cog for the socio-economic, empowerment, livelihood enhancement and sustainability of more than 2 billion people in developing and less developed countries. Efforts to provide modern energy services, however, face pervasive challenges reflective of wider development efforts, establishing the imperative for greater understanding of their underlying dimensions as a basis for enhancing sustainable development pathways.

The thesis pursues this through ethnographic studies of innovative and contrasting energy access pathways in remote areas of Nepal. These were supported by preliminary site visits, semi-structured interviews, participant observation and observant participation with a range of key development actors, led by a reflexive, multi-sited research approach. The research reveals that the challenges and opportunities of effective energy access and sustainable development are embedded in under-recognised social routines and contexts that subsume essential dimensions of daily life. These are dynamic, multi-actor and interconnected through routinised codes, performances and institutions for which social emotions, meanings and relations are integral. Interventions, technologies and impacts interdepend on these mundane interactions and structures, signifying the vital role of social agency and conventions in everyday life. 'Access' is a constant (re)negotiation of these within a socio-technical context.

The findings demonstrate the value of integrating these dimensions into development approaches through being attentive to, and co-produced by, the plurality of actors, settings and routines. A practice theory informed approach supported the analysis to signify further distinctive policy, research and pathway implications. The thesis thus demonstrates the potential of a social practice approach for enabling a more sensitive and effective framework for enabling energy access for sustainable development.

Contents

Acknowledgements.....	i
Preface	iii
Abstract.....	v
Contents.....	vii
List of Figures	xii
List of Tables	xiii
List of Boxes	xiv
List of Abbreviations	xv
CHAPTER 1 Introduction	1
1.1. Situating energy in everyday life: Why study energy access experiences today?.....	2
1.2. Research aims and objectives	7
1.3. Thesis structure.....	8
CHAPTER 2 Energy ‘access’ for sustainable development? Towards conceptual & empirical insights.....	14
2.1. Introduction	14
2.2. Dominant approaches to energy access & development: Creating sustainability or perpetuating barriers?.....	15
2.3. Alternative approaches to sustainable development.....	17
2.3.1. Capabilities, basic needs & rights-based approach approaches.....	19
2.3.2. Appropriate technology	22
2.3.3. Business-based models.....	23
2.3.4. Nexus & partnership approaches	24
2.3.5. Community-based approaches	26
2.4. Reframing development pathways in terms of innovations.....	29
2.5. Approaches to innovations	30

2.5.1. The dominant diffusion paradigm: a paragon of development theory.....	30
2.5.2. Towards (re)framing innovation appropriation: insights from alternatives framings	31
2.5.2.1. The ‘diffusion of innovations’ model.....	33
2.5.2.2. Technology acceptance model (TAM)	34
2.5.2.3. ‘Learning selection’ model	35
2.5.2.4. Diffusion insights from structural theories: Sociologies of technology & multi- level theories	36
2.6. Towards (re)framing innovation appropriation: Insights from empirical literatures.....	40
Social use, support, awareness, perception & learning	43
2.6.1. Social use, meanings, innovation & learning.....	43
The empirical literatures foremost substantiate the importance and interrelation of	43
2.6.2. Risk & Uncertainty	45
2.6.3. Affordability	46
2.6.4. Compatibility	48
2.7. Reframing innovation appropriation: Integrating theoretical & empirical insights.....	50
2.8. Conclusion	53
CHAPTER 3 Conceptual Framework: A Social practice approach for energy access & sustainable development	54
3.1. Introduction: Framework requirements	54
3.2. Social practice theory: The origins & elements of practice theory	55
3.3. The formation & systems of practice: Innovation, operation & scale	59
3.4. Practices, positionality, structures & context.....	65
3.5. Summary, Implications & exemplification.....	69
3.6. Conclusion	78
CHAPTER 4 Research Design.....	79
4.1. Introduction.....	79
4.2. Epistemic orientation: Co-producing the social, dynamic & contingent.....	80
4.3. Methodology overview: Qualitative research & interpretative approach.....	83

4.4. Research design & methods of data collection	90
4.4.1. Research location: Nepal	90
4.4.2. Institutional-level, semi-structured interviews.....	93
4.4.3. Ethnographic case studies	95
4.4.4. Data recording, analysis & interpretation.....	116
4.5. Research access, quality & ethical considerations & challenges	123
4.5.1. Positionality, context and access	123
4.5.2. Research ethics	127
4.5.3. Working with translators	130
4.5.4. Quality and credibility of findings	131
4.6. Conclusions	133
CHAPTER 5 From 'energy access' to energy use in rural Nepal	134
5.1. Introduction	134
5.2. Rapid uptake and a dichotomy in appropriated innovations	135
5.3. The global importance & low uptake of rural cooking innovations.....	144
5.4. The low uptake of cooking innovations in rural Nepal	147
5.5. Overlooked reasons for the low uptake of innovations & implications for sustainable development pathways	155
5.5.1. A sense of taste: the sensual & symbolic as practice signifiers & anchors.....	155
5.5.2. Taste & tradition in (re)producing the moral & political economy of social life ...	161
5.6. Summary of insights: Sensory taste, embodied distinctions & practice systems.....	173
5.7. Conclusion.....	176
CHAPTER 6 Managing energy, energy use & sustainable development.....	177
6.1. Introduction	177
6.2. Refining the management lens for sustainable development: towards collective management?	178
6.3. Communities for sustainable development.....	180
6.3.1. Management via mobilising & using interactions & social structures.....	180
6.3.2. Management via pre-existing skills, meanings, emotionalities & procedures	190

6.3.3. Co-management of medium to large-scale energy projects.....	195
6.4. Collective management trade-offs?	200
6.4.1. The pragmatics of trade: negotiating practice gaps & inequalities.....	200
6.4.2. The constraints of time: Practice temporalities & demands.....	203
6.5. Summary & implications	212
6.6. Conclusion	221
CHAPTER 7 Emotionality & the sensibilities of sustainability.....	222
7.1. Introduction.....	222
7.2. Emotions in social & development theory and practice	223
7.3. Case I: Social change or preservation? Food, tradition, taste, risk.	228
7.4. Case II: Feeling collective: Shared elements of practice via discourse, doings & learning	238
7.4.1 Getting energy access: Emotionality in financing, remoteness & demand.....	238
7.4.2. Resistance & project disruption	243
7.5. Summary & implications.	250
7.5.1. Practice conservation, innovation or resistance? Time, place & (dis)order.....	251
7.5.2. Emotionality, discourse & practice: Agency elements, drivers & bonds.....	259
7.6. Conclusion	267
CHAPTER 8 Conclusion.....	269
8.1. Introduction.....	269
8.2. Towards conclusions: Three central contributions of each chapter	270
8.3. Thesis Conclusions.....	277
Conclusion 1: Co-production, plurality & dynamism for theory & praxis.	278
Conclusion 2: Research through practices.	280
Conclusion 3: Advance practical approaches to development & sustainability through social practices.	282
8.4. Thesis strengths & weaknesses: Learning from research	285
Strengths.....	285
Weaknesses.....	289

8.5. Final remarks.....	292
Appendices.....	294
Appendix I.....	294
Appendix II.....	299
Appendix III.....	301
Appendix IV.....	303
Appendix V.....	304
Appendix VI.....	306
Appendix VII.....	308
Appendix VIII.....	310
Appendix IX.....	311
Appendix X.....	312
Appendix XI.....	313
References	318

List of Figures

Figure 2.1. The learning selection model	35
Figure 2.2. The uptake of innovations: A characterisation of the theoretical landscape	39
Figure 3.1. The elements of practice interlinked within a practice.....	58
Figure 4.1. Nepal’s geographical location and altitudinal/ ecological zones	91
Figure 4.2. Stakeholder analysis flow chart of key actors for energy access in Nepal	93
Figure 4.3. Location of 3 selected case study sites.....	98
Figure 4.4a and 4.4b. Conducting a focus group in Jaidi	115
Figure 4.5. Promoting the interactive nature of the research approach through sharing my camera, discussing openly, and transcribing attentively and transparently.....	117
Figure 4.6. Excerpt of 1st stage nodes embedded in 2nd stage nodes	120
Figure 4.7. Example of a parent node and embedded nodes developed for this thesis.	121
Figure 4.8a and 4.8b. Sharing identities, customs and values through food in Nepal.....	124
Figure 5.1. Total variance in firewood sourcing among the 3 case studies.....	148
Figure 5.2. Conventional cooking in a typical rural Nepali household.....	152
Figure 5.3. Collecting fuelwood in Sisuwa-Bala.....	157
Figure 6.1. Group-based managerial structure of the three case studies.....	180
Figure 6.2. The domains of practices and their relations for effective project management .	181

List of Tables

Table 2.1. A selection of models related to achieving sustainable development.....	18
Table 2.2. The principal premises and practical implications for enhancing effective innovation uptake derived from eight influential constructivist and relational theories.....	32
Table 2.3. Principal empirical literature insights for enhancing sustainable development pathways.....	42
Table 3.1. Key concepts and implications from a social practice theory for advancing innovations and sustainable development.	77
Table 4.1. Research design overview	89
Table 4.2. Energy ‘access’ case studies: An outline of three pioneering models in Nepal.....	102
Table 5.1. Gender-specific, household-level electricity uses in the three case studies.	138
Table 5.2. Mean household-level cooking fuels consumed in rural and urban Nepal	147
Table 5.3. Daily mean time required to source household cooking fuel per household.....	147
Table 6.1. Recommended SHS user maintenance practices.....	209
Table 8.1. Interlinked theoretical, empirical & methodological thesis insights & implications for enhancing energy access approaches for sustainable development (SD).....	313

List of Boxes

Box 4.1. Membership, power, participation.....	111
Box 5.1. The experience of cooking.....	152

List of Abbreviations

ADB	Asian Development Bank
AEPC	Alternative Energy Programme Committee
AES	Alternative Energy Sources
AGECC	Advisory Group on Energy and Climate Change
BSP	Biogas Sector Partnership
CBNRM	Community Based Natural Resource Management
CDM	Clean Development Mechanisms
CEF	Community Energy Facility
CM	Community Mobiliser
Co-	Collective- (i.e. working, management)
CSR	Corporate Social Responsibility
DANIDA	Danish International Development Agency
EA	Energy Access
EMC	Electricity Management Committee
ESAP	Energy Sector Assistance Programme
EET	Energy Efficient Technologies
FF	Fossil Fuels
FR	Forest Resources
FSG	Financial Services Group
GDP	Gross National Product
GGCA	Global Gender and Climate Alliance
GoN	Government of Nepal
GTZ	German Technical Cooperation Agency
HDI	Human Development Index
HPL	Himal Power Limited
IBT	Improved Biomass Technologies
ICIMOD	International Centre for Integrated Mountain Development
ICS	Improved Cook Stoves
IEA	International Energy Agency
IWM	Improved Water Mills
INGO	International Non-Governmental Organization
INFORSE	International Network For Sustainable Energy
IPCC	Intergovernmental Panel on Climate Change
IPPAN	Independent Power Producers' Association Nepal
IREDA	Indian Renewable Energy Development Agency Limited
IRM	Integrated Resource Management
kW	Kilowatt
kW/h	Kilowatt hour
LDC	Least Developing Country
LPG	Liquid Petroleum Gas
MDG	Millennium Development Goal
MES	Modern Energy Services
MFI	Micro Finance Institution
MGSP	Mini Grid Support Programme
MH	Micro-hydro
MHP	Micro-hydro Plant
MoE	Ministry of Energy, Government of Nepal
MoEST	Ministry of Environment, Science and Technology
MoFSC	Ministry of Forest and Soil Conservation
MWh	Megawatt Hour
NACEUN	National Association of Community Electricity Users-Nepal
NEA	Nepal Energy Agency

NGO	Non-Governmental Organization
NTNC	National Trust for Nature Conservation
NTFPs	Non-Timber Forest Products
NORAD	Norwegian Agency for Development Cooperation
NPC	National Planning Commission
NR	Natural Resource
NRREP	National Rural and Renewable Energy Programme
PES	Primary Energy Sources
PLA	Participatory Learning & Action
PPA	Power Purchasing Agreement
PRA	Participatory Rural Appraisal
PV	Photovoltaic
R&D	Research & Development
REEEP	Renewable Energy and Energy Efficiency Partnership
REDP	Rural Energy Development Programme
RESSP	Rural Energy Sector Support Programme
RET	Renewable Energy Technologies
RM	Resource Management
RETs	Renewable Energy Technologies
SD	Sustainable Development
SDG	Sustainable Development Goals
SE4ALL	Sustainable Energy for All
SEMAN	Solar Electric Manufactures Association Nepal
SHS	Solar Home System
SNV	Netherlands Development Organization
SPV	Solar Photo Voltaic
SSHS	Small Solar Home System
SWHS	Solar-Wind Hybrid System
TERI	The Energy and Research Institute
UNESCO	United Nations Educations, Scientific and Cultural Organisation
UNDP	United Nations Development Programme
UNFCCC	United Nations Foundation Climate Change Committee
VDC	Village Development Committee
WB	World Bank
WECS	Water and Energy Commission Secretariat
WGC	Women and Gender Constituency
WECF	Women Engage for a Common Future
WTP	Willingness to Pay
WHO	World Health Organization

CHAPTER 1

Introduction

Energy consumption is an intrinsic part of everyday life. It relates to the resources we use and affect, how we build and use our homes and cities, how we work, cook, communicate and boost our capabilities in a multiplicity of ways often backgrounded by their normalisation. Energy practices are thus instructive for understanding core sociological processes, as well as the modern services and outcomes their relation to electricity and clean fuels enables and constrains. The availability of electricity and clean fuels, however, is highly unequal, resulting in dependency on unsustainable natural resources limiting social capabilities, resilience and sustainability for more than 2 billion people in developing countries and less developed countries. Accordingly, access to modern energy services is a foundation for sustainable development and one that has recently become a foremost international and national priority. The burgeoning 'energy access' projects that have emanated from this, however, have met pervasive challenges and limited impacts. There is a need, therefore, for new frameworks for realising energy-based sustainable development.

In this thesis, I seek to make substantive contributions to the development of such frameworks by exploring the intimate link between underlying social processes and energy pathways and effects. Through probing relationships between the routine ways energy is situated, consumed and transformed, I focus on a central area overlooked in the frameworks: how access translates to outcomes in everyday life. Pursuing the problem from this angle offers a distinctive analytical lens through which I consider how the steps required from provision to sustainable development enhancing use and normalisation may offer significant insights for improving both the sustainable access to, and equitable impacts of, modern energy services.

Through this approach, I also turn the focus to groups typically eclipsed as an essential means to enhance these insights and implications, namely everyday communities, non-consumers and the disempowered. Doing this through exploring the experiences of a plurality of such groups in rural Nepal provides unique insight into the needs, feelings and capabilities of people living with and without modern energy and related innovations and how these are mobilised and constrained in ways that may extend existing inequalities and the barriers to meaningful access, but also may signify means to overcome them. The thesis thus investigates

the neglected social context of energy use, experience, expertise and structures. Yet these are also influenced by the discourses, paradigms and activities of market, state and broader development actors. These are added to the research approach to enable a comprehensive investigation of energy access and development, whilst an emergent and flexible approach is taken throughout to reflect the unexpected and dynamic realities of empirical phenomena, co-producing further data and analysis as energy practices are patterned and unfold.

This approach expands the range of factors considered for energy access and development and provides a unique vantage from which to advance insights into pressing problematics. The thesis does this further through conceptually and empirically evaluating the significance of the array of factors for energy and sustainable development, how they converge or are constrained, and to what implications for enhancing energy projects and sustainable development pathways and outcomes. In so doing, this thesis contributes to key debates and challenges at a pertinent time, reveals critical yet overlooked factors and processes underpinning these, and advances conceptual and practical guidance for better attending to these challenges for enhancing sustainable development.

1.1. Situating energy in everyday life: Why study energy access experiences today?

The importance of access to modern energy services cannot be overstated. It drove industrialisation, western standards of living and recently 680 million people from poverty in China (Rosenberg 1998; Cairo and Massetti 2011; Birol 2014). Through providing an alternative to traditional biomass for meeting daily energy needs, modern energy also offers an instrumental route to natural resource management if energy pathways depart from the resource-intensive paradigm underpinning western development. Globally, however, more than 1.3 and 2.7 billion people lack access to electricity and clean cooking fuels, respectively, 98% of whom are in developing countries and less developed countries (IEA 2011; UNDP 2014). Lacking these, sources are used that severely hinder gender, social and physical environments, sustainability and socio-economic development (Annecke 1999; Cecelski 2004). Accordingly, access to modern energy services is recognised as a cornerstone for sustainable development (Clancy et al. 2002; Bazillian et al. 2012; Mukherjee and Sovacool 2012).

This recognition catalysed in 2012 through the UNDP's 'sustainable energy access for all' campaign (SE4ALL), setting a goal of universal access to modern energy services by 2030 and positioning it as one of eight core Millennium Development Goals and an agent for enhancing others, such as viz-à-viz ecosystem sustainability, gender equality, food security, education, poverty and health (UNDP 2012a)¹. The importance of modern energy services to such diverse domains of everyday life is further signalled by its recent prioritisation by influential international development institutions and in state-level policy agendas (IEA 2011; World Bank and IEA 2015). Such focus has materialised in a surge in energy projects.

This multi-level momentum, coupled with the reality of exacerbating resource pressures, pervasive limitations to technology focused development projects, and challenges to sustainability, signifies a pertinent time to consider factors underlying these constraints and ways to improve them. This pejorative situates the thesis in the thick of consumption, innovation and user-engagement research to develop conceptual and practical tools to enhance energy and project pathways in relation to the imperatives of sustainable development. This requirement is compounded by the pitfalls of energy projects through dominant development paradigms, uncertainty over what more effective pathways entail, and the impacts of project failure and dependency on conventional fuels being concentrated on the most vulnerable (Banerji and Baruah 2006; Sovacool et al. 2013; Shyu 2014).

Consistent with these problematics is a premise in central models of development enshrining the doctrine that material provision of goods or services is sufficient to achieve functionality and wellbeing goals (Barnes 2007; Brew-Hammond 2010). This positions 'access' as the ends rather than a conditional means to subjective ends, resulting in efforts focused on technological research, development and deployment rather than wider dimensions and impacts (Martinot et al. 2002; Bryne et al. 2011). This has led to the nature of access and impact being unquestioned and the journey from provision to consumption, reproduction, management and sustainability being overlooked. This conceals the transformative immersion of innovations in the social, as well as the contingent needs of societies and sustainable development. within and through which innovations differentially function, modify and are resisted (Lessard 1998; Bizikova et al. 2012).

The imperative, therefore, is to integrate an understanding of these dynamics into frameworks for better apprehending how (energy) access extends innovations into new and

¹ These are maintained in the UNDP's Post-2015 Sustainable Development Goals (UNDP 2016a, b).

divided settings beyond the scope of current development orthodoxy frameworks. This research agenda is thus one that stems beyond domains of sustainable development. Enduring sustainability challenges and failures for technologies to achieve their intended consequences have far reaching implications whose contingencies are complex, more-than-physical and misaligned in dominant policy (Heiskanen 2005). They intersect with considerations of social spaces, gender, justice, resilience, identity, ethics, power and process whose neglect risks perpetuating inequalities and project failures (Sen 1999a: 171; Cabral et al. 2005). This includes how prospective societies and sub-groups adapt to, enable or prevent new innovations and the knowledges, feelings, procedures, functions and impacts they require and produce (Patil 2010; Glemarec 2012).

It suggests sustainable development, rather than an inevitable outcome of intransigent models, is provisional and situated within the complexities of heterogeneous interactions with uneven sociologies forming systems of production, distribution, consumption and institutionalisation (Poteete et al. 2010: 58). The task then, rather than impose privileged and reductive typologies premised on 'fixed' and determinate means and ends, is to consider the plural and dynamic challenges of development and how they become normativised and reproduced in everyday lives (cf. King 1991; Massey and Jess 1995). A study of 'energy access' thus provides a pertinent opportunity to start to unpick these issues and move towards related progress at a time when these challenges and failures are poised, through the energy access drive, to be extended into new and vulnerable contexts.

A paragon of this is how modern (energy) technologies may conflict with traditional practices that may be intrinsic to societies' ways of knowing, doing and ordering, yielding insights into neglected barriers to sustainability and why certain interventions methods are predominantly resisted. Energy, access and consumption research must thus consider the social interdependencies to which they relate and why certain functions and settings, such as cooking and households, may be particularly insightful. A reading of these 'energy', 'technology' and 'consumption' functions and settings, could hence be enriched by analytics of their sociologies (Miller 2010; Marres 2011; Strengers 2013).

Cooking and household dynamics accordingly become foci within the research. These foci, and that of the materiality, narratives and geographies of energy more broadly, relate to how technologies become 'domesticated' in social contexts brought to bear by social conventions (Silverstone 2005). Patterned in the social, materials become subjected to social forces, reconfigured by and reconfiguring the social practices - and their relational, affective and

embodied capacities - that shape them (Bickerstaff and Hinton 2013). The intersection of practices and contexts for matters of development is further signified by how social functions and settings such as energy services, households and communities, represent the prevalence of innovations to be resisted and the multitude of programmes now considering clean cooking as a primary concern. Examples include the recent United Nations-led 'Global Alliance for Clean Cookstoves' and the World Bank's 'Efficient Clean Cooking and Heating Partnership' programme (Putti et al., 2015). Considering the social processes that shape these energy functions, such as heating and power (also Rinkinen 2013), therefore enables us to unpick how these functions, and intervention approaches that aim to provide and manage them, become profoundly contextualised and embodied. Through appraising energy through this constructivist approach, the relationship of (energy) access to practices and impacts often prefigured by gendered obligations, spaces and capabilities emerges.

This attends to the necessity for opening a debate on what 'access' entails, through what means, to what ends and how approaches to these can be enhanced to meet circumstantial needs (Bhanot and Jha 2012; Groh et al. 2015). This requires research open to social solutions, emergent phenomena and neglected voices and practices to support frameworks for energy access that operationalise the principles of sustainability (Bryne et al. 2011; Kaygusuz 2012). In this thesis, I address these gaps by keeping considerations of capabilities, needs, diversity and dynamics central to an assessment of what is required for energy access-led sustainable development for those for whom this is a foremost demand and imperative. To support this, I compare incumbent narratives, premises and paradigms with multiple conceptual alternatives and the empirical experiences and perspectives of energy access and outcomes from all stakeholders. This includes the feelings, routines and resources of common and marginalised energy consumers, non-consumers and the processes, actors and structures that influence their interactions and ends. This brings the focus to (non)users, norms and forms of (non)use through an explorative, sociomaterial approach at a time of rising commands for considering the social, as well as technical and their interrelations, in energy and development studies (Batliwala and Reddy 2003; Pachauri and Spreng 2004; Clemens et al. 2010).

These aims were pursued through primary research in rural and remote communities where efforts to provide energy access have been most limited and the dependency on unsustainable fuels is most extensive (Clancy et al. 2002; Bhattacharyya 2006; Barnes 2007). Nepal provides an exemplar of this, with over 70% of the non-urban population without access to modern energy services and over 90% in many remote regions. Despite energy access being pursued through concerted efforts and occupying priority at every policy level,

these figures are set to reduce by just 2.5% by 2020 under current techno-centric pathways (Parajuli 2011; Prakash et al. 2011). Focusing the research on rural areas thus enables an exploration of contexts that are likely to remain pockets of energy, development and sustainability challenges and conventional fuel dependency unless more sociological informed approaches are employed (Edenhofer 2011; DiMuzio 2012). This includes means to bolster the effectiveness of decentralised energy that the International Energy Agency calculates must provide over half of all energy services to reach the UNDP's 2030 target and preventing the risks of 'locking-in' to unsustainable energy systems (Hakes et al. 2011; IEA 2011).

Furthermore, by including communities in the research, this thesis engages closely with actors increasingly acknowledged as essential for enhancing sustainable development (Cuthill and Fein 2005; McDonough and Davitt 2011) and contributes to key areas in development theory and social science. This includes participation, conventions, social diversity, resources and their collective normalisation and institutionalisation (Bourdieu 1989: 21-22; Thrift 2002). Following these influences of innovative energy projects took the research to dimensions, actors and institutions throughout the energy and development fields. They juxtaposed the limited effectiveness and legitimacy of models uncritically following canons of stakeholder inclusivity and participation, even those within the latest post-Rio+20 wave of approaches, and community projects increasingly being the outlets for development efforts without the structural relations of 'community' and their influence for technology engagement and equity and effectiveness of outcomes being interrogated (Bäckstrand 2012; Biermann et al. 2012).

To facilitate addressing these research needs, this thesis included 11 months fieldwork in Nepal through a qualitative analytical framework in which a range of stakeholders were purposefully selected to include the diversity of actors and experiences seldom considered in-depth and collectively. A social practice and ethnographic-informed approach pursued through an epistemology of research as a subjective, co-constructed processes requiring ongoing attentiveness to positionality, participation and dynamics, supported this. It afforded a lens and methodology to enhance considering the contingencies of 'access' and how they are operationalised and (re)structured in everyday life. It provides the first extension of contemporary social practice theory to 'energy access' research, advances the theory's relevance in developing world contexts, and illustrates how such a framework offers conceptual and tangible guidance for access and sustainability pathways.

1.2. Research aims and objectives

Energy access research and interventions have been focused on technological, econometric and institutional-level parameters and actors and relatively accessible populations. Understanding the demands of energy access, dynamics of change and sustainable development and multiplicities of knowledge, means of expression and participation, necessitate alternative approaches. Those that have started to do this, however, have been predominately quantitative and overlooked the multi-level interactions influencing energy access and sustainable development. This includes a consideration of how knowledge, agency and outcomes are variously situated and may be as much embodied, engrained and implicit as rational, objective and material (Best and Maier 2003; Bhatia et al. 2014). The result has been a neglect of, and resounding need for apprehending, the wider dimensions and processes of agency embedded in the said and unsaid, the hegemonic and excluded, the affective and visceral and how these are constructed, mobilised and contextualised in nuanced, politicised and normativised ways (Plainly 2001; Anthias 2002: 511). From these research needs and problems, this thesis explores the following research aims and objectives:

Research Aims

This thesis aims to develop insights that may progress understandings of, and frameworks for, enhancing the access to, and equitable operationalisation of, modern energy services for improving sustainable development. The empirical focus is rural and remote regions of less developed countries, where the problematic is most pronounced, and through this platform, the thesis also aims to advance insights applicable to both advanced and developing economy contexts through evaluating relevant theoretical and practical paradigms whilst linking the analysis to broader issues of access, consumption, development and sustainability. In order to achieve this, the following research objectives (RO) will be addressed:

RO1 To evaluate the characteristics of 'access' required for enhancing sustainable development outcomes.

RO2 To scrutinise the details of these characteristics to advance understandings of these in relation to key theoretical and practical paradigms for innovations and development.

RO3 To investigate what enables and constrains these characteristics and how they come together to enhance energy projects, services and trajectories for sustainable development.

RO4 To advance a conceptual framework that supports understanding and developing these characteristics and outcomes in both research and implementation to enhance sustainability pathways and sustainable development.

These objectives are supported by considering the role energy plays in everyday lives, routines and societies. This is where energy and other key resources, innovations and commodities are located and consumed, but also modified and maintained. This social perspective thus provides a neglected yet instrumental starting point from which to more fully consider what energy and access mean for consumers and how they also signify key yet overlooked producers, managers and suppliers. By taking the social seriously in these issues we can hence also gain a deeper insight into how these may vary, be embedded and unequal, but also dynamic and the diverse implications of this. For matters of consumption, sustainability and sustainable development, key to this is how the social is operationalised and impacts over multiple domains (technological, environmental and human), scales (spatial, temporal, contextual, experiential, subjective, intersubjective and systemic) and forms (discursive, symbolic, non-discursive actions). Through this, the thesis opens the energy access and development paradigms to new considerations, aiming to thereby explore and substantiate alternative pathways for advancing energy approaches and sustainable development.

1.3. Thesis structure

The thesis is presented in eight chapters. The thesis starts with a literature analysis to lead the research towards key theoretical and empirical considerations for making valuable contributions to energy access debates and pathways (Chapter 2). A theoretical chapter follows this (Chapter 3), followed by a methodological chapter (Chapter 4), building on the insights raised from the literature analysis that culminates in the need to approach the research from a distinctive ontological and heuristic basis. Three empirical chapters follow this (Chapters 5, 6 and 7) with a concluding chapter (Chapter 8) bringing the thesis to a close. The progression of this thesis will now be further outlined to introduce the key threads of the narrative and how they come together in the following discussions.

Chapter 2: Energy ‘access’ for sustainable development? Towards conceptual & empirical insights.

To start progressing energy pathways for sustainable development, this chapter zooms out beyond conventional energy access thinking to consider what can be learnt from a range of sociological, technological and developmental theoretical frameworks and empirical studies and what further insights can be derived by exploring their points of convergence, divergence and neglect. The chapter brings together an extensive yet complimentary array of frameworks and findings to enhance the insights that may emerge. It results in a lengthy chapter yet one that illuminates key implications hitherto overlooked or not considered collectively in energy and access frameworks specifically and sustainable development more broadly. Points raised include the need to reconstruct notions of ‘access’ and ‘development’ to dynamic entities that reflexively embrace the circumstantial capabilities, needs, feelings, knowledges and social and physical environments of the prospective beneficiaries. The accord of conceptual and empirical insights signals that this is best achieved by co-constructed pathways fostering ongoing social and experiential learning, interaction, improvisation and normalisation and a social constructivist approach that supports this within research and project development.

Chapter 3: Conceptual Framework: A Social practice approach for energy access & sustainable development.

Chapter 3 outlines the potential of a social practice theory for contributing to energy access and sustainable development research and practical implications. The discussion starts by summarising some key insights emergent from the preceding chapter and what this signifies for going forward. This section leads to the prospect of furthering current understandings and pathways by utilising a social practice approach. The chapter then outlines the approach from the perspective of what it offers for energy access and sustainable development thinking. The discussion is divided into four parts. Firstly, a basic overview of the origins of the ontology and what constitutes a practice is outlined. This introduces three broad strands of practice theory and highlights the strand that most aligns with the objectives and initial insights of the thesis that will be the main form of the theory the thesis utilises and demonstrates for the study of energy projects and sustainable development.

The next section outlines how the formation, maintenance, modification and decay of practices and the relationship of practices to other practices provides compelling grounds for better understanding processes of sociomaterial interaction, normalisation, conducts, capacities and their structuration and how innovations and interventions may or may not function, impact, co-evolve, scale-up and endure. This discussion highlights how a practice theory supports the research needs and energy access and development considerations through yielding insights into positionality, process, power and context and the relationship between these. The final section of the chapter pulls together the insights discussed into collective implications for supporting the following empirical analysis.

Chapter 4: Research Design

This chapter outlines the methods that were used to conduct the research and analysis of this thesis and the epistemological orientation that shaped this process and considerations throughout it. The epistemological approach of knowledge as co-produced and sociomaterial, in conjunction with the reemphasised research needs and gaps, sets the basis for the research design. After articulating this, an overview of the overall design is presented, further contextualising the methodology employed through discussing the research location in relation to previous studies and work experience in sustainable development in Nepal. Further considerations for conducting research in the region are highlighted with reference to development and academic literatures and prior fieldwork experience in Nepal and India. An outline of the qualitative methodology is then presented, together with how it led to a number of substantive themes and the value of exploring three of these in-depth as part of three empirical doctorate chapters. Issues of research ethics, access, positionality, data validity, the nature of the research encounter, accountability, transparency and challenges are points of discussion throughout the chapter. A more detailed discussion of these brings the chapter to a close in fitting preparation for the following three empirical chapters.

Chapter 5: From energy 'access' to energy use in rural Nepal

The first empirical chapter sets the scene of the daily reality of energy in the three case study communities. The chapter tells the story from the perspective of the communities' energy practices, starting with a broad overview of the energy practices that emerged since the communities received community electricity and illustrating the notable patterns within the

suite of practices. The overview indicates that achieving equitable sustainable development through energy access relates to much more than the material provision of community electricity, even if electricity is the most potentially empowering form of energy. The overview is supported by considering what influences the patterns, employing quantitative statistics as an initial indicator and relating the findings to wider empirical literatures. This gives a broad sense of energy access as patterned within the socio-technical tapestry of social life.

The chapter then zooms into a core trend of the energy ‘access’ patterns for its consistency across the case studies and considerable implications to sustainable development: the low use of innovations by women and especially in relation to not abating the gendered collecting and consumption of wood for cooking and its related impacts. Honing in on this provides conceptual and empirical insights that orbit around the emergent importance of overlooked factors in access and development research and pathways, taste and sensory knowledge, and their role in practices and geographies of difference and the conservation of these through being interdependent on sentimental and symbolic attributes of these over time and space. This affirms the value of in-depth examinations of the qualitative specifics of innovation use and non-use and how these interlink micro-scale details and interactions to broader structures of influence, such as at the societal, project and national levels. The emergent importance of taste and emotions to these also demands closer consideration of the social nature of key components and structures for what are typically technological focused projects and sectors.

Chapter 6: From energy access & use to management in practices

From considering how energy access translates to implications in everyday life, the thesis then explores how these implications may be sustained over time through what emerged as a key limitation of previous frameworks and examples reviewed in Chapter 2 and as a substantial component of the case study examples: management. Through focusing on how effective electricity management was achieved and limited in the case studies, this chapter unveils insights for providing long-term service provision and wider development benefits in rural communities. The insights contribute to key concerns within sustainable development, including how to support effective participation, collaborative working, social support and self-sustaining development benefits with diverse communities on unequal playing fields to the market and state actors to which the projects relate.

The arguments are enhanced by considering the practices that influence the management and outcomes of the projects and how these relate to, and built upon, meanings, skills, relationships and norms within the communities. The chapter shows that utilising and developing these were essential to enhancing the effective emergence and management of the projects. The chapter then illustrates that social groups without those elements required for certain practices are inadvertently excluded from effectively conducting those practices and realising the related benefits. This highlights gendered and institutionalised challenges.

Chapter 7: Emotionality & the sensibilities of sustainability

The penultimate chapter pulls together key threads intrinsic to the nature of energy access in the communities by focusing on a recurring component throughout the case studies that significantly influenced the provision, management and sustainable development outcomes of electricity in the case studies: emotions. Like the multi-sensory nature of practices and consumption routines expounded in Chapter 5, the emotional component of everyday life and development is notably absent in dominant sustainable development considerations and its significance in the case studies supports enriching the conceptual and empirical contributions developed in the thesis. It does this by considering the role emotions played in both achieving energy access and resisting it and what conceptual and practical implications this signifies for energy access and development frameworks.

The chapter introduces the discussion by outlining how the role of emotions have been framed in other pertinent social and development theories and how my empirical findings suggests a reading of emotions as socially constructed and socially agential. The chapter then discusses how collective emotions were instrumental to driving collective actions that were pivotal for overcoming key energy and sustainable development barriers of remoteness, transportation, cooperation and financing through catalysing community demand. The next section discusses social emotions as an agent in social resistance across within the case studies. The second half of the chapter considers resulting theoretical and pragmatic implications of this. Discussion points relate to how social emotions implicate social agency, identity, difference, place, belonging, order, discourse and action and how a closer consideration of the role of emotions within these may support a richer understanding of social conventions, needs, capabilities and sustainable development.

Chapter 8: Conclusion

The final chapter summarises the findings and insights discussed in the thesis, highlights the contributions made to key debates and understandings and then distils these into core theoretical, methodological and practical implications for enhancing energy access pathways for sustainable development. Through the shifting focal lens throughout the research analysis, the thesis provides contributions and implications that speak to both local development projects, actors and micro-dynamics, and to larger-scale interventions, actors and considerations. These relate to how energy access and sustainable development are plural, complex, ongoing endeavours whose contingencies are constructed, (re)negotiated and become socio-technical over diverse scales through the course of everyday social routines for which multiple actors are complicit. The thesis predicates the need for multi-level, inter-actor policies that engage with the interdependent, embodied and non-rational dimensions of social actions, resources and exchange for augmenting sustainable development.

Finally, the chapter emphasises the value of using social practices as an overarching conceptual framework for this and supporting effective energy transitions and sustainable development. Drawing upon the thesis findings and contributions, empirically demonstrates the distinctly empowering framework, unique in encompassing the complexities of social and material organisation and change, and that certain dimensions within this, such as sentiments and the sensory, are suitable for further expansion within practice approaches. The thesis closes with final remarks that capture the essence of the core findings, suggesting avenues and optimism for further research and means to enhance access and development pathways through co-produced practice-approaches.

CHAPTER 2

Energy 'access' for sustainable development? Towards conceptual & empirical insights

2.1. Introduction

There are many ways of 'doing development'. The burgeoning drive for energy access for sustainable development signifies a crucial moment, and a unique lens through which to review development frameworks and articulate alternatives. To start this, it is necessary to examine what the principal sustainable development frameworks look like and what insights they may offer for addressing access and development barriers. Accordingly, the first part of this chapter investigates six particularly influential development models, focusing on their formative insights and shortcomings. Doing so engages with key debates and literatures, illuminates tensions, gaps and implications that may better support access and development endeavours and articulates the consistent neglect of the extent to which sustainability interventions demand adaptation in the lives of people and communities.

The second part of the chapter, therefore, interrogates framings of innovation uptake to augment insights from the initial review of frameworks. The insights over the two sets of analysis are then brought together in considering implications for conceptualising 'access' and approaching sustainable development. This informs and advances both conceptual and methodological approaches to the study of these. This exploration and integration of insights from across a range of theoretical and development practice traditions to inform and advance theoretical and practical approaches to development and sustainability is distinctive yet of recognised value (cf. Ingram et al. 2007; Jabereen 2008; Shove 2012). It accentuates the need for revised paradigms encompassing eclipsed opportunities and insights into what these should entail for furthering subsequent development research and approaches.

The chapter is organised as follows: the next section 2.2, critiques the dominant rational-actor development approach followed by an analysis 2.3, of alternative approaches for energy access and sustainable development. These signify that, argued in 2.4, instrumental insights lie in considering development approaches in terms of innovations. Conventional and alternative theoretical innovation frameworks are then evaluated in 2.5. The final section

considers the overall implications derivable from these frameworks, concluding that ‘access’ and sustainability require further empirical exploration and ontological support through aligned with the routinised nature of everyday agency, innovation and impacts.

2.2. Dominant approaches to energy access & development: Creating sustainability or perpetuating barriers?

Energy access has been an ongoing yet fluctuating development agenda since development strategies were first being articulated in the 1950s (Goldemberg et al. 1985). Attention to energy access, however, exploded recently following the UNDP selecting it as its core focus for 2012 and the following decades in its global 2030 campaign (Cook 2011; UNDP 2012a). Without significant approach advancements, however, a billion people are expected to remain without electricity by 2030 (IEA 2012; UNDP 2012b). This exacerbates sustainability deprivations and vulnerabilities, especially for remote and marginalised communities, accenting the urgency of analyzing access paradigms (Pachauri 2010: 200; AEPC 2012; Bhattacharyya 2012).

Energy systems show considerable variance. Those in London, Berlin, Chicago, Delhi and Kathmandu, for instance, supplying the same thing, electricity, are highly diverse viz-à-viz their contexts, applications and pathways (Sovacool 2010: 8). Their generation capacities, security, mix, financing, ownership, distribution, management, governance and impacts, for instance, all differ (Hughes 1983; Granovetter and McGuire 1998). The lesson from this is that ways of ‘doing’ energy access may differ (Cherp and Jewell 2010; Nierz 2010). Their large-scale centralisation, however, is consistent. Yet within these prevailing modes are alternative systems that broaden the options for energy access and challenge the conventional wisdom of centralised approach superiority in the developed and developing world alike (Nouni et al. 2008; Sovacool 2012). A look at variations in approaches may thus suggest insights over multiple contexts, not least development transitions in rural and remote areas.

The predominant approach remains technologies deployed through a ‘technology push’ modality (Biggs 1989; Chidamber and Kon 1994). This method reflects the dominant development, diffusion, knowledge creation and behavioural change paradigm that inform interventions: technocentric, technocratic, supply focus rather than use and underscored by positivist framings of technology and individualistic rational consumers (Ellis and Biggs 2001;

Bogers et al. 2010). With the imprimatur of influential institutions and policies such as the World Bank and Agenda 21, respectively, the paradigm promotes the understanding that innovations offering relative advantages will inevitably be adopted and achieve the intended outcomes regardless of the users context (Kimberly and Pouvoirville 1993; Fitzgerald et al. 2002). It presupposes that intervention success is guaranteed if technological and economic parameters are satisfied (Abrahamson et al. 2014; Mecure et al. 2014). This deterministic reading of development continues to direct research and energy access policy despite contradicting experience (Louw et al. 2008; Howels et al. 2010).

The practical result has been interventions focused on technical provision rather than wider concerns (Bhattacharyya 2013; Alstone et al. 2015). The overarching approach is subsequently one of supply-side technological research, development and deployment, supplemented by external market, 'expertise', and structuration (Green 1992; Coombes 2001). This model, although stemming from problematized neo-classical economic theory and Western policy², is maintained in neo-liberal economics, institutions and development models and employed in all sectors (Korpi and Palm 1998; Prudham 2004: 276). This confines projects within narrow, uniformly defined normative framings and 'official' parameters at the expense of "the great heterogeneity of actors", inequalities and opportunities (Dosi 1988: 229; Ellerman 2001: 3). This extends to doctrines of sustainable development (Redclift 2005; Robeyns 2007).

Foreclosing insights and improvements in this way, despite the model's failure to achieve sustained use and intended outcomes, contrasts with interventions open to both social and material domains (Pattanayak et al. 2003; Levine and Beltramo 2010). The result has been exacerbating inequalities, resource and development constraints and overlooked effects, substantiating concerted calls to challenge the results, mantras and frameworks of development and being "developed" (Parpart 1995: 221; Pieterse 2000: 175). Consequently, there is considerable demand to consider alternative development approaches (Apthorpe 1997: 27; Prahalad 2012)³. We now embark on this for the goal of sustainable development, defined in this thesis as enhancing equitable and ongoing social and environmental wellbeing that meets the pluralistic needs of diverse societies and environments. This definition enriches the economy focus symptomatic of the orthodox three-ring sector view (environment-society-economy) of sustainable development that sustains binary thinking contrary to the crucial interdependencies indicated in this chapter (Constanza et al. 1991; Dasgupta 1995).

² Widely problematized (e.g. Young 1993; Elson 1997; Hulme & Edwards 1997: 4; Gasper 2002; Muntaner et al. 2001; van Staveren 2001; Hall et al. 2004: 2; Escobar 1992; 2001a; 2005).

³ For wider expansions on the weaknesses of development theory, method & application, see (Said 1989; Sachs 1992; Escobar 1995; 1997; Mohan & Stokke 2000; Hemment 2004; Kothari 2005).

2.3. Alternative approaches to sustainable development

The dominant paradigm overshadows an array of alternatives. This section discusses eight influential models offered as alternatives to the dominant model and its shortcomings. The purpose of the discussion is to unravel insights for enhancing energy access and sustainable development approaches from a range conceptual frameworks and to consider their relative merits and pitfalls for advancing further research and access and sustainability pathways. The discussion encourages the reader to observe that many of the frameworks and insights are complimentary, that there is no consensus as to which model is superior, and the approaches and their popularity have evolved over time yet harbour certain limitations and gaps.

There has been an increasing consideration in development studies of the need for conceptual frameworks that more fully frame the complexity of contemporary development challenges and how to practically attend to this. Early work in this vein focused on technologies, markets and needs, particularly viz-à-viz smallholders⁴. Although usefully illustrating the differential and contextualised forms of these (Bhalla 1979), they often followed essentialist readings that eclipsed the dynamism and complexity of development (Luft et al. 2010: 44; Conley and Udry 2010). The focus thus soon shifted to the importance of diverse stakeholders, services and social forms of information, capacity, learning, support and expertise (Nkonya et al. 1997; Duraisamy 2002).

This shift was reflected in models that increasingly framed social processes, users, networks and institutions as key agents in development (Pattanayak et al. 2003, Djurfeldt et al. 2005). It represented a critical departure from linear conceptualisations of determinist change and predefined interventions and fixed technologies ‘transferred’ to achieve this. Instead, approaches were informed by an increasing regard for interactor participation, collaboration and co-production (Besley and Case 1993; Parthasarathy and Chopde 2001). This change in emphasis highlights the importance of social, systemic and nuanced factors that affect innovations, especially under conditions of uncertainty, inequality and change (Loorbach 2010; Ross 2010). These factors include ‘localised’ experience, functioning, maintenance and governance (Wakeman 1995; Hodbod and Adger 2014).

⁴ (E.g. Weil 1970; Wills 1972; Khan 1975; Binswanger 1978; Gafsi & Roe 1979; Feder et al. 1985).

Significantly, the popularised ‘localised’ term viz-à-viz development pathways is a command for utilising the circumstantial, transformative processes of daily life wherein interests and interventions are continuously re-negotiated and reformed in social rather than spatial terms (Hutchinson 1996: 28), developing and affecting in routines rather than “on the ground” (Hutchinson 1996: 28; Acre and Long 2000: 189). This renders external approaches, innovations, meanings and so forth necessarily mediated and reconfigured in some way (Long 1989; Hobart 2002), predicating in-depth studies and pathways (Zerriffi 2007; Neiz 2010) beyond central domains and processes, such as markets, policies and states (Thompson and MacMillan 2010; Hall et al. 2012). In summarising eight influential alternative approaches in five subsections, we see this social mediation and context as informing key variables between the alternative frameworks. These approaches are tabulated below to ground the following discussion that, rather than a definitive list of frameworks, signifies tensions and overlaps that may aid access pathways if collectively explored.

Table 2.1. A selection of models related to achieving sustainable development.

Alternative approaches to development	Core points
Capabilities approach	Focus on what individuals are able to do & supporting their capabilities to perform activities that support their welfare subject to differential social needs & compound nature of welfare & substantive freedoms.
Basic needs approach	Certain needs are elemental to an individual’s wellbeing. Focus on aiding these across societies.
Rights-based approach	Social justice is primordial. Includes legal, political & economic rights. Build & hold accountable the institutions influencing these.
Appropriate technology approach	Technologies & their use influence social & environmental wellbeing. Provide technologies that support this in relation to the specific contextual demands.
Business-based models	Development requires multiple actors. Market-driven schemes enhance range of actors & tap into consumer demands & ability to pay (financial or in-kind) for necessary services.
Nexus approaches	Certain services, forms of consumption & challenges influencing development are particularly interdisciplinary. Work across those sectors to enhance development efforts.
Partnership approaches	Multiple stakeholders influence development. Collaboration between them supports innovation, mutual goals & addressing common problems. Partnerships support this.
Community-based approaches	Development challenges are highly contextual & socially influenced. Citizens are agents in development. Support their agency & outcomes through collective capacity building, intervention planning & implementation.

Source: Author

2.3.1. Capabilities, basic needs & rights-based approach approaches

The capabilities approach, most closely linked to the works of Nussbaum (2001) and Sen (1990; 2003), makes significant contributions to development and access thinking by illuminating the importance of pathways focusing on subjective needs and their capabilities to achieve these related to socially embedded, structural inequalities, such as illiteracy, gendering, education and role distribution (Gasper 1997; Dreze and Sen 2002). The emphasis is thus on the vulnerable dictating their own development trajectory, rather than 'outside' interpretations neglecting needs and the processes that sustain them (Sen and Nielsen 1996; Kerzner 2013). Moreover, in explicating various 'valuable capabilities', such as nourishment, choice and freedom, and wider capabilities of 'happiness' and friendships, the neglected importance of social deprivation, emotional wellbeing, means and ends is brought to the debate (Alkire 2002: 255; Nussbaum 2003b). At its most progressive, the normative approach contests passive, utilitarian framings of needs, actors and ends and makes explicit that capabilities are ongoing processes subject to norms, predicating active, contextualised social participation, capacity building and (re)structuring (Nussbaum 2001: 2; Alkire 2005: 172).

Thus, development can be interpreted as products of both "doings and beings" (Sen 1990: 114), aligning neatly with the importance of simultaneously embracing and debating symbolic and physical access process, embedding and outcomes and what development is and should be (Lovins 1976; Gigler 2004). Consequently, it challenges both the conventional conceptualisations and evaluations of development (Gasper 1997; cf. UNDP 2012a; World Bank 2014) and enables these to be enriched by equating goals to rights and capabilities as means to secure them (Nussbaum 2003a: 37-39). Indeed, the relationship between capabilities, entitlements and functions and how these are conditioned takes the gaze of development to both public and private spheres that includes the typically neglected sites, junctures and ethics of the domestic and market (Levin-Waldman 2001: 82) whose requisite interrelations have long been suggested (Polanyi 1966: 43; Durkheim 2014: 215).

The widely applied model, however, sustains limitations (Alampay 2006; Zheng 2007; 2009). These relate to emphasising specific capabilities and functions rather than collective structures and agency (Sen 1999a: 116; Stewart 2005). Hence, although it usefully acknowledges these in highlighting capabilities depend on 'conversion factors' that include the 'social' (laws, public policies etc.), 'environmental' (infrastructure, resources etc.) and 'personal' (gender, literacy etc.), it masks their interdependencies and the co-construction of

the very needs it highlights, marring its applicability in practice (Sen 1999a: 249-260; Glover 1995: 5). As Giri (2000), Gasper (2002) and Dreyfus (2014) highlight, this includes underplaying skills for wellbeing and development and the necessity of interlinking the performance of diverse functions for redressing needs (Sen 1999a: 75; Walsh 2000). Nor does it account for choice being conditioned by perceived relative advantages shaped by the social, and that gender, emotionalities and institutions, inter alia, moderate these perceptions (Wagner 1976; Doz and Wilson 2012). This masks the complex nature of perceptions and how they may relate to disabling disconnects between stakeholders and misperceptions and ambivalences towards (normatively) advantageous forms of behaviour and change (Ingold 2000; Cass et al. 2010).

Similarly, the approach's emphasised "adaptive preferences" - what one 'has reason to value' - tend to influence interventions and their outcomes in ways missed by common applications of the approach (Gasper 2002: 28; Zheng and Walsham 2008: 227). The capabilities framing thus fails to fully resolve dominant paradigm constraints whilst being susceptible to the latter to incorporate the former without making substantive changes (Gore 1997; Nussbaum 2000; Robeyn 2005: 24). Yet it does lead to a useful debate about justice for reframing energy access.

Embracing certain capabilities and functions as prerequisites for development coalesce in interpretations of energy as intrinsic to achieving essential human needs. This builds upon burgeoning political, moral and justice framings of energy for sustainable development (e.g. Walker and Day 2012; Jenkins et al. 2016). Sovacool and Dworkin (2014) provide a comprehensive account of philosophical framings to energy justice to date and for energy access finds form in the 'basic needs' approach. This focuses on the household provision of a predefined unit of energy required to meet these predefined needs, namely lighting, heating (cooking and space heating), livelihoods and communication (Pachauri 2011). These support meeting the basic needs defined in wider 'basic needs' approaches, such as nutrition, shelter, clothing, health, and education (Sen 2004; Zheng and Walsham 2008).

The link between these and an energy baseline has been sought by correlating per capita energy consumption with a proxy for these, the Physical Quality of Life Index (PQLI), derived from aggregating infant mortality rate, life expectancy, and literacy (Pachauri et al. 2004). Relatively high PQLI's typical of industrialised countries are reached with consumption rates of 1 to 1.2 kW (Goldemberg et al. 1985). Above this rate, PQLI correlates with very marginal increases while below it PQLI are substantially lower. Consequently, one tranche of energy access approaches focuses on providing 1 kW per capita, reminiscent of rights, justice and 'needs first' development approaches (Cornwall and Nyamu-Musembi 2004; Gready 2008).

This approach is compelling insofar as it spotlights the link between energy consumption and welfare and opens a debate on what 'access' should be (IEA 2011; Bhanot and Jha 2012), however it has notable caveats. It eclipses the variance of needs, their link to subjective wants, normative definitions and constructed capabilities, the significance of the nature and multi-spatial applications of fuel consumption to meet multiple ends and the embodied energy of goods and services (Madon 2004; Pachauri 2010: 197-198). The 'total energy access' benchmark aims to rectify this latter issue⁵ (Pachauri & Spreng 2011; Practical Action 2012), however still downplays the intrinsic necessity of embedding modern energy carriers with equitable and contingent end-use practices and capabilities to routinely perform them.

Following this logic, recent energy access proposals advocate rights-based approaches (Tully 2005). The additional value of this approach to the former two is highlighting the need for gender sensitivity, equitable participation and multi-actor accountability and thereby emphasising inter-household and community considerations as well as wider regulatory mechanisms and institutions (Gross 2007; Danielsen 2012). Such concerns have given rise to new organisations emphasising these, such as the Global Gender and Climate Alliance, WGC and WECF. Akin to needs-based approaches, however, rights are commonly reduced to legal rights and material provision rather than deeper structural, emotional and moral dimensions (Kahneman et al. 1999; Pogge 2002). Such embodied and normative factors, and the processes that underlie them, may help explain why marginalised rights-holders, such as women, often have limited perceptions of being such and how to realise them (Goetz 2006). The reductive framing of the shaping and embedding of capabilities, needs and rights and the complexity of development and responsible actors thus renders these approaches insufficient for this thesis and, as Robeyns (2003: 67–8) cautions, requiring additional social theories to aid their operationalisation⁶.

⁵ Expands the definition of energy needs by underscoring individual energy requirements pertain to enhancing services across the domains of household, employment and society and include electrical, cooking and mechanical power rather than providing only one of these and in only one domain.

⁶ For further discussions of rights-based and capabilities approaches and how these require refining to better support wellbeing and sustainability enhancing thinking and programmes see Gready & Ensor (2005), Robeyns (2006) Copestake & Wood (2007) and Copestake (2008).

2.3.2. Appropriate technology

Including social choice, equity, autonomy and application dimensions related to the specific social and physical environment, the appropriate technology method is both an influential ideology and model for development that counters some of the constraints of the above models (Thormann 1979: 283). Born of Schumacher's (1973) 'small is beautiful' doctrine, it highlights development 'solutions' as being spatially and temporally contingent requiring contextualised innovations that may be effectively used and managed throughout society so that interventions may engage the masses and extend benefits throughout a population rather than exclusively (Cornish 1974: 276). As such, the approach advocates designs utilising 'common materials', resources and methods that are 'locally friendly' in relation to boosting incomes, employment, productivity and welfare (Stewart 1985: 28; Schumacher 1973: 153-155 175). Consequently, applications of the approach are often people and purpose-orientated and promote decentralised, inclusive, 'locally meaningful', small-scale, simple methods linked to self-sufficiency, robustness and sustainability (Akubue 2000; Ray and Jain 2013: 24-9).

Accordingly, the ideology and approach relates to extending indigenous capabilities, functions and activities and is often employed for rural development (Pellegrini 1971: 2; Long 1980) and in concert with other concepts aimed at enhancing these goals, namely open-source strategies, Village-level operation and maintenance (VLOM), Gandian village industries development and Buddhist economics (Heeks 2008)⁷. In integrating these dimensions, the appropriate technology approach is hence compatible with renewable energy technology projects for community and sustainable development and the language of both economics and engineering whilst counterposing their oversights of social autonomy, application, context and sustainability (Zelenika and Pearce 2011; Zahnd 2013). Conversing with these discourses, the approach may hence support energy access pathways allied with enhancing local interpretations, hybridisation and practices (Escobar 1995: 19) and considerations of technology, innovations, markets and development as socio-technical ensembles dependent on social contexts, communities and practices (Akubue 2000; Bovaird 2007).

⁷ For more on these and the links between Gandian development and Buddhist economics see Dunn (1978) & Kaplinsky (1990). Evans & Adler (1979) & Hazeltine & Bull (1999) provide further examples of the appropriate technology approach. For more on the merits of open-source approaches viz-à-viz energy access and sustainable development, see REEP (2013).

2.3.3. Business-based models

Financing the long-term provision and maintenance of development services together with engendering their sustainable consumption and benefits are pervasive impediments for enhancing sustainable development (Bazilian et al. 2011a; Benchimol 2012). The barriers tend to relate more to the social than monetary, state and technical (Zerriffi 2007). Energy access is archetypal of this (Liming 2009; Shyu 2012). Yet there is also a severe funding gap for achieving universal energy access (Rodriguez-Sanchez 2010). Collectively, it reinforces the requirements of broadening and interlinking the actors and approaches involved in sustainable development and refining them to suit the capabilities and constraints of each specific yet dynamic context (DiMuzio 2012; Bhattacharya et al. 2013).

In Nepal, for instance 25% of approved rural energy projects eligible for government subsidy have been delayed or not implemented due to communities being unable to access credit through insufficiently adapted finance institutions via-a-viz the predominately agrarian-based and social nature of rural economies and support systems (Mainali and Silveria 2011; 2012)⁸. China's rural energy access success shows, in contrast, that developing local companies, cooperatives, banking, markets and inclusive income-generating practices and appliance supply chains facilitates overcoming this (Barnes and Floor 1996; Dincer 2011). These are now being fruitfully emulated elsewhere, including in Nepal, and show particular value for boosting energy-led sustainable development in broad contexts through interlinking these with business-based energy delivery and management models developing and employing them in conjunction with innovative financing mechanisms (Zerriffi 2011a; Birol 2012; Yadoo and Crishank 2010).

Those that incorporate many of the above insights, such as socio-cultural, socio-economic and material culture context, have shown to be particularly effective for overcoming these barriers and spurring substantial sustainable development outcomes (Prahalad 2004; Panapanaan et al. 2009). Business models for energy access and sustainable development have accordingly become a focal point of research and development (Parthan et al. 2010). The projects awarded funding in recent Renewable Energy and Energy Efficiency Partnership (REEEP) rounds and emergent companies and NGOs focusing solely on innovative financing for sustainable development and energy access reflect this (e.g. SunnyMoney and IREDA).

⁸ Includes social networks, guarantees, non-monetary exchange and limited and variable liquidity and savings, prohibiting high one-off cost expenditures that typify consumer-side commodity costs in rural contexts (Banerjee et al. 2011; Bensch et al. 2013; Groh 2015).

Socio-technical contextualisation appears key to the success of these models, marking significant distinctions from the dominant development paradigm and discourses of non-willingness to pay (WTP), mispricing risk and reducing low income groups to ‘unbankable’, too remote or too poor (Schroeter and Martin 2008)⁹. Examples of approaches surmounting these include business models utilising social relations for self-sustaining, low-cost, flexible and responsibly used and managed revolving funds to overcome the ‘first-cost’ barrier of access (Chaurey et al. 2012), enabling managing household electricity costs in rural Botswana and Namibia and expanding community micro-hydroelectricity projects in India (Martinot et al. 2002; Stage and Fleermuys 2001). Crowd-funding, public data, management, means-based tariffing, and additional considerations presented in Appendix I, provides further means for augmenting venture financing and key commodities to the poorest communities, as well as enhancing engagement with energy issues and technologies more broadly (Zerriffi and Wilson 2010; Bazilian et al. 2012; Kaplan 2013). Thus, although decentralised energy costs tend to be user-centric (Glemarec 2012), integrating social, government and market mechanisms and actors can mitigate this and pervasive development constraints whilst enhancing outcomes beyond costs and risk (Lemaire 2009)¹⁰. This signifies the potential of market-based models to extend ways of being sensitive to the social specificities of energy implementations.

2.3.4. Nexus & partnership approaches

Integrative frameworks support this focus on sector and activity interconnections. ‘Nexus’ approaches do this by recognising sustainable development as dependent on inter-domain consumption patterns and their multiple actors and intersections (Dasgupta et al. 2005; Weitz et al. 2014). Through this, development change requires mediating interactor interlinkages into forms that reproduce alternative resource relationships (Peronne and Hornberger 2014). It allows making sustainable development the principal focus, rather than certain sectors at the expense of others, and giving precedence to forms of society, exchange and impact that best achieve this rather than undermining it for privileging dimensions described within ‘economy’ (Lawrence 1996: 64; Giddings et al. 2002). This allows a shift in thinking about and actioning resources, needs and consumption from technocentric and siloed approaches to

⁹ Studies reveal households without energy access typically pay US\$3-15 per month more for energy than those with, indicating a significant WTP for energy that others indicate is augmented for electricity (GEF 1998; Angel-Urdinola & Wodon 2007; World Bank 2000; 2004; OAI 2011; Sesan et al. 2013).

¹⁰ Further exemplified in 2.6 and by Elsen (2012), Jannakc (2013) & Dornan (2014). Indeed, electricity use enables long-term monetary savings and superior services. Kerosene lights, for instance, often cost ¼ of a family’s income in LDCs, considerably more than lighting from renewable energies such as SHS, & for adverse effects, quality & volatile supply (Balint 2006; Zerriffi 2011a; Jumbe & Mkondiwa 2012).

socio-technical processes and interdependencies (Loza 2004; Norris 2005; Wolf 2008).

The value of such a shift is articulating mutual relationalities between sites, resources and modes of doing and exchange that appear formative to daily life and energy access and may be revealed through their substantive interconnections, such as those at household and village levels, especially in rural contexts (Waddock 1989; 1991; Nelson and Zadek 2000). This better enables overcoming interlocked development constraints, minimising trade-offs and illuminating related pathway synergies (Peronne and Hornberger 2014). Crucial interdependencies include those between environment, economy and society (Giddings et al. 2002), energy, water and food (Hoff 2011; Howells and Rogner 2014), energy, gender and poverty (Sen 2001; Clancy et al. 2004) and households, family and work (Lambert 1990; Krüger and Levy 2001). They harbour insights for thinking about interdependencies, agency and complicity that support or subvert sustainable development (Tracey and Anne 2008: 70).

Integrative approaches accost this through working across domains and actors. This allies with certain cooperative partnership models¹¹ and calls for holistic pathways to sustainable development that incorporate interdisciplinary, multi-level stakeholders and open-ended methodologies embracing the dynamism and complexity of development challenges¹². Approaches can thus gain from mobilising the substantive lessons from within these fields. These include maintaining appropriate sharing of responsibilities between complicit actors as diverse as government bodies, civic organizations and local communities across the scales related to the issue (Baland and Platteau 1996; Hartman et al. 1999). Thus, ideally the approach co-evolves through complimentary collaboration and capacity building around a co-defined problem between the actors affected and responsible, rather than via conflictual obligations, institutions or political forces (Conroy and Litvinoff 1988; Forsyth 2010).

These principles are embedded in various sustainability paradigms¹³, post-Rio Earth Summit 1992 community-based natural resource management (CBNRM) approaches and the partnership models formalised at the 2002 World Summit on Sustainable Development, especially the now ubiquitous multi-stakeholder and cross-sector partnerships (Ostrom 2002; Biermann et al. 2007). Such approaches have made headway in addressing diverse sustainable

¹¹ The partnership typologies of this chapter underscored the variability of the form, function and outcomes of 'partnerships'. Persuasive scholarships explicating this and the pitfalls of participation include (Selsky & Parker 2005: 850; Biermann et al. 2007; Martens 2007: 4; Mert 2009; Ibnouf 2011).

¹² (E.g. Morgan 1996; Austin 2000; Googins & Rochlin 2000; Pieterse 2001; Costanza 2010).

¹³ E.g. include ecological modernisation theory, governance & innovation theory, socio-technical change theory & ecological economics (Hartman et al. 1999: 25; Folke et al. 2005; Van Huijstee et al. 2007).

development problems, from energy, water and health development and management¹⁴.

Nexus thinking insights can thus draw from a multiplicity of perspectives to illustrate the 'collaborative advantages', broadening purview and interconnections required to address interactor complexities characteristic of development challenges (Agyeman et al. 2002)¹⁵. It facilitates sustainable change through social considerations and forms of multi-stakeholder collaboration (Bazilian et al. 2014), yet is unclear about the forms of, and mechanisms through which, such interconnections and strategies, although context-specific, are best forged. Learning from partnership experiences and capability approaches, those that reflexively account for the differential positions, powers and practices of stakeholders may be necessary to become an 'action lever' for sustainability (Murphy and Bendell 1997) rather than another 'policy paradigm' (Richter 2003: 9; Pattberg 2003: 56).

2.3.5. Community-based approaches

Allied with contextually embedding interventions and forging links between public and private sector actors, communities are increasingly invoked as necessary partners for sustainable development, constituting the 'real experts' of locally unfolding development problematics and the sites wherein resources, resilience and strategies can be most effectively augmented (Craig and Mayo 1995; Rogers and Weber 2010). Accordingly, as epitomised by adaptive, resilience and livelihoods approaches, communities are seen as vehicles for best representing, and responding to, the multi-dimensional and uncertain nature of development challenges (Chambers and Conway 1992; Solesbury 2003). Indeed, many have expounded that the unique nature of communities renders them instrumental for signifying and engendering development needs, resources and transitions with reduced uncertainty due, in part, to their wider variety of knowledge and related dynamics (Hemmati 2002)¹⁶. Morsink et al. (2011) demonstrate this in the context of energy access and add that communities are essential for tailoring and interlinking projects and actions over diverse agendas, contexts and 'communities' particular to their specific customs and social settings (Heap 2000; Bäckstrand 2006).

¹⁴ (E.g. Israel et al. 1998; Farrington et al. 1993; Leach & Pelkey 2001; Mehta & Heinen 2001; & Gallis 2006).

¹⁵ The resulting lock-in effects, path dependency & transition challenges affects energy access as this thesis increasingly depicts. For more on the relationship between sector and actor interdependencies and embedding see (Unruh & Carrillo-Hermosilla 2006; Urry 2006; Hartman et al. 2002; Toke 2011).

¹⁶ Often unique compared with other organisations and actors with respect to mode of expertise, conducts, governance, membership, ownership, flexibility and bonds (Lee & Cole 2003; Rondinelli & London 2003; Brohamanna et al. 2007; O'Mahony & Bechky 2008; Dahlander & Frederiksen 2012).

This sets the basis for community-based approaches premised on interactor learning and capacity building through ongoing social inclusion as intrinsic for integrating marginalised voices and practices for broadening development legitimacy, support and suitability (Hollander and Leroy 2001; Woolvin and Hardill 2013)¹⁷. Thus the models, from adaptive management, 'Participatory Learning and Action' (PLA) to CBNRM, advocate cyclical iterations between policy, implementation and intervention and institutional revision on the basis of ongoing multi-actor interaction and dialogue for feedback, learning and reflexivity attentive to ethical and political dimensions (Olsson et al. 2004; Arora and Romijn 2009)¹⁸. Such approaches utilise perspectives and tools of those directly affected by development interventions as well as conventional 'experts' and scientific methods (Mohan 2002)¹⁹. The resulting multiple resources and social user engagement, including actor relationships and collective capacities, can provide a milieu that reduces tensions between stakeholders, enhances valuable learning and bonds, and augments problem-solving innovations (Von Hippel 2005; Elzen et al. 2004). Collective groups and group-based methods bolster this²⁰.

Approaches that enhance these interactions and interconnections can thus transcend traditional limitations to development (Allen 1997, Shalley et al. 2004). Community-based approaches provides a framework for this, supported empirically by instantiations of active, collective, deliberative processes, such as the work of empowered leaders and community groups, augmented when interactions are both 'horizontal' (trust and reciprocity) and 'vertical' (formalised rules and relations) (Scheraga et al. 2000; Olsson et al. 2004). Participation must hence permeate scales, institutions and boundaries (Stringer et al. 2006) and foster non-hierarchical relations, socially 'local', 'indigenous' knowledges, and relational, 'experiential expertise' throughout these (Agrawal 1995; Cowe 2004; Gaventa 2004)²¹.

Yet such relations, resources and ability to contribute and benefit from them are seldom socially equal. 'Community', as a concept and a development approach, often obscures this through framing a social structure within which all aspects are uniform. Without focusing on multi-level, multi-form and structured inclusion, learning, capacity building and methods,

¹⁷ Reinforced by Bandura (1963), Reinicke (1999; 2000); Stringer et al. (2006).

¹⁸ For an extensive review of participatory methods for policymaking & project development, covering over 100 public engagement mechanisms, see Rowe & Frewer (2005).

¹⁹ Although key insights from these approaches are presented in this chapter, a further review of these influential approaches are beyond the scope of this thesis. For this, see Berkes et al. (2000), Chambers (1994; 2007) & Armitage (2005), among others, for extensive accounts of adaptive management, PLA & CBNRM, respectively. Broader discussions are provided by Rakodi & Lloyd-Jones (2002).

²⁰ For diverse examples, see (Ray 2002; Woolcock & Narayan 2000; Wiersma & Devine-Wright 2012).

²¹ Integrating 'local' knowledge, practices & systems marks a core theme of SD & sustainability pathways galvanised since the works of Brokensha et al. (1980), Richards (1985) & Hobart (2002).

therefore, community involvement and ‘participatory processes’ can reflect the objectives and means of the powerful, the elite capture of public goods and services and an exploitative, undemocratic use of local-resources (Geurts and Mayer 1996; Glasbergen 2007a).

Development approaches and researchers must thus interrogate structural, often obscured avenues and constraints for enhance development pathways. Effective elections to promote downward accountability and benefit sharing may mitigate these yet require challenging the assumptions of ‘community’ itself, and the contingencies of participatory approaches. This thesis does this throughout all stages of the research, starting with emphasising an understanding of ‘community’ as a processual structure often subsuming dynamic yet embedded and unequal differences between members²². Failing to do so, despite ‘frenzied’ interest in participatory methods, can reflect and enhance embedded inequalities, imposed demands, agendas and control (Fung and Wright 2003: 191; Van Huijstee et al. 2007: 79).

Community-orientated models, when critically approached, thus align with ‘nexus’ thinking to push pathways towards the tensions and systemic yet localised assets and deficits that effective change must mobilise and negotiate. Recurrent examples of these for energy access include local information networks, manufacturers, suppliers and technicians for reducing maintenance and user costs and enhancing consumer trust, energy choices, practices and benefits (Allderdice and Rogers 2000). Moreover, broad studies suggests that framing these complexities of participation, communities and power may be invaluable for enhancing sustainable development (Cone 2000; Islam et al. 2006; Taelle et al. 2007). They also appear instrumental for enhancing project cost-effectiveness, social resilience and energy developments (Guijt and Shah 1998: 4; Fraser et al. 2006). Finally, community considerations also align with evidence that social bonds and WTP enhance interventions and relate to the demand for and quality of the service (Nieuwenhout et al. 2001; Walker and Shannon 2011).

The five subsections and eight approaches thus underscore the importance of approaches attentive to intersubjective needs, relations, experiences and capabilities and how these are constructed, mediated and embedded over multiple dimensions, domains and actors

²² ‘Community’ is a variously defined term within development, sustainability and social science discourses. It is commonly used to signify a fixed spatial or administrative scale or a fluid, relational scale of common interactions, activity, interests, values, or a social group distinguishable by shared aspects of one or more of these. I use it in the latter sense and highlight its intersubjective, socially constructed and dynamic nature that can simultaneously be a source of social unity and empowerment, contention and exclusion. Supporting this definition and for further notable expansion on these points, see (Berkes 1989; 2004; Gladwin et al., 1995; Mosse 1995; 2001; Lave & Wenger 2002; Bouwen & Taillieu 2004; Dasgupta and Beard 2007; Walker & Devine-Wright 2008; Walker 2011).

(Verganti 2008; Wilson et al. 2012). It exemplifies the value and outstanding need for frameworks encompassing these pluralities and processes. These are developed further by turning to an underlying yet similarly narrowly framed and argued component: innovations.

2.4. Reframing development pathways in terms of innovations

Innovations are key components of addressing sustainability and development challenges (Milbrath 1989; UNDP 2016c). Their form and process, however, carry significant implications for development pathways (Blumenthal 1976; Glass and Saggi 1998). Energy access epitomises this, introducing populations to potentially bewildering arrays of new technologies, concepts, norms and working modalities. Failing to sufficiently account for these has rendered development approaches subject to a pervasive paradox: the low take-up and unintended consequences of innovations replete with relative advantages (Prahalad 2012; Bensch et al. 2014). This prevails over diverse boundaries and renders the success of interventions under the de facto model objectively limited (Lewis and Pattanayak 2012)²³.

Classic examples include the reticence to adopt electricity and telecommunication in North America during the twentieth century despite the rapid uptake of other innovations over the same period (Nye 1999: 191; Pinch 2001); the prevalence of the QWERTY keyboard when more efficient versions exist (Rogers 2010); and failed health innovations in remote communities (Wellin 1955). These examples illustrate the embedding of common innovations, effects and resistance within daily lives (Katz and Shapiro 1986). Yet these may be particularly prone to the diffusion dilemma (Dixit and Pindyck 1994; Metcalf and Hassett 1999). The paradigmatic case viz-à-viz energy access is the low transitioning from fuelwood cooking, the primary energy source for over 2 billion people and a significant cause of human and environmental degradation (Troncoso et al. 2007; Bielecki and Wingenbach 2014). Frameworks failing to address the uptake paradox thus exacerbate a development and sustainability 'rift'²⁴.

The empirical paradox suggests the modern energy access revolution in the Global South will meet the same development barriers unless the problematic is challenged. Indeed, despite the history of development portraying the profound extent of this paradox entrenched by the neoliberal development paradigm, its framing and mechanics remain contested, especially in

²³ Prevails over dominantly held boundaries of spatial, temporal and sectorial domains (e.g. Feder et al. 1985; Cohen & Levinthal 1990; Attewell 1992; Bensch et al. 2001; Hanna et al. 2012; Barnes et al. 2014).

²⁴ See, for instance (Howath & Stanstad 1995; Pretty 1995; Ansar & Sparks 2009).

sustainability contexts, and have crucial implications for development research, programmes and outcomes (Williams et al. 2009)²⁵. Moreover, the theoretical hegemony is antithetical to provisioning for complexity and dynamism, underlining the necessity for alternatively framed change pathways to reflect this (Sterling 2010)²⁶. This warrants innovative and conjoined conceptual and empirical evaluations of the diffusion problematic and their implications for enhancing sustainability pathways (Meyer 2004; Boons et al. 2013a). We now discuss these.

2.5. Approaches to innovations

2.5.1. The dominant diffusion paradigm: a paragon of development theory

Despite the diffusion dilemma, the dominant approach remains unaltered since the turn of the twentieth century: technologies promoted as the anodyne for development challenges (Hughes 1972; Hart 2001)²⁷. This paradigm is legitimated and applied in international development predominantly through the ‘central source of innovation’ model (Biggs 1989) and the transfer of technology (TOT) approach (Byerlee and Pingali 1994). These conceptualise innovations as complete following external production via affording primacy to materiality and uptake as inscribed in an innovation’s rationally normative ‘benefits’ and technological parameters (Green 1992; Mecure et al. 2014). This drives technocentric, supply-side innovations assumed to inevitably create relative advantages and external ‘fixes’ via linear adoption regardless of the users and their contexts (Kimberly and Pouvourville 1993; Fitzgerald et al. 2002).

Innovation design, objectives and procedures hence become imposed, universalist and black-boxed, mirroring the existing workings of development institutions that embed them (Hamilton 1995; Ely 2014). The appeal of this framing is hence that development can be entirely achieved by centralised and incumbent actors, structures, processes and modalities (Diamond 1996). Exemplars include the development and deployment of western technologies, research methods, *laissez-faire* markets, top-down governance and heavy expenditure thereon (Hagmann et al. 1999; Sachs 2005). This ‘techno-rational’ approach is

²⁵ See also, Mokyr (1990), Swan & Clark (1992), Heiskanen (2005), Greenhalgh et al. (2004).

²⁶ Also (Franzel & Wambugu 2007; Morlacchi & Martin 2009; Schillebeckx et al. 2012; Karakaya et al. 2014).

²⁷ The agrarian ‘Green Revolution’ is a seminal exemplar of this and its limitations for international and sustainable development (e.g. Farmer 1973; Lipton & Longhurst 1989; Evenson & Gollin 2003).

accordingly widely replicated, from energy access (Alstone et al. 2015) to environmental strategies (Rydin and Pennington 2000; Ellis and Biggs 2001)²⁸.

Principal contentions with this approach centre on its blinkered view of what diffusion may involve and result in that reinforces an approach overlooking contexts, applications, ‘misuses’ and modifications (Helm 2003: 349). These appear instrumental for take-up, needs and impacts (Sen 1999b; Castree 2006). Indeed, consumers seldom conform to perfect rationality and standardisation misses the dynamism, contextualisation and diversity required for sustainable development (McFadden 1999; Mitchell 2012). Yet through prefiguring programmes, performance metrics and evaluations on individual purchase or acquirement of an innovation, the unintended consequences of use and impacts, non-deterministic and often unequal, are untested and exacerbated (Guy and Shove 2000)²⁹. The techno-gaze thus risks bifurcating development to spectacularized “subjects” and “objects” that eclipse the manifold actors, positions, voices and dimensions of wellbeing and sustainability (Chow 1992: 105; Escobar 2011: 191). The diffusion paradox thus illuminates the socially situated development challenges, constraints and needs overlooked under conventional approaches (Barrett and Browne 1994; Ross et al. 2010). Accordingly, we now consider alternative frameworks.

2.5.2. Towards (re)framing innovation appropriation: insights from alternatives framings

The ontological and pragmatic hegemony of the dominant diffusion model contradicts the diversity of fields that have focused on the variable pathways of innovations. Notable examples include branches of economics³⁰, marketing, communication studies (Rogers and Kincaid 1981), science and technology studies and sociology (Tarde 1903; Ryan and Gross 1993). Collectively, they underscore that diffusion is highly contingent rather than a linear, technological invariant: social, spatial, temporal and somewhat disorderly variables are also instrumental and innovation pertains to all dimensions of the social and physical environment (Katz 1961: 70; Kline and Rosenberg 1986). An array of models have been proposed to better

²⁸ Further examples of the limitations of this development and diffusion approach, see (Costanza & Folke 1997; Easterly 2006; Forsyth 2010; Levine & Beltramo 2010; Manuelli & Seshadri 2014).

²⁹ Argued further via viewing the technocentric model as extending colonial hegemony. Occurs via interlinked symbolic power, performed practices and “development narratives and knowledges” (Mercer et al. 2003: 420), such as of ‘us’/‘them’, ‘modern’/‘tradition’, ‘developed’/‘underdeveloped’, ‘superiority’/‘inferiority’, expertise/lay (Said 1989; Dirks 1992; Goldsmith 1997; Kothari 2005).

³⁰ Such as evolutionary economics (Arthur 1988; Dosi 1999; Nelson & Winter 2009), development economics (De Mel et al. 2008; Cohen & Dupas 2010; Grimm & Treibich 2014) and economic historians-cum-political scientists (Schumpeter 1942; & Rosenberg 1974).

explain this. Evaluating these suggests further requirements of development frameworks for augmenting sustainable development. These are exemplified through eight approaches, summarised in Table 2.2, critically selected for the following discussion for the range of ontological and pragmatic implications they represent.

Table 2.2. The principal premises and practical implications for enhancing effective innovation uptake derived from eight influential constructivist and relational theories.

Alternative uptake models	Principal ontological precepts	Practical Implications
Diffusion of Innovations	Innovations are diverse, uptake is socio-technical, occurs via ongoing co-production & socialisation. User trailability & reinventions vital. People have different uptake abilities.	Communication channels and socio-material 'climate' of the society in question key. Innovation must suit these and user participation vital. Uptake both processual & structural.
Technology Acceptance Model	Individual perception & uptake tied with behaviours, attitudes, beliefs, context of innovation's usefulness & ease of use.	Innovation use & performance quality Key. Model easy to apply. Overlooks unconscious & non-rational factors.
Learning Selection	Iteration, coaction, learning & revision between designers & users key.	Co-evolution starts from social users. Social learning via experience key.
SCOT	Social & technological factors equally important. Uptake is social, contextual & co-produced. Meanings key.	Must consider user-producer interactions & how these are socially mediated, contested & located.
ANT	Agency & uptake by social & material, systemically related interactions of co-construction, (re)translation, (re)structuring & (re)alignment.	Must consider inter-scalar relational effects & processes. Hard to define network, processes & to implement. May speak less readily to SD actors.
MLP; Innovation Studies; & History of Technology	Uptake sociotechnical processual & active. Organisations their environments key. Innovation must become systemically interrelated through interactions across three scales: niches, regimes & landscapes. Scales constitute analytical levels. Consumer practices, meanings, civil society & relational dynamics key.	Niches, suggests value of innovation support & 'spaces.' Institutions important for influencing practices, interpretations & rules. Social roles, relationships & location important. Support interaction between these 'levels'. Agency unclear & focus on hierarchical relations, a key organisation or key individual.

Source: Key developments in innovation diffusion debates according to my engagement with the range of literatures.

2.5.2.1. The 'diffusion of innovations' model

A fitting starting point is Rogers (2010) seminal 'diffusion of innovations' model. This influential framing of the uptake process introduces a number of divergent insights from the technocentric tradition. Its central propositions are that innovations encompass new ideas, practices, artefacts and techniques and that their uptake or rejection in any society over time is a contingent social and technological endeavour requiring communication (Rogers 2010). From this perspective, the analytical and practical purview for effective innovation diffusion is the socio-material context of the society in question (Rohrbach et al. 2005). Achieving this requires continuous and bespoke evaluations that include the nature of the adoptees, social system and communication channels through which interpretations of innovations may travel.

These are notable distinctions to the dominant paradigm yet enables a reading of agency and primacy as individualistic and technical through its focus on diffusion as a product of individuals' rational decision-making deduced relative advantage à propos an innovation's degree of compatibility, trailability, observability, complexity and reinvention (Rogers and Shoemaker 1971). These five attributes, however, are widely substantiated uptake variables, especially when evaluated over time (Ryan and Gross 1943; Tarde 1963; Dirksen et al. 1996), supporting the increasing interdisciplinary regard for user-led reinvention for successful uptake and development (Emrick et al. 1977; Ferlie et al. 2001).

On a societal level, the theory makes a compellingly exemplified account of differential stages of diffusion and nature of adoptees that determine an innovations' rate and degree of adoption. Key implications are that innovations experience decision-making, take-off or rejection, adaptation and re-evaluation; these influence the extensiveness of diffusion and occur in a five-stage process - knowledge, persuasion, decision, implementation and confirmation - that may be particularly influenced by certain individuals (e.g. opinion leaders, "cosmopolites", and entrepreneurs) and the system in which they are embedded (Rogers 1963: 219). This predicates considerations of the differing attributes of individuals and societies as well as governing bodies. As Mansfield (1961) and Robertson (1967) instantiate, these characteristics influence the rate and extent of uptake and have noteworthy interrelations that influence the effectiveness of intervention efforts³¹.

³¹ For extensive examples see also Katz (1961), Rogers & Bhowmik (1970), Valente & Davis (1999); Rogers (2010), Greenhalgh et al. (2004), Shipan & Volden (2008); Dearing (2008), (2009).

Implications include dispelling uptake uncertainty via increasing innovation trailability, and that most effective mechanisms for this occur early in a project and relate to social norms and interpersonal interactions (McPerson et al. 2001; Meijer 2014). Focus is on how these vary according to the degree of social similarities (homophily) or diversity (heterophily), intervention stage, uncertainty and that these affect, and are affected by, the systems in which they occur (Rogers 1963: 283; Rostila 2010). The crux of this model, notwithstanding the noted limitations - others include the models inconsistent interpretations and applications (Katz et al. 1963; Downs and Mohr 1976) - is nudging innovation debates to theorisations that integrate processual and structural considerations (Burt 1992; Gibbons 2004; Choi et al. 2010), paving the way for a burgeoning social constructivist field from the 1970s.

2.5.2.2. Technology acceptance model (TAM)

Following the epistemological developments of Roger's model and answering some of its limitations, the technology acceptance model (TAM) marks an influential shift to the diffusion debates by putting further emphasis on the human and consumptive dimensions of innovation use, performance quality and broader contextual variables that shape them. It conceives of diffusion as primarily a matter of perceptions of the innovation's usefulness and ease of use as subject to the interlinkage of consciously intended behaviours, attitudes, and beliefs subject to external variables (Davis 1989). These include capacity building, culture, roles and meanings (Bourdenave 1976), increasingly evidenced as influential for diffusion³².

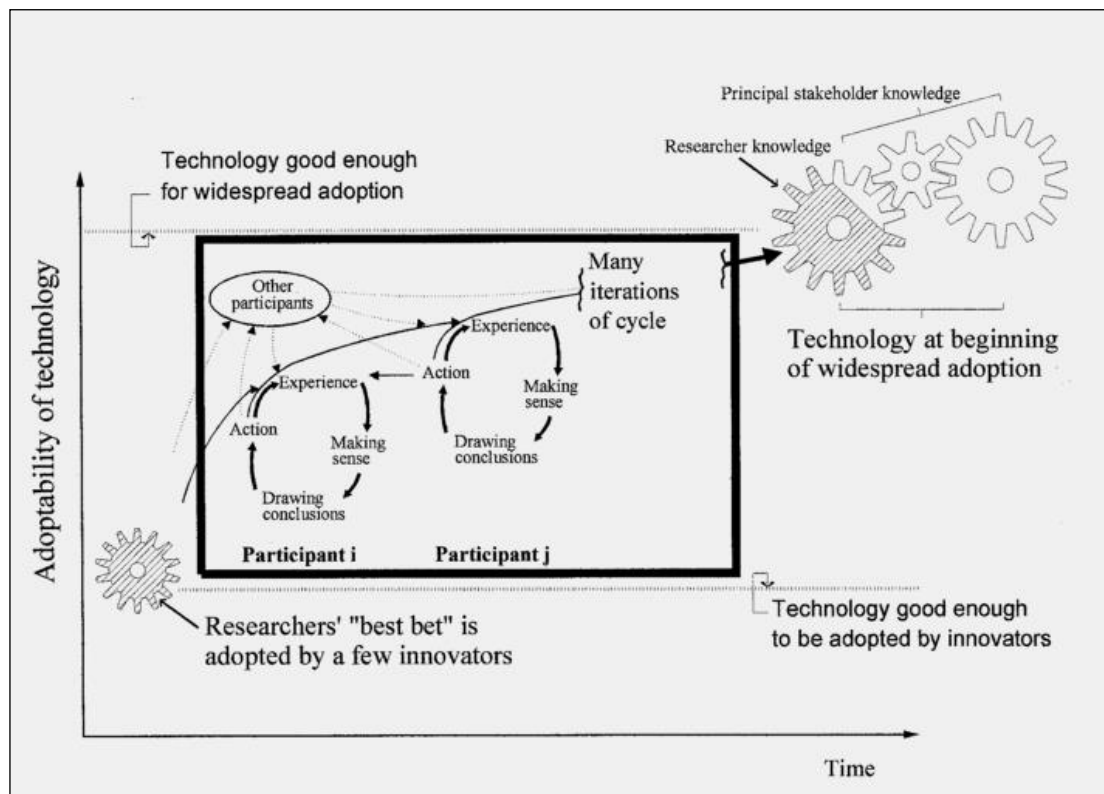
Further, in focusing on fewer variables than its Rogerian predecessor, its advocates underscore the model's greater heuristic 'ease of use' that may include additional variables as necessary (Igbaria et al. 1995). This spurred user-facing research that revealed the importance of consumer agency, satisfaction, emotions, norms and capacities to use for effective diffusion (Venkatesh 2000; Marsden and Mullen 2014; Orr et al. 2015). The uptake gaze thus shifted from technological implementation to socio-technical collaboration. The 'learning selection' model further epitomises this shift.

³² (E.g. Abrahamson 1991; Uhlin 1993; Heinrich 2001; Al-Jabri & Sohail 2012). See also Appendix I.

2.5.2.3. 'Learning selection' model

The learning selection model explains uptake in a society as co-evolution through iterative interaction and refinement between designers and users (Douthwaite et al. 2001). The collective process, depicted in Figure 2.1, commences via trailing by an enterprising cohort. This overcomes wider social risk, interpretations and experiential barriers via society and designers learning from the experiences of the innovation users and adjusting the innovation to meet contextual requirements emergent through social use.

Figure 0.1. The learning selection model



Source: Douthwaite et al. (2001).

Empirical support for the process includes various agricultural innovations (Douthwaite et al. 2002a; 2002b) and tangential evaluations and conceptualisations of the diffusion process. These include anthropological, socio-technical and innovation study framings emphasising 'learning by doing' and participatory co-creation (Minniti and Bygrave 2001; Malerba 2002; Hatch and Dyer 2004). Equally notable is that these are supported by conventionally polarised

fields of economics and sociologies (Moran 2002; Prahalad and Ramaswamy 2004) and considerations in both domains of dimensions hitherto kept exclusive, such as emotions for enhancing productivity through effective co-production (Kelley et al. 1990; Zaltman 1997).

These conceptual developments emerge as empirically significant yet the above models provide negligible guidance on how such dimensions and processes are ordered, especially those that help or hinder the emphasised processes, such as user-producer co-production, social learning and reinvention. Insights to these are advanced by certain structural theories.

2.5.2.4. Diffusion insights from structural theories: Sociologies of technology & multi-level theories

A final significant theoretical component of the diffusion literatures are accounting for structural dimensions. We now briefly consider four for their contributions to diffusion debates and towards an improved framework for sustainable development. Firstly, the Social Construction of Technology (SCOT) perspective addresses previous models' constraints by treating the social, technological and their functioning in the same symmetric, impartial manner (Mackenzie and Wajcman 1989; Grint and Woolgar 2013).

Secondly, although SCOT principally focuses on how innovations *develop* rather than *diffuse*, it usefully explains diffusion as intrinsic to the development of an entity. SCOT, therefore, affirms the social-shaping notion first added to the debate by Rogers' reinvention and taken further by the learning selection model yet adds greater sophistication to this contextualised co-production through notions including 'interpretive flexibility' (Pinch 2003; Bijker et al. 2012). This flexibility may vary at sub-cultural levels over time and space, allowing an innovation to be embedded in social meanings and thereby employed by social groups with contrasting identities and frame of references (Trevor and Pinch 1986; Kleinman 2005). Hommells (2005), describes this in terms of 'ways of thinking' becoming entrenched and constituting obdurate diffusion-determining elements where social meanings are elementary for the shaping, 'stabilisation' and success of a technology.

Accordingly, SCOT articulates the significant role of users and non-users through the ongoing negotiation and co-generation of innovation meanings in society that renders a product that will be suitable, widely used and diffused *if* integrated in design (Klienman 2005). As SCOT's

consideration of the mutual development of bicycles and cycling indicates, designers that consider a common functional user purpose or practice (e.g. commuting) within the wider socio-political milieu may enhance the extensiveness and inclusivity of an innovation's diffusion (Pinch and Bijker 1984; Bijker 1997). SCOT's final vital contribution is explicitly demanding a more textured understanding of how culture shapes the co-generation and diffusion process and who may or may not be involved (Klienman 2005; Bijker 2010).

For ANT, innovations and diffusion emerge through a human-nonhuman network and actors therein (Latour 1987). Concurrently, for diffusion to occur and its impacts to persist, networks need to be created, expanded and maintained (Latour 1991; 1992; Elias et al. 2003). This occurs through (re)defining and (re)configuring their alliances, identities and actions (Callon and Latour 1981). Whilst highlighting the iterative, interactive nature of diffusion, therefore, its distinctive focus is on 'system building' and restructuring processes through changing or embedding relations between actors (Lee and Brown 1994). In this 'translation' process, relations are the primary concern, although three other notable considerations include the interrelated nature of scales and meanings, their mediation between and within networks, and agency as both elemental and systemic (Callon 1980; Callon and Law 1985: 485).

These mark the primary contributions of ANT to framing diffusion, allying with considerations of various network-effects, such as of heterogeneity, thresholds and interlinkages. Influential examples include 'the strength of weak ties' (Granovetter 1985) and the 'social core' (DiMaggio and Powell 1983). They emphasise structural effects of innovation, especially important for innovations with ambiguous merits, that influence how many and when potential adopters might cause 'bandwagons' and 'tipping points' that mobilise rapid and major diffusion (Leibenstein 1976; Granovetter 1992; Abrahamson and Rosenkopf 1997)³³. Despite these contributions and extensive empirical applications for diffusions³⁴, ANT's unit of analysis – a network of actors constituting a phenomena – suffers from being especially hard and subjective to define and its symmetrical approach risks further obscuring analytical focus, as well as power differentials, the marginalised and excluded, and hindering identifying key points for enhancing intervention (Miettinen 1999; Law 1999; Law 2009).

Others add further challenges of the approach, such as derived narratives privileging the non-human and reflecting the idiosyncratic consideration of scale and how groups within a

³³ See also (Kimberly 1981; Granovetter & Soong 1986; Burt 1992; Adebayo 2009; Pine et al. 2011).

³⁴ From food choices (Mol & Mesman 1996) and the embedding of IT, medical & automobile innovations (Bloomfield & Danieli 1995; Robertson et al. 1996; Cottle & Ashton 1999; Prout 2008) & systems of production, governance & supply (Callon 1980: 126; Renting et al. 2003; Rydin 2013).

network are represented and mobilised (Fox 2005: 861; Whittle and Spicer 2008; McFarlane 2009). Thus, although anything is a product of its components' collective functioning and interaction (Foucault 1984: 93), focusing on the processes within a system rather than a uniform consideration of material, human, relations and network, may more fully support practical insights and implications (Deleuze 1988: 102; Thévenot 2001a: 57)³⁵. This may include which component is most agential, how to mobilise change and embed doings (Schatzki 2001: 209) and the significance of 'cultural' (Mackenzie and Wajcman 1999), external, political and transient variables (Noble 1979; Kimberly and Pouvoirville 1993).

Insights into these factors are advanced by certain transition theories; most pertinently the history of technology framing (SCHOT) and the multi-level perspective (MLP). Collectively, they yield four significant insights. Firstly, they affirm diffusion is processual and active rather than passive and determined and occurs within a macro-scale system only through the innovation's interrelation with a range of non-technological factors (La Porte 1991; Summerton 1994). Hughes' (1979; 1987) work on SCHOT, for instance, argues that enduring uptake and change requires binding a range of variables - social, economic, political, scientific, technological - into an interrelated, 'seamless web' (Mayntz and Hughes 1988).

Geel's (2004; 2005; 2011) MLP, like evolutionary and interpretivist theories³⁶, also entails these elements yet makes prominent consumer practices, cultural meanings, civil society and the horizontal and vertical dynamism, interdependency and ordering of these across local (niche), meso and macro scales. These interactions are subject to codified rules and procedures, signifying key diffusion and transition mechanics, particularly for sustainability (Elzen et al. 2011; Raven and Geels 2010). SCHOT and MLP thus attend to the social and co-constitutive processual-structural nature of systems by framing these as cause and effect of action (Geels 2002a; 2002b). The MLP does this further in framing how the components arise and transmute through collective action impacting across the levels within a spatially and temporally variable system (Elzen and Wieczorek 2005; Geels and Schot 2010).

MLP thus provides a mechanism for how diffusion may occur that is skirted by development and diffusion theories yet may advance intervention approaches. It denotes the need for innovations to become embedded within the heterogeneous, contextual system that guides activity and is co-constituted by it (Smith et al. 2005; Geels and Kemp 2007). This account is

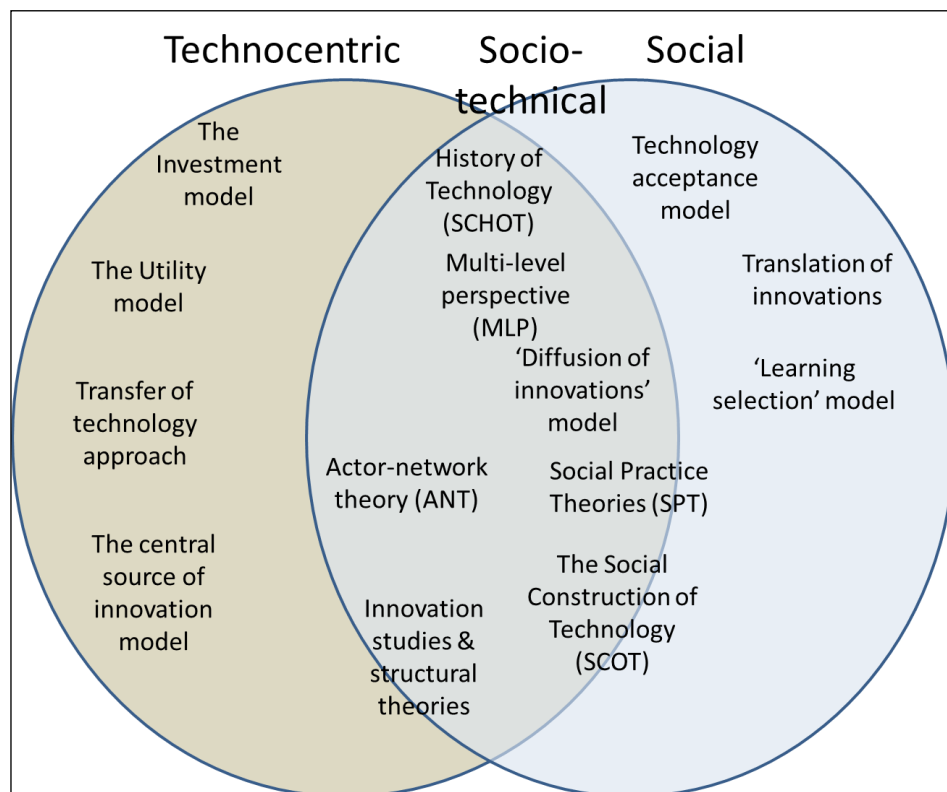
³⁵ ANT thus reinforces that agency is relational yet evokes the material agency debate: the degree to which materials inscribe social outcomes. For more on this, see, for instance, Law (2009) and the 'Epistemological Chicken' discourse led by Collins & Yearly (1992), Pickering (1995) and Wynne (2003).

³⁶ (e.g. Sewell et al. 1992; Geertz 1994; Nelson 1995; Rip & Kemp 1998; Geels 2002).

consistent with various prominent structural and innovation theorists³⁷. The latter field of innovation studies encompasses the contributions of MLP and is additionally significant for highlighting the role of organisations, rules and positionality (Martin et al. 2012; Fagerberg et al. 2013). Although problematically privileging vertical relations and processes (Shove and Walker 2007: 768), they thus usefully underscore the significance of co-constituted elements, processes and setting, and power-related access to these (Zaltman 1973; Daft 1982).

Additional conceptualisations offer limited further insights, except complexity studies, underscoring the adaptive nature of processes (Fonseca 2002; Plsek 2003; Greenhalgh et al. 2004). The theoretical landscape characterised in this discussion is presented in Figure 2.2.

Figure 0.2. The uptake of innovations: a characterisation of the theoretical landscape



Source: Derived from thesis literature analysis.

The sum of these scholarships is that innovation demand and diffusion is not a “given” (Verganti 2008: 14), it requires continual embedding in a lived system through the provisional interactions of diverse variables co-constituting and occasioned by human activity (Geels

³⁷ Including (Lévi-Strauss 1963; Orlikowski 1992; Luhmann 1993; Strang & Meyer 1993; Dosi et al. 1988).

2006; Ellingsen et al. 2007). This is widely manifest, from the social diffusion of electrical lighting and internet systems, to the inhibited uptake of renewable energy innovations³⁸.

Uptake is contingent, therefore, on social actions that are, by virtue of their provisional interdependencies, iterative, dynamic and socio-technical (Freeman 1987; Ford and Gioia 1995). 'Users' are hence vital yet variously constrained (Von Hippel 1998). Critically, however, the requisities of these actions, wider influences and means for engineering change have been inadequately hypothesised by the above framings of the diffusion process and only collectively do the insights unpicked in this discussion emerge, risking missing key considerations. Those that orientate us to multi-level dimensions, for instance, eclipse the affective and learning. Indeed, the very diversity of the ontologies carrying specific terms and assumptions render them liable to misinterpretation and disabling for extensive employment in development strategies. Finally, the approaches insufficiently consider innovation resistance, disuse and decay. This affirms the importance of a framework capable of apprehending the contingencies of social (in)action, change and impacts. To further inform this framework, empirical literatures viz-á-viz diffusion are now examined.

2.6. Towards (re)framing innovation appropriation: Insights from empirical literatures

This section discusses notable findings for development strategies from an extensive review of empirical diffusion and development evaluations. For this 100 relevant studies for gaining insights beyond the dominant technocentric parameters were evaluated. This emerged as an appropriate amount to substantiate diffusion and development characteristics influential for sustainability pathways. Studies were included from across areas of development, engineering, design, economics and social, environmental and political sciences. Insights consolidate the contingencies of diffusion and interdependencies of development to further problematize assumptions central to their dominant paradigms whilst overcoming a key weakness in the field: a lack of empirical substantiation and conceptual-empirical alignment (Meade and Islam 2006; Morlacchi and Martin 2009). Through considering these collectively, pertinent lacunae emerge that underline the necessity of revised development frameworks.

³⁸ For scholarship on this, see, for instance, Schot (1998), Rehman et al. (2010), Castells (2013) and Eleftheriadis and Anagnostopoulou (2015), Nygren et al. (2015), and Yun and Lee (2015), respectively.

Firstly, analogous to development framings, ‘innovation’ and ‘diffusion’ are inconsistently defined in the discourses, contrary to required scientific, interpretative and pathway clarity (Whittle and Spicer 2008; Kleine 2010). Concurrently, this thesis defines ‘innovation’ as anything socially perceived as novel by a social group that may include a concept, technique, practice, structure, relationship, tangible object or a combination of these whose components are mutually essential in their contextualised moments of use. ‘Innovations’ thus relate to a component, process, organizational or institutional change (Klein et al. 2003: v), and pertain to diverse domains and scales and to policy, projects and pathways. This integrative definition advances those put by anthropologist Barnett (1953: 7) and sociologist Rogers (2004).

Secondly, the fate of an innovation can be considered in terms of ‘adoption’, ‘dissemination’, ‘acquisition’³⁹, ‘use’ or level of use, inter alia (Fishbein 2003; Gwyer 2008). The thesis shows, however, the importance of *sustained* innovation use for augmenting diffusion and effects. Although the dominant discourses miss this, its co-construction and multiplicities, empirical studies emphasises the need for accounting for them (Lai and Chah 2010; Sovacool and Drupady 2011). This concurs with Barnes’ (1994) critique that only terms encapsulating the active, user-dependent nature of the process suffice. ‘Uptake’ and ‘appropriation’ connote this (Rehfuess et al. 2014), and hence the thesis favours these terms and specifies ‘effective use’ in using them, defined, comparable to Klein and Sorra (1996: 1085), as both competent and compliant use which fulfils the needs and aims of the user and society over time.

Despite this, empirical considerations of uptake largely reflect technical or fiscal-based perspectives. This is at the preclusion of dimensions central to daily life and sustainable development (Moreno and Bareisaite 2015). Studies such as Jacobsson and Johnson (2000), for example, do not conceive users and society as agents in the uptake process and the literatures privilege a narrow range of sectors, innovations and spatialities. Prime foci have been technical corporate and agricultural innovations emanating from Western contexts and rationalistic framings of consumers (Gautam 2000; Chamber 2014). These rely on quantitative approaches limited by focusing on groups most able to invest, predefined categories and narrow metrics divorced from their diverse settings (Watts 1993; Ashley and Maxwell 2001).

This has excluded unexpected outcomes, underlying reasons and marginalised groups where innovations may be most effective for sustainable development (Puzzulo et al. 2003),

³⁹ These terms – also ‘diffusion’ & ‘dispersion’ - imply that innovations need only be distributed to be used by a society & that no work is required for this. Early models employed this rhetoric. Their projects accordingly underestimated the influence of custom, setting, & circumstance & many failed (see Agarwal 1983, Foley & Moss 1983, Manibog 1984, Krugmann 1979; 1997; Mahajan et al. 2000).

especially those that might emerge gradually and towards a unifying framework (Greer 1981: 135; Meyer 2004)⁴⁰. Additionally, although valuable factors are revealed through such studies, dimensions are missed and policy and intervention implications are undeveloped (Greenhalgh et al. 2004; Otte 2014). Others recognise this and, through focusing on neglected dimensions, yield instructive points for development approaches. These are summarised in Table 2.3, in order of their degree of emphasis in the literatures, and subsequently discussed.

Table 2.3. Key empirical literature insights for enhancing sustainable development pathways.

Uptake requisite	Essential points
	<ul style="list-style-type: none"> - Motivations, awareness, perceptions & attitudes. - Socially occasioned socio-technical factors modify interventions, viz., routinised rules, relations, symbolism, interactions, skills & knowledge; ‘social capital’. - Sustained use & management necessary: Experiential & interactive. - Negotiated process. Mitigates unintended consequences & project failure. - Decentralised & participatory approaches support this - Consider context of use & use in context; normative, interdisciplinary & sociomaterial. - Iterative learning & adaptation. - Group-based, ‘social learning’ best. - Drive uptake. Relate to organisational structure & structured interactions.
Risk & Uncertainty	<ul style="list-style-type: none"> - Affects all stages of appropriation & participation. Requires systemic approaches. - Risk is multidimensional & linked to ambiguity of an innovations outcomes. - Affected by resources, including markets, wealth, education & power. - These are rarely equal & hence risk, experiences & effects vary socially. - Subjective levels of ‘acceptable risk’ - Co-constructed & sociomaterial.
Affordable	<ul style="list-style-type: none"> - Underestimated ability & willingness to pay & contribute. - Long-term budgeting required for all costs: assessments, implementation, training, management & extension. Revise structural barriers to these & use consumer capacities. - Up-front costs prohibitive without socially tailored procedures. - Decentralised operation, management & finance often best for SD. - Both established & innovative methods work. – Extends significant market potential.
Compatible	<ul style="list-style-type: none"> - Innovation’s qualities must be <i>perceived</i> as consistent with potential adopters’ needs, values, experiences, capabilities, social norms, ties & material environment. - Requires melding innovation with situated yet processual setting for ‘viability’, functionality & sustainability. - Further understanding & supporting this process & its dimensions essential. – Clear responsibilities, mutual understandings & goals. - Driven by participatory design, use & extension. Multi-actor but society-led.
Power & agency	<ul style="list-style-type: none"> - Power diversely situated. hinders equal input & benefits unless mediated. - Requires detailed appraisal of socio-technical context & processes. - Includes variant priorities, values, demands, skills & expectations. - User age, gender, land rights & marital status can shape resource differentials, practices, meanings & innovation uptake & ends. - Such dimensions are systematised, multilevel and multi-actor. - Equity in outcomes is often linked to equity in decision-making. - Requires these considerations within empowerment mechanisms.

Source: Derived from analysis of empirical innovation and sustainability intervention literatures. An expanded version of this table with citations is provided in Appendix I.

⁴⁰ Emphasised by, inter alia (Carpenter & Gunderson 2001; Uzzi & Spiro 2005; Coenen & López 2010).

2.6.1. Social use, meanings, innovation & learning

The empirical literatures foremost substantiate the importance and interrelation of socially occasioned motivations, views, skills, predilections, needs and capabilities viz-á-viz an innovation's demand and requirements to use, maintain and impact (Barnett 1953; Azjen 1985). It emphasises the suite of 'meanings' required for activities and that perceived relative advantages of an innovation are significant, socially influenced and primarily non-technical (Muggenburg et al. 2012; Bhojavid et al. 2014). Important components for the meanings stressed in the studies include knowledge, information, experience and clarity (Agarwal 1983; Valente and Rogers 1995; Baumgartner et al. 2012). These are socially produced, evidenced by the variance of meanings across socio-economic, spatial and political scales (Schoemaker et al. 1983; Bardhan et al. 2003) and often being asymmetrical to the innovation information and benefits received (Dosi 1988: 229-230).

Meanings, rather than being faithfully translated, thus transmute from social and technological interactions, and much more than interpretative understandings are required for innovation uptake and functioning. Such complexity and asymmetries underpin the dominance of sub-optimal innovations, unequal use and the non-use of alternatives (Rogers et al. 2001; Maijer et al. 2014). Indeed, common meanings of an innovation may only need abide in a sub-group for its uptake within that sub-group and eventual wider appropriation if their meanings affect the use and modification of the innovation (Trevor and Pinch 1986). The critical literature hence stress the significance of 'perception' barriers to uptake as beyond perceptions. This includes barriers when user perceptions mismatch their capacities, requirements and those of other stakeholders and means to successively implement or adapt them within innovation use and maintenance (Gatersleben and Appleton 2007; Bielecki and Wingenbach 2014).

Ruiz-Mercado et al. (2011), Lewis and Pattanyak (2012) and Smith et al. (2015), suggest, however, that disuse is also influential and they interact in an often competitive relationship. This emphasises knowledge-power associations, capital and power dynamics, and insufficiently shared engagement, learning and meanings of the innovation, process and context of use between the developer and society (Long and Long 1992; Tronsco et al. 2009). Such producer-user and user-innovation disconnects includes the know-how and know-why to do something new, appear particularly common in rural, developing contexts (Goodman and

DuPuis 2002; Sparovek and De Maria 2003), and causes low uptake or unintended effects due to inability to contextually use and refine (Walsh et al. 2001; Lyytinen 2002).

Compellingly, the literatures also underline means to overcome this: co-production and co-learning. These require all intended beneficiaries socially using, modifying and learning the innovation in their contexts (Bajgain and Shakya 2005; Mahon et al. 2006). The innovation-society co-evolution may occur 'organically' or be aided by dialogue and capacity building mechanisms (Cole et al. 2013), but the overarching necessity stressed is interactor use, learning and ability to reinterpret, reapply and (re)arrange (Ramani et al. 2012; Magnan et al. 2013). This ongoing co-evolution processes is thus both processual and structural.

Garb and Friedlander's (2014) comprehensive drip irrigation study substantiates this for sustainable development-enhancing innovation appropriation: interlinked user, producer and supplier institutions, support, meanings and complementarily soil, water and crop practices showed extensive uptake and benefits, as in Israel, whereas disconnects between such actors presented extremely low uptake, as in the African context. In Niger, for example, insufficient user motivations, training and regulatory landscape presupposed opposing cultural ideas and routines resulting in most of the 800 irrigation units failing to achieve intended benefits due to misuse, non-maintenance, and abandonment (Garb and Friedlander 2014).

Such findings indicate the interlinked aspects of effective uptake engendered by innovations being incorporated into social routines of use, management and wider interconnected practices (Chhatre et al 2012; Simon et al. 2014). Other studies indicate that this interlinking mechanism is social routines (Matata et al. 2014; Rehfuess et al. 2014). Kennedy and dos Santos' (1998) evaluation solar-powered wells in rural Brazil, for instance, presents that maintenance was only sufficient when its required expertise and enactments were incorporated into daily community procedures, including childcare and sanitation. Ondraczek (2013) and Bensch et al. (2014) find comparable results in the uptake of solar-power and cooking innovations, respectively, in Africa. Such studies add to the growing concern that although leaders, neighbours and culturally tailored innovations effect uptake (Malla and Timilisina 2014; Bhojavid et al. 2014), socially inclusive uptake and benefits require interpersonal network processes routinely performed by all (Pahl-Wostl 2002b; Baland et al. 2003). These encompass social identities, needs and positionalities across multiple spatialities and mark orthodox approach oversights (Sen and Bhowmik: 1970: 1; Rip 2006).

Perceptions, for instance, although crucial for uptake, reflect multiple societal differences (Mallet 2012; Muggenburg et al. 2012). They are conditioned by the control and enactments of needs and resources, such as finances and domestic energy innovations and show significant gendered discrepancies, especially in LDCs. The result for 'access' includes stratified purchasing and consumption power and females sacrificing personal needs for family welfare (Villamor et al. 2011). It indicates the significance of household and societal economies of ethics, choices, responsibilities, rights and roles for maintaining or reconfiguring inequalities regardless of technological 'progress' (Hirmer and Cruickshank 2014). Drawing upon Dutta et al's (1997) biogas research in rural India, Ceceliski (2001; 2002) illustrates that the effect of these structures may be especially innovation limiting when they concern particularly gendered practices such as cooking (Ilkkaracan and Appleton 1998; Lee et al. 2015). Although conceptual debates reinforce this and alert us to the importance of various differential meanings and abilities to perform innovations⁴¹, empirical cases often miss underpinning aspects of these enabling and disabling practices at the expense of development insights (Dutta et al. 1997: 24; Gautam et al. 2009). This includes how innovations relate to the realities of groups to manage risk and change (Warring 1999; Carney 2002).

2.6.2. Risk & Uncertainty

Risk appears to affect many of the above dimensions of the uptake process and sustainable development. These include user evaluations, uncertainty, rate of uptake and non-use and reflect unequal 'coping capacities' and positionalities (Marra et al. 2003; Liu 2007)⁴². This suggests risk may be a pivotal barrier to uptake and a lens into the mechanics of everyday life (Flitsch 2008; Hodgetts 2016). This includes risk influencing empowerment, emotionalities, identities and moralities (Horton 2003; Macnaghten 2003), resulting in differential risk-aversion and abilities (Knight et al. 2003; Wilson and Dowlatabadi 2007). The sum of these factors, as revealed above for social use, renders certain groups particularly constrained to manage risk and require improved assessments of capabilities and related constraints, such as energy investments, avoidance and insecurity (Greene 2011; Morton et al. 2011).

⁴¹ Held together by normativised and mainstreamed forms of these, especially gendered values, roles and decision-making (e.g. Douglas 1974; 2000; Bourdieu 1984; Mennel 1994; 1996; Warde 1996; 2014).

⁴² (e.g. Feder et al. 1985; Miller 1995; Giddens 1991: 215; Finucane et al. 2000; Sunding & Zilberman 2001; Henrich 2001; Isik & Khanna 2003; Ghadim et al. 2005; Connolly & Prothero 2008; Rigotti et al. 2008; Bryan 2010; Foster & Rosenzweig 2010; Ross et al. 2010; Cole et al. 2013; Barham et al. 2014).

Risk is hence context, positionality and innovation specific, results in differential patterns of uptake reflecting structural inequalities and constraining choice and ends (Petit 2012). It reifies the importance of development approaches apprehending these, their ‘underestimation’ and diverse implications (Adams 2003: 299). The ‘portfolio selection’ problem epitomises this: risky outcomes of both prospective and incumbent practice(s) incentivise diversification and hence uptake (Lin 1991), while ‘complex’ and particularly novel innovations to an area cause high risk and low uptake (Feder et al. 1985; Barham et al. 2014). Methods to reduce risk and its impacts include multi-stakeholder capacity building to manage the social discourse and experience of using an innovation (Halkier 2001; Akay et al. 2012). Collaborative methods appear particularly effective for this and thus gaining increasing attention viz-á-viz risk and (dis)empowerment (Halkier 2001; Engle-Warnick et al. 2011).

2.6.3. Affordability

The means to have, use and maintain an innovation often have a financial bearing that impinges on uptake and development interventions. Yet critical literatures expound a vital conclusion that contradicts dominant models: there is a willingness and ability to pay with low repayment default rates for key commodities amongst all social strata and geographical areas and related motives and abilities are more than monetary if their specific constraints are considered (Karnani 2007; Toke et al. 2011). The success of innovations via business-models, even in contexts of poverty and sustainable development, that consider cultural contingencies explicates this (Seelos and Mair 2007 and 2.3.3). Indeed, such models appear essential to overcome constraints of predominant and formal institutions (Prahalad and Hammond 2002). The implication is the untapped potential of upscaling services through business-based models (Hart 2007; Boons et al. 2013b). Before exploring this potential through the related empirical literatures, let us consider why the “affordability myth” is so prevalent.

Narratives become embedded in institutionalised practices (Foucault 1977). Conventional discourse depicts affordability as a principal uptake and development barrier (Halle and Borregaard 2004), underpinned by self-legitimatising and privileged institutional arrangements, technologies, ‘expertise’, and the assessment of affordability primarily via household income over upfront costs (Iyer 2007; Jan 2012). Examples include preconditions of the ‘right’ household income and ‘technology’ (Shove 1998: 1107) and evaluations of income as a prime

determiner of fuel type used in cooking practices (Polak and Yoder 2006)⁴³. Methods hence focus on cost reductions rather than sustainable functioning, financing and integration (Polak et al. 1997; de Laet and Mol 2000; Barnes 2012). This misses the multidimensional nature of incomes, agency and (potential) markets, modes and ends (Jaffe and Stavins 1993: 2; Lall 1993a: 100), and the futility of price signals to drive sustainable practices (Geels et al. 2008: 522).

Similarly, others show income/price for uptake as secondary to factors such as social networks, conformity and moralities, affording group-based policy, project and payment mechanisms tied to these (Wickramasinghe 2011; Sesan 2012). These can tackle the upfront costs of innovations and normalise their ongoing use, management and wider systems of supply and support (Schön 2000; Dulal et al. 2013). Indeed, mechanisms incorporating social factors appear most effective for this (Sengendo 2001; Howells et al. 2005), requiring multi-variate studies of affordability and change (Schillebeeckx et al. 2012; Islam et al. 2013). Results from these extol integrated supply-demand, socio-technical strategies, including for 'unbanked' populations (Schumacher 1973; Skees 2003). Methods include building market trust, competitiveness, pay-as-use, simplified and remote payments, and loan guarantees (Yaron 1994; Arun 2005). Cross-subsidisation, grants, feed-in tariffs and conditional cash transfer programs are also championed (Rawlings and Rubio 2005; Lam and Heegde 2011).

Literatures warn, however, that such policies can have adverse impacts, requiring prudent assessments and linking with improving public information and engagement (Bamber and Möser 2007; Tsoutsos et al. 2009; Wolsink 2012). It reaffirms the potential of interlinked strategies. Lapur and Ehui (2004), for instance, demonstrate that both access to credit and education predominately explain why farmers in the Phillipine highlands adopted dual-purpose forages; while Kiptot et al. (2007) depict the dovetailing of interventions with credit programmes as primary factors for innovating farming methods in Kenya (cf. Nepal and Amatya 2006). Most such studies, however, maintain an implicit empowerment model that neglects intra-household dynamics that favour male interests rather than household needs (Kusago and Barham 2001; Lama and Buchy 2002). Patriarchal control of resources provided to women in development programs explicates this (Handa et al. 2009; de Brauw et al. 2014).

Others highlight ethnicity, land rights and ownership issues as compounding these constraints (D'Agostino et al. 2011; 2015; Kaygusuz 2011), problematizing assumptions that policy benefits 'trickle down' (Goetz and Gupta 1996) and highlighting that development may reduce

⁴³ (E.g. Pachauri & Jiang 2008; Ekholm et al. 2010; Pearson et al. 2012; Bansal et al. 2013).

resources and resilience for already disadvantaged groups (Dulal et al. 2013: 308). Social schemes informed by multidimensional framings of empowerment are associated with greatest success in overcoming such barriers (Hashemi et al. 1996; Mayoux 1995)⁴⁴. They include inclusive self-help groups, saving clubs, and collective education programmes (Biggs et al. 2004; Mahadeva 2008), especially effective when interwoven with social structures and attributes and renegotiate unequal forms of these (Phal-Wostl et al. 2007; Mair and Schoen 2007). Exemplars include social identities, values, meanings, roles and relations supporting loans, information and insurance within sub-caste networks in India (Ramani et al. 2012), female empowerment and livelihood diversification in Bangladesh (Anderson and Eswaran 2009) and extending equitable end-uses and benefits following technology implementation in Nepal (Upadhyay 2004). The sum is a refutation of the favoured income proxy as a gauge for innovation suitability and affordability that miss long-term, dynamic and multi-dimensional factors, and the need for holistic models incorporating these. This rendition conditions the final principal influencer for uptake stressed in the literatures: compatibility.

2.6.4. Compatibility

Innovation/intervention ‘compatibility’ is a vaguely used term that empirical work depicts requires purpose and context of use specificity allied with contingent social needs, capabilities, economies, institutions and cultures (Bradford et al. 2003; Ajaz & Taylor 2015). The most critical studies convey that these contingencies are intertwined in functioning services and systems and related interventions and subject to learning, uncertainty and change over multiple timeframes (Lall 1993b; Doloreux 2002). These dimensions, processes and dynamics, however, are put in tension in dominant innovation paradigms and subordinated in related development and research, focusing instead on performance ‘inscription’ via fixed and closed designs and applications (Meadowcroft 1999; Scoones 2009). Whilst this risks deskilling, disempowerment and limiting valuable innovations (Attewell 1987), others find innovations requiring skills to use and maintain aligned with existing work and life conventions boost uptake (Blewitt 2012; Schwartz et al. 2013).

⁴⁴ (cf. Ackerly 1995). See Phal (1989) for an analytically important distinction of household power dimensions - “control”, “management” and “budgeting” - viz-à-viz how resources translate into impact, while Hashemi et al.’s (1996) eight-variate methodology for assessing empowerment highlights important impacts that relate to structures of inequality at both the household and community-level.

Similarly, Otte (2014) and Garb and Friedlander (2014), find food and farming innovations require routinised social learning and use for effective uptake, concurrent with others showing innovations requiring maintenance, especially in contexts where maintenance practices are uncommon or politicised, are dysfunctional without routine learning and use (Dosi 1988; Donner 2009). Compatibility is thus tied to an innovation's routine incorporations and requires capacity building viz-á-viz social meanings, routines and structures (Reyes-Mercado 2006; Liedtke et al. 2015). The uptake contrast of improved cook stoves illustrated by Hanna et al. (2012) and Bensch and Peters (2014), epitomise this. The former, using highly novel methods, were not commonly uptaken, whereas the latter achieved uptake because the product related to conventional routines (cf. Edger 2013).

Analogously, others find that uptake correlates positively with social participation through mutually enhancing the innovation and communities viz-á-viz the routines required (Cecelski 1993; Sharma 2014). This relationship demonstrates the duality of structure that for development is both medium and outcome (Giddens 1984: 18, 25). In Ghana, for instance, Bensch and Peters (2014) show an inclusive co-developed approach that aligned producers, promoters, governors and potential users, their needs and knowledge bases, enhanced social capacities, innovation design and uptake. By contrast, the 'design drift' attributed to the failure of the Indian national cook-stove program relates to the manufactures remove from the social context of cooking, rendering their inscriptions unsuitable (Wang and Bailis 2015).

Supporting social contextualisation, design and use - marking a burgeoning participatory production field exemplifying positive uptake effects - is therefore advised (Simon et al. 2014; Voorberg et al 2015). It presents 'compatibility' as a negotiation between users, non-users, innovations and contexts via iteratively experiencing and co-evolving innovations within in social routines (Rennings 2000). This routinised transformation within societal architectures enhances innovation effectiveness, including for enhancing sustainable energy behaviours, welfare and management practices (Barr et al. 2005; Arnold et al. 2006), and evokes what Rosenberg (1982: 120-40) calls 'learning by using'. This co-creation includes all intervention stages and stakeholders (Karnani 2007) and the earlier social participation occurs in this process, the greater the benefits appear (Douthwaite et al. 2002; Heiskanen et al. 2005).

Co-production may hence be augmentable by utilising or restructuring pre-established positionalities and routines to enhance inclusive interaction (Schot 2001; Selwyn 2003). Silverstone and Haddon (1996) provides a formative example of this, showing televisions and

ICTs, by virtue of their everyday use, co-depend on, and co-construct, the cultural codes, institutions and practices that both enable and constrain how people organise their lives. This occurs within and across normative domains such as the 'household', 'moral' and 'political economy' (Allouche et al. 2015). Thus (non-)use is enabled and constrained by resources and structures it continually influences yet are themselves social and products of previous collective agency whose normativities occlude alternative pathways (Orlikowski 1992; Jeffrey and Seaton 2004). These insights across suggest critical implications for enhancing development pathways. The final section of this chapter pulls these together for this purpose.

2.7. Reframing innovation appropriation: Integrating theoretical & empirical insights

Critiquing the conceptual and empirical development and uptake landscape shows notable points of convergence, increasing social and socio-technical considerations and the value of a range of theoretical traditions for augmenting insights into these and access, sustainability and development. It reveals that analytical premises extend from rational models of choice, behaviour and diffusion to the principal energy and development frameworks and evaluations. Contrasting frameworks and studies problematized this by depicting that innovations become refined, operationalised, effective and sustained by virtue of structured processes that extend sustainable development and uptake barriers if unequal. This included their co-construction with multiple stakeholders, social meanings, networks, skills, institutions and roles. The diverse schools of scholarship evaluating policy, project and innovation diffusion, failures and successes increasingly converge on emphasising the importance of these factors and the interactions, actions and co-constituted relationships that constitute and systematise them.

It signifies exploring systemic relationships and processes across all production-consumption domains to reframe development (Oudshoorn and Pinch 2003) and that change, rather than standardisation, may require interactive 'making do', pulling on repertoires of meanings, materials, skills and emotions in relation to others to 'satisfice' routine incorporation and responsiveness (Simon 1997: 119-120; Moltoch and McClain 2008). Social processes and contexts are involved in this and hence determine intervention functionality in ways that may supersede, though interdepend with, technological factors (Nicolini et al. 2012). Emergent yet neglected aspects within this 'access' and development is thus considerably more textured than individuals, technologies, linearity and 'user'/'nonuser' distinctions as primarily construed.

At best, as Heller (1987) and Kanter (1995) also argue, technology and provision expands 'options' subject to social contingencies, necessitating the mobilisation and functionality of any entity within the social and its co-construction therein (Heidegger 1962). These insights signify defining 'innovation' as a diverse entity and interactive process dissolving distinctions between consumers and producers (Lundvall et al. 1988; Oudsoorn and Pinch 2008). This variously active and passive process (Gherardi 2000) suggests framing 'access' and 'diffusion' as 'effective use' and 'uptake' of diverse and socially situated and co-evolving innovations may better direct approaches to the pluralities required for enhancing sustainable development.

Omitting such complexity reinforces constraining development assumptions, arrangements and approaches, denoting the necessity of redressing this for the overlooked yet ordinary development opportunities they signify (Shove 1998; Rao and Kishore 2010). Indeed, as Edgell (2011: 127) and others discuss, diverse norms, practices, social investments and moral economies may be key for sustainable development (Seyfang and Smith 2007; O'Boyle 2011). Such considerations compliments readings from a number of critical socio-cultural perspectives⁴⁵ and supports a more sensitive approach to what sustainable energy transitions may involve. This is invaluable in and of itself, yet is of further value for cautioning against uniform, simplified and deterministic definitions of 'sustainable development'. This chapter instead paints development as a partial, patterned process embedded in the social and its multiplicities, situating ongoing means and constraints for continuously negotiated innovation 'compatibility' for 'sustainable development' 'achievement' (Cockburn 1992: 39).

Accordingly, definitions of sustainable development need to be clarified and adjusted on a case-by-case basis (Robeyns and Van der Veen 2007). The insights unpicked above advise that doing so will be enriched by social participatory and diversely co-produced approaches. This thesis thus defines 'sustainable development' as an uncertain and negotiated process requiring an unprecedented range of actors to enhance equitable and ongoing social and environmental wellbeing that meets the pluralistic needs of diverse societies and environments. This definition deepens the economy focus symptomatic of the orthodox three-ring sector view (environment-society-economy) of sustainable development that

⁴⁵ Feminist studies especially scrutinise this latter oversight. Exemplified well by the following (Chen 1983; Agarwal 1989; Berg & Lie 1995; Nelson 1995; Faulkner 2001; Haraway 2006; Wajcman 2010).

sustains binary thinking that is contrary to the crucial interdependencies indicated in this chapter (Constanza et al. 1991; Dasgupta 1995; Sovacool and Drupady 2016)⁴⁶.

Alternative frameworks collectively support this, highlighting social learning, influences and socio-technical interactions across the 'nexus' of intersecting routines, structures and spaces. Yet how this occurs and modifies in everyday life requires deeper. The MLP provides a compelling avenue for this through framing change, interactions and embedding in terms of niches, practices, rules, institutions and systems. It provides negligible guidance, however, about the sorts of dimensions required for these, the importance, struggles and politicisation of capabilities, roles, organisations and the 'domestic' (see Siisiäinen 2003) and that interactions are multiply embodied rather than extant at three principal levels (Amin 2002; Schatzki 2016). Empirical insights amalgamating to present their interconnection to, and importance of, interrelated risk, emotionalities, moralities and identities within relationally situated actions supported this. The chapter thus predicates the necessity of a framework that can apprehend such diversity for pragmatic ends and suggests the "indispensable" importance of routines incorporating the socio-technical contingencies for this (Frissen 2000: 70).

⁴⁶ Sustainable development is a normative concept with a variegated legacy, definition & deployment. Comprehensive reviews of this include Milbrath (1989), Prescott-Allen (1991), Long & Long (1992), Scoones & Thompson (1992), Warren et al. (1995), Giddings et al. (2002) and Escobar (2005). My definition allies with such scholars and the multiple, interlinked post-Rio+20-summit SDGs viz-à-viz wellbeing, needs, equality, resilience and ecosystems (Griggs et al. 2013; UNDP 2012a; 2016a).

2.8. Conclusion

This chapter establishes sustainable development as a patterned, contested and pluralistic process, which, better understood, offers means to overcome pervasive development limitations. Although conceptual and pragmatic frameworks are required to support this (Meade and Islam 2001), tensions and oversights arise between these. Consequently, there is a remaining need for theoretically and pragmatically aligned development approaches through operationalisable frameworks that both grasp, or facilitate the discovery of, the circumstantial multiplicities of development. To this end, the chapter suggests considering co-produced, socio-technical development. Its pursuit requires reflexive, integrative approaches that challenge the neglected diversity of needs, differencing, structures, opportunities and impacts that appear intrinsic to social life and sustainable development. This redefines 'access' as contingent upon using and reproducing within the tapestry of daily life. The implications of this underpin the magnitude of the energy access problematic and its relationship to crosscutting development challenges.

The crux is that mundane, inclusive innovations may have greatest development implications if the qualitative details of use, non-use, norms, relations, feelings, interpretations and their forms of co-evolution and (dis)embedding are considered. It suggests the importance of communities, households and consumption and introduces us to risk, uncertainty and complexity that, apprehended, may better forewarn and forearm development pathways.

CHAPTER 3

Conceptual Framework: A Social practice approach for energy access & sustainable development

3.1. Introduction: Framework requirements

To understand the possibilities for energy access and sustainable development we must be attentive to the world into which it enters. In light of the insights and gaps identified in Chapter two, it necessary to consider an alternative ontology for this. Indeed, the conceptual ‘enframing’ can impart significant implications on the research encounter, knowledge production and wider outcomes (Heidegger 1977: 19; Bijker et al. 1984: 107). In light of its burgeoning empirically grounded contributions to understandings of sustainability and change, although predominantly overlooking the technical and applied in advanced economy contexts, this chapter substantiates the value of extending a social practice-framing to addressing issues of sustainable development and energy access in less wealthy contexts.

Chapter 2 culminates in signifying the value of a social constructivist framework for integrating the co-evolving, multidimensional nature of agency, needs, and change to development approaches to overcome pervasive sustainability constraints. These eclipsed forms, means and ends are both processual and structural and undergirded by an insufficient theoretical framing of the interlinkages and mechanism that enables and formalises certain forms of interaction and effects over others (Law 2004a; Latour 2005: 423). Essential mechanisms substantiated from the previous discussion were social activities and norms. One of the few theories applied to the diffusion and development field to apprehend most of these dimensions is Normalization Process Theory (NPT)⁴⁷, yet its neglect of dimensions such as the emotional and subconscious that manifest from the empirical literatures as influential, underscore the outstanding necessity of a framework that can also apprehend these.

This reinforces calls for development and energy research from a new perspective supporting collective knowledges, skills, perceptions, values and consumers for mobilising ‘preconditions, process, and outcomes’ occurant over diverse sectors, actors and dimensions (Gray and Wood

⁴⁷ NPT posits normalisation and development as dependent on social agents - individuals and groups - intentionally initiating a sequence of events to operationalise pre-existing, novel or altered modes of practice (Finch et al. 2007; May et al. 2009; Murray et al. 2009).

1991: 3). These appear to co-evolve only through the routines intrinsic to the social fray, and their constitutive, yet often unequal, 'communities' and 'cultures' (Mosse 2001: 19-21). This demands more textured approaches to sustainable development that treat actors as collective and contingent. Those that support overcoming problematic premises and binaries and advancing research and actionable change appear most effective for this (Faulkner 2001). This chapter presents a social practice theory as a framework well equipped for this.

3.2. Social practice theory: The origins & elements of practice theory

Theories of practice offer distinctive understandings for materiality, social action, convention, structure and change that reconcile fundamental conceptual limitations. This includes plurality, dynamism, co-construction, dominance, scale, "the tyranny of dualisms" (Pile 1994: 246), and methodological and pragmatic operationality in a range of contexts (Strang and Meyer 1993). Consequently, practice-applications have furthered insight into diverse variables pertinent for this thesis signalled by the previous chapter. This includes the nature of society, space and place, organisation, governance and innovation, identities, wellbeing, technology, food, water and energy consumption patterns and effects⁴⁸, and social projects, demand, health, aptitudes, learning and livelihoods, including viz-á-viz sustainable energy (Van der Horst 2008; Walker et al. 2010)⁴⁹. These contributions expand into the study of large-scale phenomena, such as automobility, policymaking, food provision systems and climate change (Shove and Spurling 2013)⁵⁰. Practice theories consequently signifies a lens especially applicable for furthering insight into sustainable development.

Although it was not until the 1970s that theories of practice took on its more contemporary form through the work of Taylor (1971), Bourdieu (1977), de Certeau (1984) and Giddens (1984), its origins stem from early twentieth century scholarship of Wittgenstein and Heidegger that focus on overcoming the classic binaries in Western ontologies of self/object and agency/structure by explaining individuality, intelligibility and order as resultant from ongoing praxis. Their core concepts drawn upon within social practice theories are Heidegger's notion of being-in-the-world (Dasein), and Wittgenstein's philosophy of logic,

⁴⁸ (Silverstone 1994; Shove 2003a; Allon & Sofoulis 2006; Shove et al. 2007; Gram-Hansen 2010a; Spaargaren 2011; Leneke 2012; Watson & Meah 2012; Walker 2013; Judson & Maller 2014).

⁴⁹ (Leach 2005; Walker et al. 2007; Strenger & Maller 2011; May 2013; Healy 2014; Maller 2015).

⁵⁰ (Shove & Walker 2010; 2014; Hubers et al. 2011; Watson 2012; 2013; Welch & Warde 2015).

certainty and action. The former explains everything, from moods, objects and doings, as products of being encompassed in purposeful practical engagements and their temporalities that construct and situate ways of being and future “possibilities-for-being” (Richardson 2012). Thus everything is beholden by a degree of intentionality or care related to past performances and constituted by one’s being (“Sein”) located (“Da”, here/there) in a world constituted by such performances and possibilities.

The latter outlines that all entities are determined by the flow of activity whose purposes and rules are irreducible and reasons and functions are specific to those ‘rules-for-use’ internalised and reproduced by the act (Wittengstein 1954: 2). Process and system thus co-depend and co-create in performances that are structured and structuring. Similarly, their properties only function and communicate by virtue of their common association with the grammar and its employment, such as words in a language (Wittengstein 1954: 4, 15; 1969: 58). Consequently, from both we can read being, order, agency and effect as use-specific, relational, positioned and collective viz-á-viz a system of performances and performers that signifies performances as the substantive analytical metric for understanding these. This logic also has resemblances to the Pragmatist movement and the semiotic tradition, especially in relation to experience, subjectivity and structure as ongoing social processes subject to revision and renegotiation, manifest in routinised interpretations and habits, and requiring internalised skills (Peirce 1992; Dewey 2002; James 1907).

From this basis, practices have been expanded into various strands to explain key phenomena of social life and can be characterised by their relative socio-cultural, social structural and socio-technical orientations. Although interrelated, the former is perhaps best defined by Taylor’s (1989) use of the practice ontology to attend to issues of social convention, identity, morality, culture and being and Bourdieu’s tome of scholarship relating to social position, power, space, resistance and resources in his accounts of social habitus and capitals. De Certeau’s (1984) interpretation of practices reinforces these themes whilst further highlighting the roles of everyday consumption and users as society personalise, appropriate and transform the world around them - objects, spaces, language, rules and rituals – in course of quotidian practice.

These social discourses, rules and capital gives space for the consideration of power, control, conflict and structure in social practice. These are focal points of Foucault’s and Giddens use of practices, the former to explore the mechanics of order and institutions through the relationship between knowledge and power, the latter to explicate the co-constitutive and

embedding nature of practices in the production and reproduction of the institutions, rules and order of which they entail. Thus, while conceiving of practices in different ways and with differing foci, from the micro to structural, each used the concept of practices as part of closely related approaches to comprehending the relations between social structure and human action, understanding those relations as recursive, negotiated, collective, with structure and action, and co-constitutive. Moreover, in their latter works, particularly of Bourdieu and Giddens, these practice understandings were utilised to explore social change, 'disembedding' and inaction (Bourdieu 1996; 1998b; 2000; Giddens 2010).

The third broad strand of practice theory allows for attending to all these dimensions through a reading of practices that upholds their socio-technical interdependencies throughout the micro and systems scale. Seminal scholarship in this field include the conceptual explorations of Schatzki (1996; 2001), and the more applied focus of Shove et al. (2012; Hand and Shove 2007; Shove and Watson 2010). From these works, there has been something of a practice theory renaissance. This intellectual diversity was refined by Reckwitz's (2002) cogent exposition of the common characteristics of prominent approaches to practices as a foundation for moving towards an "ideal type of practice theory" (Reckwitz 2002: 244). It is from this we get the dominant definition of a practice in social practice theory:

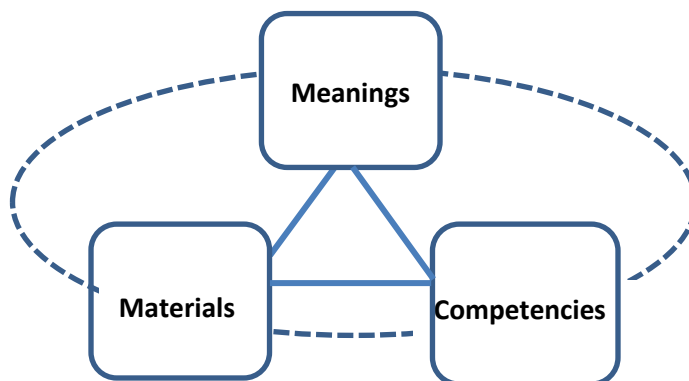
a routinized type of behaviour which consists of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge (Reckwitz 2002a: 249).

In referring to "practices", therefore, practice theorists are referring specifically to this socio-technical modality rather than in the loosely defined sense prevalent in social and political sciences. Comprehensive contemporary accounts of social practice theories supporting empirical sustainability research are broadly distinguishable into two models: Schatzki's (1996) site ontology and Shove et al.,'s (2012) three-element model. For the purpose of this thesis, I outline the theory from a perspective of innovations, consumption, social capabilities and change.

The three-element model, Figure 3.1, is the most informative for this and it is hence here we start. Capabilities, innovations, transitions and impacts are products of practices and practice ensembles and how they emerge, evolve, journey, persist, spread or disappear. Shove and

Pantzar (2005a; Pantzar and Shove 2010) and Shove et al. (2012) explicate that all the trajectories and outcomes of practice can be ascertained by a focus on three fundamental sorts of elements - materials, meanings and competencies - that constitute all practices and how they are bound and liberated. The three types of elements and the importance of their linkages for any social practice is illustrated below.

Figure 3.1. The elements of practice interlinked within a practice.



Source: Adapted from Shove et al. (2012).

Only integrated in a specific social practice, either in symbolic or enacted form, are the elements and their bonds agential. This explains the absence of an explicitly labelled ‘actor’ or ‘actors’ in the diagram; it is the specific form of the elements and bonds in an interdependent and specific assemblage, a practice, that counts. Within such a commonly defined and recognised practice, the elements and links between elements are relatively stable, represented by the continuous lines. Yet all practices are dynamic. Through the dashed lines encompassing the elements and their arrangement, Figure 3.1 aims to signify this.

Materials are the matter that makes all things, encompassing any entity from tangible objects and bodies to physical infrastructures (Ingram et al. 2007). Of pertinence for sustainability, this includes labour-saving tools, appliances, consumables, spare parts, waste and energy pipeline and pylon networks. Meanings are our semiotic frame of references through which we comprehend the world around us: the emotive-attitudinal realm embodying values, beliefs, emotions, concepts, interests, purposes and motivations. Exemplars for sustainable development include constructs of ethics, rights, good/bad, normal, to live a “full life” and “fitting in” (Taylor 1989: 14; Rettie et al. 2012). Competencies are the skill-sets needed to

perform practices and accomplish desired ends: the know-how, bodily comportment, embodied knowledge and necessary understandings (Shilling 1991; Reckwitz 2002: 249). The elements, by and of themselves, however, have no agency or structure in the world; they influence neither social nor technical development. Elements only gain effect through collective performative or symbolic human interaction recursively integrating any range of the three sorts of elements within the embedded routines of specific practices (Schatzki 1996; Pantzar and Shove 2010). Practices may thus entail various specificities of meanings, skills and artefacts yet necessarily require one or more of all three and reveal that consumption (of these) is a necessary part of any practice (Warde 2005: 145).

3.3. The formation & systems of practice: Innovation, operation & scale

As abstract conceptions, practices signify a historically and communally constructed body that is not enacted but has effects through shared intelligibility (Schatzki 2002). It is the locational, provisional and immediate *doing* of things, however, the 'practices-as-performances' rather than 'practices-as-entities' (Schatzki 2002), upon which theories of practice are predominantly focused and are of most implication for innovations, consumption and sustainability (Shove and Pantzar 2005b; Pantzar and Shove 2010; Watson 2012). Accordingly, this thesis focuses on 'practices-as-performances' whose specific doings and sayings, if repeated by a sufficient number of people, normalises their form, components and relations within routines that provides the structuration of elements in practices that is critical to their effect (Schatzki 1996: 89).

Produced, sustained, ordered and modified within practices, elements are thus socially dependent and constitute all individuality, sociality and agency and thereby "the production of the world itself" (Schatzki 1996: 13; Ortner 2006: 16). Practices are, therefore, specific assemblages of elements that are linked and sustained by their habitual assembly in collective activities affected by mutual rather than individual actions (Wenger 1999; Barnes 2001). These heterogeneous routines of daily life (Taylor 1971: 27), may hence enable effective innovations and interventions by combining (e.g. Hand et al. 2005; Shove and Pantzar 2005; Mitchell 2014), constructing and deconstructing these and practice-formative elements into new practices and their co-constituted norms (Wright and Egan 2000; Warde et al. 2015).

Yet practices do not exist in isolation. Their interdependencies include interrelations with other practices. These include temporal scheduling (e.g. having breakfast, commuting, working), spatial co-existence (e.g. practices of road provision, cycling and motorcars) and coupled functions (e.g. exercising and showering). Practices thus interdepend in time, space, functionality and practitioners in relationships that may be complimentary or adversarial, micro-level specific or institutionally coordinated, yet seldom exist apart from macro processes and structures constituted by wider webs of practices.

How we shop, cook, eat and work, for instance, are presupposed by circuits of generation, production, provision, regulation and consumption enabled, legitimated and sustained by those everyday practices (Fine and Leopold 1993: 4; Gross 2009). Similarly, seemingly macro systems of economy and governance are products of micro interactions, such as in boardrooms and offices. The interdependencies of practices thus provides a flat ontology that enables overcoming scalar binaries; practices are interconnected across co-constitutive planes of existence and to understand practices is to understand their elemental and systemic interdependencies.

Indeed, the epistemological value of transcending scalar binaries is the motivation behind Schatzki's (2010) terminology of "small" and "large" phenomena that are composed of relatively smaller or larger sets of practices stretching out over objective timespace within the plenum of the social constituted by horizontally related practices. Power and production is thus relatively symmetrical throughout the practice-arrangement plenum, rather than in predefined centres as conceptualised in transition theory "niches" and Latour's variously termed "power centres" (Latour 2005; Smith and Grin 2010).

Practices, by virtue of their manifold interdependencies, are hence 'multi-level' insofar as they encompass co-constitutive dimensions, bodies, structures and systems, yet transcend the spatialities characterised by ontologies defining two, three or hierarchical levels. Micro/macro distinctions, therefore, are useful for locating the sites and specificities in and through which interactions and hence interventions localise, occur and are most intensive, interlocked and influential, yet are necessarily co-constitutive and best approached by considering practices in relation to their 'translocal' co-dependencies constituting a 'transpatial assemblage' (Li 2007; Ong and Collier 2008)⁵¹.

⁵¹ All action is prefigured by myriad interconnecting locales, publics and forms of interaction, constituting unique yet dynamic socio-technical spaces, identities and 'place' via the plurality and "specificity of its interactions with the outside" (Massey 1994: 169). This counters romanticised,

Exemplars include the value of interlinking local innovation 'spaces', such as start-up enterprises or energy communities, with their non-local interdependencies of monopolies, taxes, import duties and social convention. Practices, therefore⁵², aid framing the sites of production-consumption, capacities and development; signalling a vital analytical unit for augmenting sustainability pathways⁵³. Another way of grasping these interdependencies is through the degree to which practices and their constituting elements and relations interact and influence other practices. The degree they overlap, compliment or compete with others, affects the stability of the specific practices (Sanchez and Mahoney 1996). This signifies the likelihood and the work involved for a relating innovation to be incorporated into society through the practices and structures that form and sustain them (Giddens 1984; Schatzki 2013). The more the practices are interconnected, the greater their interdependencies and hence their resilience to innovation because for their form to change any change has to be compatible with its interrelated elements, practices, practitioners, orders and timespace (Hand and Shove 2005). These are finite resources, requiring synchronous changes in other elements, practitioners and practices or signifying considerable resistance or disruptive innovation (Shove et al. 2007; Shove et al. 2012).

We can call practices that show negligible interaction with others independent or 'dispersed' practices, those that interrelate with and influence others to a moderate degree 'practice bundles', and those that interconnect increasingly extensively 'integrated practices', 'compound practices', 'complexes of practices' or 'systems of practices' (Schatzki 1996: 1991-2; Warde 2013: 24). These terms are loosely applied between practice theorists, however, and for clarity this thesis will espouse the terms independent practices, practice bundles and practice systems and refers to their *relative* degree of interdependency viz-à-viz a continuum that infers practice connectivity and structuration rather than spatiality⁵⁴. The former are especially susceptible to innovation due to being performable without significantly requiring or affecting other practices, while the latter are especially stable because their myriad

essentialist, spatialised readings of 'rurality', the phenomenological & 'local', assigning them, *a priori*, natural & legitimate status & static portraits of subject, object, place & being that counterposes innovation. Social practices, 'translocal' & 'transpatial' signifies this (Probyn 1996; Maddock 2002).

⁵² Rather than networks, infrastructures, institutions, markets, attitudes, space or individuals (cf. Tompkins 1980; Pickering, 2001; Miller 2012; Latour & Woolgar 2013: 178; Parenti 2015).

⁵³ This contention reinforced throughout the thesis is diversely & increasingly suggested (cf. Kopytoff 1986: 67; Baldry 1999; Chappells & Shove 1999; Parham 2004; Nicolini 2009; Rinkinen 2013).

⁵⁴ Often, however, there is a correlation between extent of practice interdependency & spatiality. Notable exceptions render the ontological connection misleading however. Contemporary telecommunication practices, for instance, are spatially global yet can be performed & effect independently of, & simultaneously with, innumerable other practices (cf. Aral et al. 2013).

normativised interdependencies provides marginal independent volition and substantial consequential effects of change (Shove et al. 2012).

This practice-structure gives sense, agency and order to the multiplicities of social life yet always involves temporalspatial practices (Bhaskar 2014, Schatzki 2010). Indeed, seeing that these practices and 'systems of practices' relate to 'cycles of production, consumption and innovation' that play out over multiple domains provides a vital contribution to conceptions of agency and change by explaining both horizontal and vertical relations (Shove et al. 2007: 14)⁵⁵. Without being routinely regularised within such a nexus, an innovation is simply another thing or notion, not something that, tacitly or overtly, becomes commonly performed and associated with other necessary elements associated with ends; not, therefore, something that will effect, gain currency, socialise and spread.

For an innovation to function, faithfully be reproduced and extended, it needs to become enmeshed with, and embedded within, the elements, tendencies and organisation of everyday life (Southerton et al. 2004: 7). Interventions can thus be considered intrusions within this wherein innovations are new elements in practice or new arrangements of elements and/or practices that only function, effect and defuse through their collective incorporation in routinised enactments of those practices. The spatial and temporal reach of innovations are thus constituted by the continuance of their specific arrangement within practices and sets of practices and how these travel, persist and change in concert with their requisite practitioners.

This explains how innovations diffuse, effect, and why certain practices exist and affect differentially in differing contexts despite serving the same sorts of functions. Consider, for instance, the notable distinctions in modalities of washing, eating, commuting and socialising just within Western Europe. Indeed, although structured by ensembles of practices and their connecting infrastructures of employment, rules, markets, inter alia, the performative, relational conditionality renders practices innately dynamic (Borg 2007; Shove 2010). Their perpetual co-construction and social enactment gives practices the latent energy to change. Falling from this habitual state - through deliberate or unwitting improvisations, reinterpretations and reconfigurations of the elements or arrangements of practices - renders elements or practices insufficiently linked to constitute a functioning entity (Shove and Pantzar 2006). Yet the links between practices are also continually subject to (re)formation,

⁵⁵ Contrary to a concern that has been raised about it, for example, Hargreaves et al. (2011).

contestation and de-formation (Shove et al. 2012: 44), such that the potential for flux is also intrinsic to the structuring and structured nature of practices.

This requisite perpetuated 'inter-connectedness' (Reckwitz 2002: 249) for effective, sustained practices and interventions is especially significant as matter, concepts and communities of experts wane, disperse, shift, and re-orientate and the population of the doers of a practice, the 'carriers', may change spatially and temporarily (Strinchcombe 1959; Cox 2005). Forming, changing or breaking links interconnecting the elements or practices, therefore, makes, modifies or mars existing social routines and an innovation's form, growth, persistence and termination (Graham and Thrift 2007). Shove et al. (2012: 24) present this succinctly in terms of solely the absence, presence or cessation elemental links signifying the distinction between a potential or 'proto-practice', practice, and ex-practice.

The significance of these links is shown further via Lave and Wenger's (1991; 1998) discussions of practices that stretch out over timespaces through interactions between potentially dispersed practitioners sharing and maintaining the elements and elemental links through practice within translocal 'communities of practice' (Reay 2000)⁵⁶. Consequently, although modifying any of the elements may result in social change, so too would reconfiguring the elements that populate social conventions and that doing so is an active, collective process in competition with incumbent customs that may not be spatially and temporally bound. Indeed, not unlike Schumpeter's (1950) "creative destruction", due to the complex interdependencies of practices that create 'lock-in' effects, some consider the break-down of existing practices essential for the emergence of any others (Unruh 2000; Urry 2011).

This link-splitting process, however, may be more essential for some practices than others: novel practices that compete rather than overlap or co-exist materially, conceptually or for skills, space, time and in constituting a social norm, are more likely to require the decay of the incumbent to gain the necessary position of social normalcy (Schot and la Bruhèze 2003). These elements, then, and the time and space they require (Pred 1981; Hagerstrand 1985), are essentially resources, which, like practitioners, are limited and for which practices may

⁵⁶ Communities of practice (COP) is a concept developed from social practice theories that is expounded further in this thesis as the narrative unfolds for its aid for integrating some of the developing insights. The starting point for its later citation & elaboration is the dominant interpretation stemming from Lave & Wenger's works: social groups or individuals mutually engaged in a practice & thus part of it, including its, & thus its members, meanings and coordination (Wenger 1998; Lave 1999). It signifies a collective body united by a shared practice whose interactions therein support the development & negotiation of elements of practice & capabilities within the collective yet are not necessarily unanimous, fully inclusive nor the group explicitly interacting, utilitarian or reified.

compete (Hochschild 1997; Southerton 2003). These systemic dynamics of interdependent components and implications for engineering change are reinforced by concepts from sociologies of technology such as *reverse salients* and *emergent friction* emphasising the importance of systemic synchronicity for innovation appropriation to occur and be maintained. The former explains a co-evolving system wherein components that lag behind become obsolete: the latter that when a new component is introduced it brings conflict that requires work to overcome it (Hughes 1986; Leonardi 2009).

The interdependent nature of elements, however, may render them relatively stable in relation to practices and capable of communicating and enduring over space and time (Shove and Pantzar 2006). This reinforces the effect they may have on the longevity and form of incumbent and future practices, respectively. Elements from the early era of postal delivery, for instance, such as the messenger bag, have endured and been interlinked by a sub-group of cyclists over various places with other elements, including meanings and values of style and practicality, to upscale the messenger bag practice over wider practice communities and settings (Williams 2008; Petty 2014). The semi-rigid and spherical depiction of elements and practices in Figure 3.1 aims to convey the relatively stable nature of elements. Thinking about energy access in terms of novel practices relating to pre-established practices and allocated, finite resources necessary for practices thus opens 'access' thinking and interventions to distinctive implications. Focusing on the nature of the elements, practices and their links thus offers additional routes to approaching conventions, order, impact and change.

Modes of transport, for example, must fit into the schedules, demands and spatialities of the practices of working away from home, transporting children or food shopping (Watson 2012). These include inextricably material, pragmatic (e.g. finances, time and space needed) and symbolic, sensual concerns (e.g. identity, comfort, convenience, pride). These co-depend further, however, on socio-physical structures that make certain modalities an everyday possibility and 'obligation' (e.g. systems of production, town planning and consumption) (Smart 1985: 122). Similarly, conventions of showering are tied to variable materialities of plumbing, heating and power (Hand and Shove 2005); concepts of propriety, cleanliness, immediacy, privacy and leisure; understandings of how to wash; and normatively institutionalised temporalities and standards of other practices, such as what time and how to appear at work (Hand et al. 2004; Lenneke 2014).

Links between practices thus present significant implications in terms of what accomplishing or innovating a practice may entail and include interdependencies of time, space and functions that establish a degree of stability (Lefebvre 2013). Their constitution in practices, however, renders them also inseparable from shared activities, normativised meanings (e.g. being a good mother, father, employee, safety, 'lunchtime'), competencies (e.g. of multi-tasking, scheduling and driving) and materialities (e.g. absence or presence of cycle lanes, traffic and workplace showers). These are themselves shared and sustained by often numerable practices such that elements are not just the building blocks of practices; they are also pertinent for the manner in which practices relate to each other (Shove et al. 2012). A reading of practices thus gives unique purchase to explore interdependencies and embedding forces that appear instrumental to development impacts and change, but also how and by whom these are created. For the purpose of enhancing energy access pathways and supporting research, these attributes are pertinent and suggest imperative implications as encompassing as capabilities, consumption, equality, actors, conventions and coordination. This may be informed by practice theories account of agency and structure.

3.4. Practices, positionality, structures & context

The elemental, practitioner and timespace requirements of any practice are seldom distinct from other practices and the socio-technical context, both objective structures and intersubjective agents, that both shape and is shaped by them. This co-constituted process and context is underscored by the tendency of well performing innovations in controlled settings failing to be performed well in others, especially in homes (World Bank 2011). The enactment of social practices distributes, locates and maintains means and ends relative to non-performers, determining social position within this practice system (Shilling 1991; Reckwitz 2002a: 249).

From this vantage, we can hence utilise practice ontologies to further investigate embedding conditions in concert with additional sustainable development criteria of positionality, resources and structuration and their implications for social needs, constraints and complicity. Indeed, by approaching these as relating to contingent practices requiring certain meanings, skills and material repertoires subject to the temporally and spatially situated discourses and activities of everyday life, we can gain a deeper insight into what these entail than other

approaches premised on the importance of context, positioned agency, social capabilities (2.3) and capitals (Putnam 1993a)⁵⁷. Bourdieu's habitus and Giddens' agency-structure duality are insightful for this.

The habitus is a set of dispositions, reflexes and forms of behaviour people acquire through acting in society. It reflects the different positions people have in society (Bourdieu 2000: 19).

The habitus and one's position in it are thus relational and prefigure the resources/capitals available to social agents to be and act thereby maintain their position (Bourdieu 1980: 2). Bourdieu explains that this occurs through practices whose habitus includes ideologies and conventions that "produce practices that tend to reproduce the regularities immanent in the objective conditions...and cognitive and motivating structures making up the habitus" (1977: 78). These are transformed into, and maintained and moderated by, the construction and circulation of meaningful distinctions that extend to "competence", categories and "ethics" (Bourdieu 1998b, 42-43), prefiguring and justifying domination, "deliberative capacity, and individual purposes" (Bourdieu 1977: 1972; 1990: 1980). Critiques of sustainable development emphasise the prominence of these tactics of 'othering' (Sennett 1980). Thus, the practices and their socio-technical elements, emplacement and interaction, co-constitute and mediate the structuration, agency, politics, capitals and exchange (social, symbolic, cultural, economic) of societies and daily life (Bourdieu 1979: 112; Schatzki 2013).

The habitus concept hence articulates the social construction and distribution of the elements and modes of practice and change that others have utilised to highlight the positioning and politicisation of certain knowledges, meanings, classifications and artefacts (Geertz 2000; Foucault 1979: 24). Within this habitus, social groups are differentially positioned and thus able to 'carry' a practice and fulfil its valued ends (Shove 2002: 80). Considering this allows us to locate points of intervention and move towards a more equal actualisation of intervention benefits, mobilisation and scale-up through recursive performances of specific, disparate yet often interrelated goals (Shove 2002: 154) and practices (Walker 2013: 186; Hitchings 2013). Habitus or practice system positionality hence enriches insight into the dimensions and dynamics of agency, exchange, exclusion and 'othering' highlighted by Chapter 2 as critical oversights for sustainable development. The avenues it indicates for enhancing research and

⁵⁷ Other examples include Newton (2001), Miztal (2013). They premise social capital on trust, values and consensus without fully accounting for the construction, maintenance and contestation of these (c.f. Warren 1999; Adger 2001a; Sen 2005). Bourdieu contends that these are products of practices within the habitus and its 'fields' of power and struggles (Bourdieu & Wacquant 1996: 76).

development are further augmented by considering the range of practice components influencing these and everyday capacities and doings, not least meanings, abilities and emotions. Bourdieu (1998b: 40) signifies this calling for development to embrace the sum of the material and symbolic dimensions associated with activity and inactivity into something of an “economy of practices” and “economics of happiness”. Thus, through practices, we can advance concerns raised by proponents and critiques of the capabilities, needs and rights approaches of the neglected importance of moralities, skills, emotional wellbeing and social systems of welfare and exchange for advancing sustainable development (2.3, Gasper 2002; Robeyns 2006).

This multidimensional interdependency of means, structures and effects co-constituted in social practices is further illustrated by Schatzki’s ‘teleoaffectivity’ and “teleoaffective structures” concepts: “a range of normativised and hierarchically ordered ends, projects and tasks to varying degrees allied with normativised emotions and even moods” and essential to social life and praxis (1996: 89; 2010: 80). This concept allows for a constitutive role of materials in everyday life (cf. Latour 2000: 113), yet invaluablely stresses the intertwining and structuring of the elements of practice in their moments of performance whose universal feature is the “omnipresence of affectivity” (Schatzki 1997: 302). In underscoring normativity, this concept also accentuates the socially constructed nature of agency, priorities, ‘rules’ and relational bonds beyond those of officialdom and rather enshrined through, and mediated by, custom that enable and reinforce social being, distinctions and action through their co-constitutive ‘emergent order’ that interventions must heed (Byrne 1991; Schatzki 2013: 34).

Finally, this co-constitutive relationship is reinforced by Giddens depiction of the system of institutions, rules, resources, morality and beliefs that are simultaneously medium and outcome of practices and both enabling and constraining by shaping the production and reproduction of social action and the means of system reproduction (1984: 19, 24-25). The value of this duality of structure explanation is threefold. First, it enables social practice theory to attend to the dualisms of agency and structure wherein the key domain is not individuals (e.g. classic development and Sen’s approach) or any form of social totality or actor relations, but social practices (Giddens 1984: 2).

Secondly, in accentuating the drawing together of essential elements as both processual and structural, it implies the socially mobilised nature of development patterns and effective change transcending determinism or voluntarism and active/passive, objective/subjective

distinctions⁵⁸. Instead, it signifies that the normativised and normalising nature of practices rather render them capturers of their carriers who are not necessarily compliant, witting or reliable recruits (Bourdieu and Wacquant 1996: 167-168; Shove et al. 2012: 126).

Thirdly, it further highlights the social requirements, resources, roles and forms of agency and order fundamental to daily life whose co-constitutive practice relationship renders them structured, ongoing, relatively durable and presupposed by previous practices and their constructions of social institutions and traditions (Pred 1982: 8). Indeed, Schatzki's plenum of practices, Shove et al.'s (2012) practice complexes and structural theorists notion of 'Regime' further stress the importance of these dualities in daily life, settings and transitions whilst also including the role of natural and artificial physical dimensions (Kemp et al. 1998; Smith and Raven 2012). This guides us to the need for new practices, visions and standards and their institutional endorsement (Lemke 2001; Smith 2012).

Practices, therefore, are the "structured structures that orchestrate action without being the product or outcome of a conductor" that, through habits, experiences and templates, presuppose outcomes even before they have occurred (Bourdieu 1984: 72). Practices key to wider routines may thus entrench the means for their production and reproduction, explaining path dependence and 'lock-in' widely shown to impact innovation and development transitions (Unruh 2002; Geels and Schot 2007)⁵⁹. Practices hence shape the being of elements and encounter of the structure that set the context for what people can do and feel (Heidegger 1985: 217), for "life must be lived amidst that which was made before" (Meinig 1979a: 44), shaping experience and future predilections (Pollak 1970). Yet through the contingencies and performances of practices that constantly affect one's means to either reinforce or modify their structures, the productive and political nature of the habitus and arrangements of practices constitutes a setting of conflict and potential change (Bourdieu and Wacquant 1996: 133).

⁵⁸ And, similarly, other limiting binaries, as we see throughout the empirical analysis, including human/non-human, self/other, local/global, nature/culture, place/world, practice/culture rational/emotional, discourse/action, reality/representation, continuity/dynamism, belonging/movement (cf. Casey 1993; Descola & Palsson 1996; Escobar 2001a; Tsagarousianou 2004; Peteet 2005; Shamir 2005; Sharma 2007; Kjellberg 2008; Meah 2014b). Cloke & Johnston (2005) underscore the value of this in a useful chapter considering such dualisms, adding to debates ignited by Laclau & Mouffe (1985) that although problematic and intractable under dominant theoretical framings and reductionism, their tyranny is surmountable through multifaceted, fluid constructivist approaches.

⁵⁹ Examples provided by David (1985), Arthur (1989) and Beckert (1999). The slow growth of renewable energy practices is a contemporary exemplar, discussed well by Kemp et al. (1998), Tsoutsos & Stamboulis (2005), Jacobsson & Johnson (2000), Geels (2012) and Simmie (2012).

3.5. Summary, Implications & exemplification

This social practice outline presented a framework for understanding the experience, process and embedding of the pluralities of everyday life and change. Through this, we can become better equipped for apprehending what effective interventions entail and the possible extent of its effects. Insights into this include seeing that innovations must be embedded, and most effectively occur, within the situated routines of the society in question as only collectively performed practices develop the necessary innovation and social modifications necessary for ongoing use, development and support of the innovation/intervention. This co-evolution is necessary because innovations only function and socialise through social use. This is governed by the highly socio-technically, temporally and spatially ordered lives of society that use either reifies or readjusts (Bourdieu 1985: 204; Hand et al. 2005).

Seeing these conditions and dynamics as part of a contextually specific practice system or segment thereof yields multiple constructive insights. This includes realising the duality of classic binaries; how coordination, interconnections and ordering occurs and how change may be best defined and steered viz-à-viz socially developed norms, elements and their intersecting routines that require being “synchronised” with others across potentially multiple spatial scales (Urry 2011: 123; Sayer 2013). A synchrony necessitating multi-actor collaboration and overcoming opposing elements and structures via practices, especially for innovations that are incongruous to established systems (Urry 2007; Geels 2014). Indeed, by suggesting the importance of (embedded) social relations, competencies, meanings and materials, the ontology suggests the ends to which collaboration should focus, and the actors necessary for this. This includes those responsible for making the elements (un)available, customary and organised, and how people vary in the degree to which they can perform such integrative work (Watson and Shove 2006).

This guides the onus away from technologies and the behaviour, attitudes and choices of individual citizens, and instead to institutionalised assumptions, narratives and diverse systems of norms and capabilities (Shove 2003b). For access and development, this predicates thinking in terms of participation in practices subject to unequal roles, abilities, institutions and benefits that relate to cumulative and unequal effects of routinised experiences (Bordenave 1976). These “must be attended to” (Hughes 1987: 465), via considering which elements and structures in a locale make courses of action possible and the consortium of

actors across the system required for mediating these (Sparagarren 2013; Judson and Maller 2014). These dimensions and structures are products of recursive practices and hence socio-technical, processual, contingent and enacted, allying with symbolic interactionist and constructivist views of structures, institutions and development⁶⁰.

This positions capacity building as the means to undertake tasks enhanced by experiential learning (Heinrich 2001; Young 2009) that should expand practices to new sites, domains and social groups (Bowles and Gintis 2002). This advances calls for interactive, pluralistic, collaborative networks of reflexive and coordinated participation and learning from government, market and civil society at multiple levels (Berkhout et al. 2004; Smith et al. 2005). These principles have been incorporated to some extent in methods such as sociotechnical design (e.g. Sacchi 2004), reflexive design (e.g. Grin et al. 2004), and reflexive governance (e.g. Loorbach and Rotmans 2010: 197)⁶¹. Local-level interventions and community action must, therefore, knit with higher-level policies and infrastructures (Seyfang and Smith 2007; Ederington and McCalman 2013). The place of power in systems of practice instructs that although this is a two-way process, fostering this knitting must be incumbent upon the dominant power holders of state and corporate institutions (Seyfang et al. 2014).

Yet in highlighting the ongoing (re)positioning and (re)shaping of technologies, provision and welfare in and through everyday performances (Jackson 2004; Everts et al. 2011), practice theory allows us to further operationalise these calls whilst problematizing contradictions and hegemonies contained within concepts that inform development pathways. These include 'development', the 'domestic', 'community', 'traditional' and 'modern' (Miller 1998a: 19)⁶². Instead, the ontology guide us to consider these and sustainability pathways as co-dependent on co-evolving environments wherein bodies, predilections, moralities, objects and infrastructures are continually embedded, "configured, contested and emergent" (Shove and Southerton 2000; Shove et al. 2007: 114).

Moreover, the interdependencies of practices imply that the sites and ways in which practices relate are possible innovation-junctions. These include myriad elements, elemental-links and arrangements, signifying multiple gateways for introducing change (De Wit et al. 2002; Pantzar and Shove 2006). The requisites of practices also indicate the potentially considerable impact

⁶⁰ Including Stone & Hughes (2002), Dodds (1997), Routledge (1996).

⁶¹ See also (Kemp & Loorbach 2006; Voss & Bauknecht 2006; Bos et al. 2009; Elzen et al. 2012). An interrelated field underscoring these points is 'transition management' (Rotmans et al. 2001).

⁶² Discussed further by Parsons et al. (1965), Levy (1966), Phal (1970: 63), Cooke (1989), Duncan & Savage (1989), Chaskin et al. (2001), Logan & Molotch (2007: 128-145), Shaw (2008), Phuspa (2011).

of any intervention and the complexity, dynamics and intertwined performances, materials, meanings, competencies and associated effects analysts should be attentive to (Ingram et al. 2007; Jensen 2011). This is consistent with the need for inclusive approaches that recognise and build the diverse interests, endowments and capacities of communities, individuals and other stakeholders (Stirling 2008; Walker and Shannon 2011). Furthermore, it indicates the importance of social learning for uptake and one that occurs via and in practice (Brown and Duguid 1991; Hager 2012); supporting commands for development to empower marginalised groups (Lehmonnen 2004; Gupta et al. 2008).

A social practice framing uniquely enables such principles to be operationalised, however, by showing that although multi-level actors are implicit in the distribution of resources and overcoming inequalities (Leach et al. 2015: 30), only in the performance of specific, interdependent practices can various functions be achieved and reproduced (Walker 2013: 185). This allows practices and boundaries to be recast and be more inclusively shared (Hitchings 2013), mobilising alternative framings of entitlements, functions and disparities through social practices (Naussman 2002: 36; Duguid 2008).

The framework signifies that consumption and production are interdependent, social and continuous aspects of everyday life that moulds the environment in which it is situated, and whose particularities are embedded within, and require investigation of, the components and systemisation of social actions (Lave and Wenger 1991). Effective interventions may hence be those that blend and co-evolve with society, becoming maintained and modified as part of everyday life: an active, relatively durable yet dynamic social process requiring continued work for 'successful' integration in daily routines that are subject to competition, synchronisation and reconfiguration on many fronts (Warde 2013: 25).

Examining practices may thus suggest fronts which are particularly conducive to reshaping daily routines and the consumption, interactions and outcomes these entail. The theory also notably frames how these routines hang together in relation to other domains pertinent for sustainability transitions and sustainable development. It helps reveal, for instance, that the dynamics and contingencies of social practices are manifold and further include inter-task (cooking, eating, transporting), inter-setting (the household, the workplace, the 'public', the market, the state), inter-elemental (skills, ethics, expectations, convenience, finances), inter-functions (caring, socialising, staying healthy, warm, clean) and temporal (notions, demands, schedules) considerations. This allows analysts to explore which practices occur within and across resource intensive domains and hence which practices or dimensions may be especially

focal for engendering change and better coordinating policies, organisations and interventions to ensure an equitable distribution of support is provided (Taylor 2000; Bradford 2005).

Moreover, the open-ended nature and various states of practices, practitioners and dimensions thereof, and focus on everyday citizens, provides reflexive, inclusive ways of defining normative goals, discourses and pathways of which development and access is archetypal (Hand et al. 2007; Schatzki 2013). It provides a mechanism for constructing these through the performative, reflexive interaction between the range of complicit actors (McFarlane 2009; Watson 2013: 162). Tracing the practices, their dimensions and interdependencies across domains reveals these necessary actors and means for collaborative interactor practices that chapter two suggests is most effective for amplifying effective innovation and development (2.4)⁶³.

This centres attention on common consumers, mundane routines, capabilities, multidimensional and diverse conditions, 'publics' and pathways (Costanza and Folke 1997; Purdue 2001: 47) that are iterative, flexible, needs and consensus-orientated and community engaged across all intervention stages that Chapter 2 signified as instrumental for sustainable development yet conventionally excluded (Adesina et al. 2000; Gupta et al. 2008). Practices thus provide an ideal platform to engage with communities, overcome the neglect of forms of power, interpretation, competence, othering and expertise, and embrace the breadth of possible innovations that may bolster sustainable development (Shove and Hand 2005; cf. Dahlander and Frederiksen 2012).

Yet a practice gaze highlights that the ongoing effects of these preconditions, process, and outcomes are stratified via diverse geographies of differencing. These reflect and reproduce the elements, doings and sayings⁶⁴, capitals, institutions and economies of practices that suggest considerations for engendering equitable sustainable development beyond the lens of alternative frameworks. This reinforces the multi-dimensions of use and what use and maintaining it entails, the importance of relinquishing essentialist views of technology, place, producers and consumers and doing so through social practices (Abu-Lughod and Lutz 1990; Shove et al. 2007: 10). Such affordances expands opportunities for innovation and sustainable

⁶³ Exemplified further by Poncelet (2001), Marra et al. (2002), Hemmati (2002), Innes (2011).

⁶⁴ The doings & sayings of practice become significant to the forthcoming empirical analysis & so I will now clarify that by this, à la Schatzki (2010: 72-78), these signify non-discursive & discursive routines, respectively, are interrelated, both constitute actions & collectively signify a practice yet often reveal different aspects of a practice, practitioner & context (Mills 1940; Sewell 1992: 13; Mayer & Argyres 2004). For these reasons, the analytical framing of this thesis treats discursive & non-discursive performances mutually yet as able to offer distinctive & complimentary insights.

design and consumption and enables insight into the contingent needs, interpretations and skills of individuals and groups, both those that are enrolled in a club of practitioners and those that are not, the innovators, conformers, the excluded and intentional non-users, and why this is (Star 1991; Shove and Warde 2002; Massanari 2010).

Practices thus provide a unique analytical unit through which to zoom in on the nuances of everyday life and zoom out to the relational processes and setting in which they are located, organised and remoulded (Nicolini 2011; Watson 2012). These practice relations constitute a socio-technical environment or “nexus” wherein sustainable development may occur or be opposed through the interplay of its co-constitutive elements (meanings, materials, competencies) and practices embedded over multiple domains (e.g. household, workplace, family, market), sectors (e.g. public, private, voluntary; water, energy, food) and functions or projects (Schatzki 1999; Watson and Shove 2008). These intersections signify possible fruitful innovation moments and spaces (Pantzar and Shove 2010; Warde 2015)⁶⁵, such as in the interstices between the cessation and onset of projects and the confluences between practices (Watson 2013). This is being indicated in the success of Japan’s Cool Biz strategy that minimises workplace air conditioning energy use by adjusting customs through modifying their underpinning materials and meanings through institutionally endorsed collective campaigns and procedures (Shove and Walker 2012; Shove 2014)⁶⁶.

Moreover, the practical frame of reference provided by a practice ontology that does not “reduce the scope and ordering potential of reason” enables more textured less partial ways and of considering how agency, society and innovations function, evolve, interconnect and hence influence others and become path dependent or vary than other ontologies (Schatzki 2001: 3; Terlaak and Gong 2008). This includes others premised on socio-technical systems, including those concerned with webs of relations⁶⁷, or those giving precedence to either local (e.g. Goffman 1956) or macro interactions (e.g. Tarde 1903). Moreover, practices are diversely manifest, contextualised and dynamic, providing a more readily definable, insightful and less subjective unit of analysis than alternatives. This includes the scales, domains and premises of analysis, the normativised and taken-for-granted, the sensual, symbolic and implicit, and functions actors ‘claim’ they fill (Hartman and Stafford 1997; Reckwitz 2002: 246). Thus, for

⁶⁵ Akin to Rogers’ ‘transitional spaces’ (2003; 2010). Emphasizing how the spaces of social activity are often limiting for innovation, however, see Murdoch’s (1998) discussion of ‘prescriptive spaces.’

⁶⁶ For a more detailed account of this see (Mendelsohn & WRA 2008; Aliagha 2013; Janda 2014).

⁶⁷ Including ANT, institutional theory and transitions theory. (E.g. Van den Belt & Rip 1987; Rip & Kemp 1998; Dosi 1982 1984; Carroll & Kellogg 1989, Schot et al. 1994; Elzen et al. 2004; Latour 2005).

sustainability and sustainable development, Giddens' (1984: 2) contention that practices should be taken as the 'basic domain' in social sciences appears particularly pertinent.

Interventions to change transport or washing routines, such as to more sustainable alternatives, must hence interrelate with a consortium of practices and their transpatial suite of socially and technically intertwined and embedded dimensions that signify "sets of requirements necessary for competent and necessary engagement" (Southerton 2006: 440). These all occur within a practice system and hence micro, 'local' or macro, 'global' phenomena are all products of practices constituted by, respectively, slices or features of practice bundles or constellations thereof. Whilst this signifies the need for systemic, interdisciplinary development approaches, the insight that both the process and structuring of pathways and the social are constituted by practices (Wittgenstein 1966: 13), the potential of small-scale and community-based interventions that address local needs and bigger-picture challenges via knitting with higher-level policies and infrastructures is also signalled (Berkhout et al. 2003; Church 2005). Indeed, contrary to the ontology's predominant application, no primacy is assigned to a particular analytical scale or element of practice. The two foremost current foci of practice theories reflect this: the affective minutiae of consumption, welfare and exchange (e.g. Pink 2005; Jackson 2015) and the meta-context of power, structuration and governance (Schatzki 2014; 2016; Watson 2017).

To exemplify many of these points that warrant consideration in development interventions, let us consider the case of auto versus velomobility. The latter, a common transport practice in some Western European countries between the 1940s-1970s⁶⁸, exhibits a rise and decline, as Watson (2012; 2013) explains, intrinsically related to the practice's performance developing and binding its required elements and infrastructures and subsequent decay and displacement of those due to substitution to, and competition from, emergent practices and elements. Insights from STS substantiate that crucial developments for the rise included material (especially the "safe" bicycle design), meanings (fear, acceptability, perceptions of risk) and competency co-evolutions through ongoing use and interactions within society (Woodforde 1970; Trevor and Pinch 1986). For those that still cycle, these attributes remain significant (Whitaker 2005, Garrad et al 2006; Cupples and Ridley 2008), especially for utilitarian rather than sport or leisure cycling (Wood 2010; Lovejoy and Handy 2014).

⁶⁸ Cycling in the 1940s was a dominant mode of transport in the UK, especially in smaller settlements yet currently accounts for approximately 2.8% and 1.8% of daily transport modalities in England, Wales and Scotland, respectively (Pooley & Turnbull 2000; ECF 2015). In other countries where cycling also popularised, however, it remains common, particularly the Netherlands, constituting 36% of the transport mode (ONS 2014; ECF 2015).

The emergence of automobility practices, however, although facilitated by the environment created by cycling, including maintenance capabilities, conventions and meanings of personal mobility, re-orchestrated the socio-technical landscape into one that established the conditions for its self-expansion and the demise of cycling (Urry 2004: 27; Røpke 2009). Although the continuance of certain elements illustrates that elements may be comparatively stable and hence further influence the development, alignment and appropriation of innovations (Kemp et al. 2001: 276; Shove and Pantzar 2006), driving conflicted with cycling in various ways. It conflicted both as practice-as-performance and as-entity by adjusting its elements and links essential for its popularised symbolic and performative reproduction and developing others that, in recruiting and displacing former practitioners, out-competed cycling (Geels 2004; Watson 2012). Meanings, for instance, adjusted throughout the social and political system in changing rules, standards, and notions encompassing privacy, status, emotional symbolism and liberty (Horton 2007; Steinbach et al. 2011)⁶⁹.

These allied with other signifiers of identity and large-scale, technocentric policy paradigms inimical to cycling (Cahill 2010)⁷⁰. Cycling feasibilities thereby diminished as necessary infrastructures, expertise and faculties adjusted in favour of automobility (Geels 2004: 20). Automobility dominance thence became self-sustaining and self-expanding through modifying practice demands, perceptions, institutions, distances and speeds, reconstituting the interlinked geographies⁷¹, norms (Spurling et al. 2013; Aldred and Jungnickel 2013; Kent 2014) and production-consumption systems (Linda 2003; Hargreaves et al. 2013). Subsequent changes of increased automobile traffic, emotions and spatialities further disabled cycling (Srinivasan and Rogers 2005; Furness 2010). The influence of practices on other routines and the sociomaterial setting signifies that practices and innovations in practice organise daily life and spaces such that certain practices and consumption patterns may become increasingly co-produced, embedded and seemingly necessary (Sheller and Urry 2000; Bohm et al. 2006: 3)⁷².

Practices may adjust with other practices and the systemic interaction of practices is central to their dominance and transitions (Shove et al. 2012). A duality that points to the multi-actor, socio-technical nature of consumption and change (Appelbaum 1997; Smith et al. 2005). As such, what people do, value, understand and feel and which innovations gain practitioners

⁶⁹ (Also Weiland 1995; Diestra & Kroon 1997; Roots 2005; Rajan 2006; Schwanen et al. 2012).

⁷⁰ (See also Polk 2004; Sheller 2004; Golbuff & Aldred 2011; Murtagh 2012; Aldred 2012; 2013).

⁷¹ See, notably, Thrift (2004), Gatersleben (2007) and Aldred (2010).

⁷² Further scholarship reinforcing this point include Banister (1994; 1999), Kingham et al. (2001), Geels and Kemp (2007), Bergek et al. (2008), Birtchnell (2012), Vreugdenhil & Williams (2013).

and thus function, socialise and scale-up, are somewhat systemically defined and bounded (Sayer 2012; Watson 2012). Emphasising the primacy of practices in this surpasses other socio-technical ontologies by showing how innovations, processes and systems become nested, normalised, expressed, impacting and mediated in society by social performances (Schatzki 2013). These require the routinised production and interlinking of certain elements⁷³ that may be more or less enduring but are always subject to reinterpretation and reordering via relatively transitional forms of social practice and arrangements thereof (Elzen et al. 2004; Shove 2010). A practice ontology thus facilitates the pressing task of researching how innovations become routinely incorporated and sustained in everyday life⁷⁴.

Further manifestations of the relative robustness and reconfiguration of elements include remnants of pre-industrial and industrial age elements that still pock post-industrial landscapes, such as abandoned or converted rail lines, smelting chimneys and warehouses whose intersubjective meanings, competencies and narratives may also endure (Ingold 1993)⁷⁵. Yet through being reworked into new practices and social geographies, they may also be modified, such as through gentrification into places of upmarket housing and culture. These examples also signify that it is not enough for these things to change at the level of the individual; materials, meanings and abilities are inevitably social constructions (Pearce 1994).

Through scrutinising practice dynamics, we thus see the diverse, interdependent requirements for sustaining and modifying dominant practices and the potential of elements, modes and systems of practice to co-evolve and seed future practices or prevent both re-emergence and the entry of others (Gram-Hanssen 2011). This includes socially mediating and co-produced practices through their consumption that re-form and reproduce phenomenological elements, interacting behaviours and systems of provision and consumption (Spaargaren 2003; Shove and Walker 2010). Practices reveal that these are diversely embedded yet contain the conditions for dynamism and augmenting development pathways (Lister 1999; Abrahamsen 2004: 1455). These points are summarised in Table 3.1.

⁷³ Rather than developments in 'niches', clusters, 'arenas of development', or networks (Hughes 1979 1983; Kemp et al. 1994; Jørgensen & Sørensen 2002; McDonald 2008).

⁷⁴ For extra key e.g.s of this, see May & Finch 2009; Gram-Hanssen 2010b; Wallenborn & Wilhite 2004).

⁷⁵ I.e. ideas, sentiments & evocations of rurality, agrarian artefacts & landscapes, as Constable's Haywain & Gainsborough may remind us (Also Bohm 1980, Cosgrove & Daniels 1988; Rose 1993).

Table 3.1. Key concepts & implications from a social practice theory for advancing innovations & sustainable development.

Key Concepts	Theories of practice	Sustainable development implications
Basis of action	Shared, normativised and socio-technical rather than individual choice, actor or silo.	Reveals hidden development inequalities and requirements. Boost social abilities to perform.
Processes of change	Emergent rather than necessarily causal.	Reflexive, dynamic, open, pluralistic approaches required.
Policy positioning	Embedded in the systems of practice it seeks to influence rather than external approaches.	Multi-actor practices required that co-evolve horizontal and vertical processes and ties.
Transferable lessons	Diversely contingent: historical, cultural, spatial specificity.	Appraise pre-existing practices, arrangements, elements and positionalities for each context.

Source: Author, as derived from the thesis research through a specifically sustainable development and sustainability orientated engagement with social practice theories.

3.6. Conclusion

Energy consumption and innovations are central to, and normativised within, everyday life. Energy and development interventions require grounding in a framework that helps accounts for this process and implications. To this end, this chapter has outlined a social practice theory and made the case for its unique value for encompassing the gamut of everyday life - meanings, emotions, skills, materiality, discourse, doings and their coordination, tensions, contextualisation and institutionalisation – for pragmatic considerations of social action, resources, order, scale and agency. Moreover, the chapter shows that framing these in terms of practices, their interdependencies and dynamics, yields compelling purchase for attending, both ontologically and heuristically, to issues of wellbeing, equality, livelihoods, innovations, learning, socialisation, normalisation, path dependency, resistance and interventions for change. The theory's phronesis for sustainable development, therefore, is multifaceted and lies in directing attention to unheeded dimensions, structures and processes that more fully encapsulate, mediate and anticipate the interdependencies, pluralities and contestations of everyday life and how interventions and enhancements may come to be.

Juxtaposing these discussions with those of the previous chapter exposing the critical theoretical and empirical lacunae and challenges for advancing sustainable development approaches, further signifies the prospect of applying a practice-ontology to the study of energy access for augmenting development insights and pathways. Indeed, the convergence of the practice insights with the sustainable development frameworks and empirical constraints manifest in the pervasiveness of the diffusion paradox, stratified development and unintended outcomes, consolidates this. This conjunction and application for the empirical study of energy access for sustainable development signifies a first for the theory and demonstrates its multi-contextual value and means to further advance the theory, its implications, and 'access' approaches. It is to this empirical focus we now turn.

CHAPTER 4

Research Design

4.1. Introduction

The core aim of this thesis is to explore ways to enhance energy access for sustainable development. This chapter outlines the methodological approach of the primary research for supporting this. A qualitative research approach was designed to mediate the limitations of researching the social. The approach closely relates to the epistemological stance, research gaps, and contingencies faced during the research process. Chapters two and three signalled the imperative of sustainable development research attentive to the multiplicities of everyday life and change wherein energy access and any innovation, to have effect, must be embedded. These dimensions were experiential, dynamic and intersubjective, premising the need for exploratory research approaches encompassing the plethora of dimensions, stakeholders and means of agency and ‘participation’ over which energy access development may relate and from which insights best emerge.

A multimethod approach was designed to achieve this reflecting the thesis research objectives articulated in Chapter 1. These are: to evaluate the nature of service ‘access’ required for enhancing sustainable development outcomes; explore the dimensions required for enhancing access to modern energy services in remote regions for sustainable development; investigate how these dimensions come together to enable this; and to identify the key actors responsible for these dimensions and arrangements and their requirements to best support this. Nepal was chosen as the research site for signifying a region wherein energy access is a central development issue exhibiting varied approaches to rectifying it and thus broadening the scope of possible insights and implications.

This chapter outlines the approach as follows. It starts, 4.2, with explaining my epistemic stance and its influence on the research design. The methodology is then broadly outlined in 4.3 before explaining each method in detail in 4.4. The chapter then presents some of the challenges and considerations negotiated throughout the research that enhanced the ultimate effectiveness and quality of the research process and outcomes.

4.2. Epistemic orientation: Co-producing the social, dynamic & contingent.

Energy access and sustainable development, to have effect, must be embedded in the social. From the preceding chapter developed in response to the ontological and heuristic limitations underscoring development pathway constraints as uncovered in Chapter 2, the practice ontology instructs us that this integrative, politicised, processual and normative space is co-produced. It integrates components and systems of production, consumption and reproduction and locates research within the diversely situated, emergent phenomena and inter-actor dynamics of specific ways of experiencing, (re)producing and (re)arranging the world (Harrison 2000; Preda 2000; Campbell and Vainio-Mattila 2003).

This requires attentiveness to the multiplicities of social being, difference and agency and how they are variously structured and institutionalised (Drezner 2000; Ruch 2002), but also their role in patterns and dynamics of change (Mercure et al. 2014; Liedtke et al. 2015). The crux of Chapters 2 and 3 was that these are co-constituted, socio-technical, experiential and best manifest through the situated and routinised doings and sayings of social groups whose praxis may be diversely precluded by the components and setting they are co-constituted by. Research must thus engage with the materiality and sociology of the phenomena of study and interlink interpretations, actions, context and effects (Law 2004a: 116; Lundvall et al. 2011).

Qualitative researchers become involved in this interaction such that research becomes a similarly co-produced, emergent process where the researcher plays a co-constitutive role (Gubrium and Holsten 2003; Cameron 2011). To account for this and augment the 'thick' insights it affords requires researchers to recognise their co-evolving affect in the research process and setting (Gellner 1970; Asad 1973: 17). This may be invaluable for improving social, sustainability and socio-technical research through expanding forms of interaction, data, and contextualisation via developing shared and situated trust, rapport, knowledge and actions through ongoing practice (England 2001: 210; Bailey et al. 2010). Doing so demands a constructivist approach embracing positionality, process and the spectrum of marginalised and "hegemonic discourses and practices"; performers and non-performers, performed and non-performed, the said and unsaid (Hammersley and Atkinson 1995; Anthias 2002: 511).

Yet the pluralistic contingencies of everyday life, consumption and change are variously embodied, expressed and situated (Best and Maier 2003; Bhatia et al. 2014), demanding engagement with the diversity of knowledges, voices, experiences and institutions (Koka and Prescott 2002). The previous chapters signified that this diversity is simultaneously symbolic, affective, experiential and systemic and only communicated and apprehended through embodying the components and grammar of the specific, interdependent practices that co-constitute them (Wittengstein 1969: 58; Walker 2013: 185). This makes people's activity in their setting worth concerted and ongoing reflection (Silverstone 1993; Whittington 2010: 111), requiring living and performing the practices and sites of practice in their communities (Appadurai 1988: 32; Hartman 1996: 97).

Consequently, I counted my own engagement with the materiality of the research sites as valid data and remained observant within the field to the varied forms of data both during the more formal research methods, and also in transit to, around and within the research sites (Smith 1996; Marcus 1997). The ethnographic, multidimensional-orientated approach this signifies thus converges compellingly with a practice-informed epistemology and the broader social constructivist paradigm. Substantiated across the social science disciplines, they consolidate the need for research to engage with the “varied and multiple” forms of being and meaning that occur and transmit through ‘emplaced’ interaction (Creswell 2013: 20). Following the practice-informed epistemology, however, this thesis conceives of these interactions and substantive emplacements of communities as situated in and through shared practices and attributes and outcomes thereof, such as shared identities, intelligibilities, moralities and signifiers of belonging. Thus, the communities are situated relationally rather than necessarily geographically and may be spatially and temporally dispersed.

The forms of energy access and sustainable development, however, like societies, practices and their contexts, are variegated and influenced over horizontally and vertically associated systems including citizen groups, policy makers, producers, development bodies and consultants. Consequently, a comprehensive analysis aiming to advance energy access thinking, opportunities and outcomes must consider multiple pathways, multiple communities and multiple parties and their possible interconnections, capabilities and constraints. Apprehending this within the tapestry in which they are contingent and distributed requires the contextualised “thick descriptions” of the sorts Geertz (1973) famously explains and have been much emphasised within the social constructivist tradition. In substantiating that agency occurs within the social-technical world in which it mediates and is constitutive of, the analytical gaze must encompass both realms and conceptualises these as interdependent in

the production of means and effect (Bijker et al. 1984: 107). This allies with increasing demands for nuanced evaluations of development attentive to the pluralities of contextualised realities (Vaara and Whittington 2012).

Since the 1990s, many methods have been advanced to support this that give greater account of the diversity of voices, dimensions and stakeholders (Neefjees 2000). These centre on qualitative techniques, ethnography and participatory visual, ranking and performative methods and facilitate giving greater expression to the varieties of knowledge, values, practices and priorities within communities of those affected by, and complicit in, development interventions (Scoones et al. 1994: 4; Mohan 2002). It follows the thesis epistemology of 'community' as constructed, contested and subsuming difference.

Although the value of these methods lie in their ongoing reflexive tailoring reflecting the unfolding research encounter and interdependent forms of knowing, discourse, actions and representations (Berkes et al. 2000), these methods are predominantly partial and inflexible, reifying the determinist epistemologies of the rational-actor paradigm they are premised on challenging (Guijt and Shah 1998: 4; Chambers 2014). Moreover, such approaches further extend the dominant development narrative and ongoing heuristic and pathway limitations by focusing efforts on the presupposed 'elite' as they are more accessible, able to participate, and represent the principal power holders (Lounsbury and Crumley 2007). The resultant "perception bias" is the antipode for furthering development insights and appears particularly pronounced in South Asia (Peterman et al. 2010; Quisumbing and Pandolfelli 2010).

This thesis aims to overcome these constraints by remaining attentive to the micro-dynamics and micro-politics of everyday life and their broader embedding mechanics and structures. Chapter two and three signalled that this requires unpicking often entrenched norms to engender effective research participation whose normativised systematisation obscures and reinforces them (Mosse 1995; Chhotray 2004). The chapters then explicated that this is at the preclusion of aspects central to daily life and sustainable development. This included the vulnerable, unanticipated, informal, relational and fluid (Bogdan and Biklen 1997; Ehrlich 2012). Consequently, the thesis methodology reflects an epistemology sensitive to diversity, co-production and change (Abrahamson 1991; Abrams and Luna 2014).

Ethnographically-informed methods are well suited to this (Gable 1994; Egger et al. 1997)⁷⁶. To further enhance this sensitive and comprehensive approach, these methods were multiple, complimentary and continually informed by the unfolding research interactions and findings (Clifford and March 1986; De Lisle 2011). This sets the precedence for research into the means for energy for sustainable development through a multi-sited and multi-modal methodology alert to the uncertain, co-constituted and dynamic nature of what these means may entail.

4.3. Methodology overview: Qualitative research & interpretative approach

This thesis designed and employed a qualitative-driven research and analysis approach reflecting the research context, objectives and unfolding nature of the energy access and sustainable development fields. This included the need to capture subjectivities and forms of data beyond those suited to quantitative research approaches which have furthermore been extensively used in conventional energy access research. Such approaches are namely national-level surveys, produced generally as a component of a country's national population census rather than an energy or development-orientated focus (Ramachandra et al. 2000; Kanagawa and Nakata 2007). The data derived from these methods is predominately based on economic and technological parameters and limited to household-level energy consumption quantity (kW/h), sources consumed or purchased, conversion efficiency, technologies available, or energy monetary expenditure as an absolute value or percentage of household income (Pachauri 2004; Nakata 2004).

To meet the research aims and extend research insights, there is a need to look beyond these metrics and the limitations of quantitative research methodologies, such as less well representing what is not voiced or purchased and producing broad trends that mask implications (Zwebe 2005; Farmer and Guy 2010). Sen (2003) gives an example of this in survey data and statistical analysis of household poverty concealing the significant dynamics and discrepancies that occur within households and groups, such as mean national poverty decreases obscuring widening inequalities and poverty cycles. Such hidden workings are likely

⁷⁶ Exemplified further viz-à-viz innovations and sustainability transitions by Röling et al. (1976), Kaplan & Duchon (1988), Viller & Sommerville (1999), Yen & Kaplan (1999a), Heiskanen (2005), Wright (2005), Kipot et al. (2007), Troncoso et al. (2007), Jeppesen & Lakhani (2010), inter alia.

to be augmented in studies of sustainability, community projects and energy access characterised by dynamic socio-technical complexity beyond the scope of dominant methodologies (Warde 1990; Walker et al. 2007; van der Horst 2008).

The imperative of attentiveness to the multiplicities of meaning, agency, consumption, needs, impacts and contestation in everyday life beyond the rational, voiced and household-level, thus demands methods receptive to such complexity (Silverstone and Haddon 1996; Crang 2003: 197). Accordingly, the research approach designed for this thesis aimed to get beneath and within the dynamic and often occluded dimensions, processes and outcomes of everyday life, energy access and change as they occur on the ground: non-linearly, complexly and unequally (cf. 2.4; Franke and Shah 2003; Baba 2010). A qualitative, positionality-sensitive research approach, informed by in-depth academic and grey literature analysis in addition to prior fieldwork experience in the region, was developed to best support this.

Energy access for sustainable development is an interdisciplinary issue that intersects fields as diverse as health, forest, livelihoods and urban and rural development and for which actors across the public, private and third sectors are complicit. Consequently, and to enhance the investigation of emergent themes and the research questions with the greatest analytical depth and robustness, it is necessary that the research considers a range of stakeholders, scales, explanations, dimensions and angles, including those not conventionally examined (Lavergne and Saxby 2001; Bazilian et al. 2012).

A pragmatic, explorative approach responsive to their local conditions and the array of stakeholders' needs is most conducive to such a task (Eisenhardt 1989; Bazilian et al. 2010). Indeed, such a multi-perspective, reflexive approach is consistent with augmenting the possibility of making critical contributions to the related academic debates and wider research impacts (Hammersley 2007; Bardouille 2012). It requires exploring and relating issues to stakeholders, impacts and actors (Johnson and Onwuegbuzie 2004). I hence developed a qualitative approach incorporating multiple stakeholders to support this (Hammond 2005; Glaeser 2011).

As informed by Chapter two, this includes the users, non-users, community groups, leaders, marginalised, producers and development bodies (Adhikari 2005; Savocool 2013). Indeed, there is increasing demands for such a suite of actors and the excluded to be at the heart of efforts to improve the delivery, management and use of energy access for catalysing sustainable development (Cecelski 2000; Beck and Marinot 2004; Brew-Hammond 2010). For

Painuly, for instance, including multiple stakeholders in energy access research is necessary to help “reveal the lacunae in existing policies and help in identification of measures to overcome the barriers” (2001: 78). To best coproduce knowledge among these actors and encompass the multiplicities of knowledge and means of expression and participation, methodological pluralism is required (Roth 1987; Lamont and Swidler 2014). Multiple methods were selected that were complimentary, feasible and encompassed the visual, verbal, haptic, embodied, engrained and implicit.

The methods utilised were semi-structured interviews, ethnographic case studies, participant observation, practice sharing, observing community groups and functions, conducting field walks and ad hoc focus groups. These were supplemented by field photos and, where possible, collecting additional secondary data. These were conducted in an interactive, dynamic and sensitive way in a range of spaces according to the participant’s preferences, needs or unfolding research encounter (Senge and Scharmer 2008; Debiel and Lambach 2009). This included private offices, boardrooms, international organisation headquarters and universities for the institutional-level key stakeholder interviews, in addition to more informal discussions with certain actors following invitations to dine with their family.

Case study-based methods were conducted in households, kitchens, farms, water points, local community businesses, markets, meeting and resting points, committee and government offices, schools, health posts, the energy generation and transmission sites and networks, the firewood collection sources, whilst collecting water and on route walking to the case study locations and throughout the dispersed communities. Through such a breadth of sites, the experientially generated data was augmented and robustly contextualised (Morse 2003). The latter for instance, was conducted in a manner analogous to the common community members (walking from the road terminus up to 2 days walk away) to more fully share and understand the experience required for rural communities to meet their energy needs.

The sum was the distinctive value of a multi-sited, ethnographic-informed approach utilising complimentary methods in case studies in contrasting settings (Marcus 1995; Hine 2007). This is consistent with commands for more and process-oriented research, tracing processes and outcomes as they emerge, and modifying the research approach and analysis throughout case study fieldwork to best reflect emergent contingencies (Creswell 2013: 47)⁷⁷.

⁷⁷ Emphasised further by Hutt (1988), Golder & Tellis (1998), Pavlenko & Lantolf (2000), Strauss (2000), Heyl (2001), Onwuegbuzie & Teddlie (2003), Maxwell (2004) and Falzon (2012).

While this approach is able to achieve the necessary 'thick description' as they localise in everyday settings (Geertz 1973), calls for research attentive to multiple actors and understandings within the broader circuits of production and reproduction, signalled the value of supplementing and informing the case studies and data analysis with key informant semi-structured interviews (Lévi-Strauss 1966a; Agarwal and Tanniru 1997). These provided greater analytical depth, perspectives and contextualisation (Blasco and Wardle 2007: 43). To augment this, participants were purposefully selected through a critical assessment of the key stakeholders across multiple sectors and spatial scales and included regional, national and international actors engaged in, influenced by, or complicit for, energy access and sustainable development. These spanned the public, private and third sector primarily in the energy, community, rural and international development spheres and encompassed the forestry, water and financial sectors.

The research process employed a structured framework with clearly defined fieldwork stages and transcription and analysis as an immediate and ongoing aspect in order to best organise and refine the research with each phase and component most effectively informing subsequent phases and methods (Stephens 2007). Organisation included interview and meeting scheduling, pre-interview preparation and case study requirements of route planning, translator arrangements and health and safety contingency planning. The institutional-level interviews and a 4-week preliminary field excursion exercise were utilised to best define and justify case study sites, number of case studies and their durations. The case studies were the final phase of the research to enable the most effective and informed selection of participants, research sites, techniques and foci (Harari and Beaty 1990; Marschan-Piekkari and Welch 2004).

This structuring was also to respond to emergent challenges, enable enhanced cultural and positionality awareness and mediation efforts to best support the research process, such as learning local languages, customs and associated symbolic values (Berkanovic 1980; Vaisey 2014). This supported contextual awareness and reflexivity and mitigating pre-existing differences between myself and the participants to enhance the effectiveness of myself as researcher, analyst and component of the data coproduced (Whyte 1984: 47; Burgess 1999: 48). Similarly, it enabled me to enhance my rapport and effectiveness with my selected translator and limit their mediating role in the research encounters and data co-production process (see 4.5.3).

This is additionally important as the target case study sites are not readily accessible, making return visits to test insights emergent from subsequent methods problematic. Moreover, this timing allowed for gaining insights and access to key informants and gatekeepers through referral from the preceding institutional-level interviews to enhance the case study research component whilst at the same time ensuring all groups are included (cf. Valentine 2005). It also facilitated conducting subsequent follow-up and additional interviews for pursuing any line of enquiry as may emerge as valuable from the case studies. This range of methods and structure enabled an explorative yet robust approach. This included capturing emergent insights through constant reflection and ongoing data collection and analysis to enhance the heuristic and analytical process throughout the research (Bryman 2006). The approach further enhanced research robustness through enabling triangulation, diversity of views, clarifying and expanding data and testing insights through subsequent research (Jick 1979; Denzin 1989). This methodology is complimentary to an ethnographic, reflexive approach to more fully explore the complex elements, interactions and relationships constituting sustainable energy access (Hurmerinta-Peltomäki and Nummela 2002; Berger et al. 2006).

The methods employed are widely supported (Weisner 1996; Marcus 1998; Cloke et al. 2008). Indeed, they are consistent with analogous studies and guidelines for energy and sustainability research (Denton 2004; Leach et al. 2010). For example, a study by Martinot and Reiche (2000) of rural electrification pathways used four research methods: academic and grey literature analysis, fieldwork experience, workshops and interviews. Similarly, Painuly (2001) recommends the use of literature analysis, site visits and interaction with all stakeholders through interviews and observation. Others substantiate these and the use of additional complimentary methods for energy access research, including ethnographic and multi-sited case studies, field observation and focus groups (Van den Buuse et al. 2012, Savacool et al. 2013). Furthermore, the research design aligns with the research goals and epistemological stance of knowledge creation and analysis as iterative, coproduced and optimised through depicting the plurality of experiences, narratives, needs and actors (Berger et al. 2006; Creswell and Clark 2011). Such studies substantiate the benefit of multilevel, multi-actor and in-depth analysis from a complimentary range of qualitative research tools and ongoing qualitative analysis.

In addition to the literature cited above, this research design is supported by a recent research project I conducted on a social-technical system in Nepal for a development organization, International Development Enterprises (IDE). In April 2013, I conducted a comparative analysis of the impact of three types of multiple use water systems for sustainable development of

three remote communities. The project demonstrated to me that particular research approaches are fruitful for the type of community and household level social-technical research necessary for this study. This included the use of key informants as gatekeepers; enhancing the effectiveness of working with translators, the effectiveness of semi-structured interviews with both open and closed questions for generating valuable qualitative and quantitative data and the closed questions preceding open ones to utilise the increasingly conducive interview environment for more expressive answers as the researcher-participant relationship develops.

Finally, it also reinforced previous fieldwork experience in the region and literature recommendations of the value of, and best ways to, appreciate and mediate positionality effects, relationships and engagement with local realities to enhance the coproduction process. Examples included the value of conducting fieldwork through living in the environments of study over a sufficient time period, introducing the research collectively to the community before starting the more formal research methods, explaining your interest, aims and nature of repayment to the community for their participation and conducting this as a two-way process (Harrington 2003; Sixsmith et al. 2003). By encouraging and answering their questions, for instance, I found participant confidence and openness quickly developed. Moreover, it exemplified the conduciveness of this ethnographic approach to, and the value of, the fieldwork schedule being structured yet dynamic to embrace unfolding research opportunities. Examples of this in the thesis case studies included detailed discussions and observational methods whilst meeting or walking with villagers serendipitously met on route to research sites, attending unexpected meetings and invitations, and researching the responses to unscheduled rural power cuts and failures, and the novel use of electricity in rural festivals, market days, elections and enterprise groups' training days.

Whilst these techniques are commonly emphasised in the literatures (Yin 1984; Marcus and Clifford 1984; Bryman 2012), in the particularly patriarchal and marginalised social groups I was researching, I also found significant value in emphasising my respect and interest in them and their perspectives, both verbally and by sharing their practices. This was especially important in the remotest households and with female, disabled or low caste participants. Yet it was also constructive in some of the institutional-level interviews. This research approach is summarised in Table 4.1. It details the methods implemented in relation to the research questions, the scales, sites and units of analysis. Following this, the research locations and methods employed are further described.

Table 4.1. Research design overview.

Research Design: Qualitative, multimethod approach					
Research Aim: This thesis aims to advance understandings of approaches to modern energy services in remote areas for enhancing sustainable development.					
Research Objectives:					
<ul style="list-style-type: none"> ▪ RO1 To evaluate the characteristics of ‘access’ required for enhancing sustainable development outcomes. ▪ RO2 To scrutinise the details of these characteristics to advance understandings of these in relation to key theoretical & practical paradigms for innovations & development. ▪ RO3 To investigate what enables & constrains these characteristics & how they come together to enhance energy projects, services & trajectories for sustainable development. ▪ RO4 To advance a conceptual framework that supports understanding & developing these characteristics & outcomes in both research & implementation to enhance sustainability pathways & sustainable development. 					
Method	Aim	Actors	Location	Number	Data Form
Institutional-level semi-structured interviews	To assess: - key actors, roles, barriers, experiences & perceptions; - How these interrelate, tensions, complexities & requirements; - Enhance contextual understanding; - Gain access to secondary sources & key actors; - Include the greatest diversity of actors.	Institutions, companies, International & national development bodies, development banks, consultants, policy makers, universities.	Kathmandu	N = 30	Recorded verbal & visual data augmented by secondary sources including reports & maps.
Household-level semi-structured interviews	To assess everyday energy & development realities, needs & insights across diversity of perspectives.	Household-level energy consumers & non-consumers of all social distinctions.	3 remote case studies	N = 54	Verbal & visual: viz. emotions, customs, meanings, interactional & situational.
Community-level semi-structured interviews	To assess: - key actors at local & district level; - Energy uses & needs at community-level, their requirements, relationships to other actors, who uses, to what ends, social structures.	Local & district leaders, gov. officers, groups, businesses, managers, teachers, consultants.	3 remote case studies	N = 42	Verbal & visual: viz. emotions, customs, meanings, interactional & situational.
Participant observation & Practice sharing	To develop insights into needs, norms, inter-linkages, means & ends of those with and without modern energy.	Diversity of actors at all levels within communities.	3 remote case studies		Verbal, tacit, embodied, social, time-spatial.
Discussions, field walks & focus groups.	To foster social relations, be reflexive, & best explore unfolding research situations, group dynamics & settings.	Diversity of actors at all levels within communities.	3 remote case studies		As above + photographic & informal data.

4.4. Research design & methods of data collection

This section further explains the research context, research decisions made and methods conducted. The primary research was conducted in Nepal in two episodes. This was to enhance research methods and interpretation by facilitating an iterative approach of reflection and refinement between the methods and data through communicating between and integrating research and analysis. Secondly, the two-trip approach also suited practical issues of site and participant access and safety. These are reduced in the monsoon and winter periods for various reasons, such as due to landslide, flood and water born infection risks and snow cover. Primary research trips were between the start of September and end of December 2012 and February to September 2014. This extensive field period supported an exploratory, in-depth research approach attentive to pursuing unfolding insights and encompassing the multidimensional and multi-actor nature of energy access and sustainable development. 30 elite-level interviews and 10 preliminary site visits were conducted in the first fieldwork period. These were primarily in the capital city, Kathmandu, where the majority of the influential development actors are situated. The three case studies were conducted in the second period in three contrasting rural and remote settings typical of the energy access problematic.

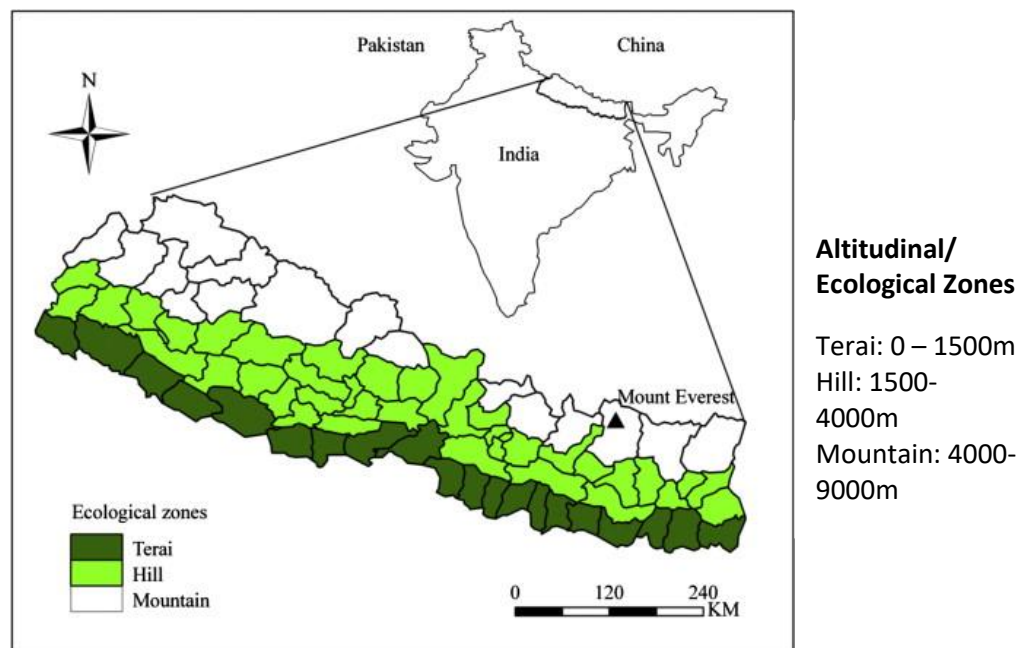
The number of interviews and extensiveness of the case studies and methods employed was determined in situ through first-level analysis throughout the field periods signifying the point of 'saturation': when abundant data was co-generated to substantiate the research questions and no new substantive insights are co-generated by subsequent participants (Byrne 2001; Guest et al. 2006). In total, this resulted in 30 institutional, semi-structured interviews; 10 preliminary site visits each 3 days in duration and including field walks, participant observation and 10 household and 5 community-level interviews; and three case studies each with between 16-20 household interviews, 9-18 community-level interviews and substantial participant observation, practice sharing, observing community groups, meetings and ceremonies and numerable informal conversations.

4.4.1. Research location: Nepal

The primary research was focused within a single country context to allow the depth, contextual understanding, and comprehensiveness of the investigation to be maximized within the research timeline to best attend to the research questions (Ghauri 2004). Nepal is the primary research setting. There are multiple reasons for this. Firstly, Nepal is an exemplar of the energy access challenge: remote regions; strong correlations between very low energy access and low human development indices; and high resource dependency, land degradation and management challenges related to the use of traditional energy sources (Baland et al. 2007; Clemens et al. 2010). To exemplify, over 61% of the total population lack modern energy services in Nepal, predominantly in rural areas, and in much of the mountain zone energy access is as low as 14%, among the lowest in the world (Gurung et al. 2012).

Traditional biomass for primary energy needs, linked to significant environmental and human costs, subsequently accounts for 86% of the country’s total energy use (Bhattarai and Shrestha 2006). Furthermore, over 75% of the population live in rural areas and conventional grid-based energy access is limited in the hill and mountain regions that constitute the predominant geography of Nepal (Figure 4.1) (Bhattarai and Shrestha 2006). These representative characteristics allow the research findings to augment existing studies and inform future endeavours throughout the rural development and energy access landscape.

Figure 4.1. Nepal’s geographical location and altitudinal/ ecological zones



Source: Chhetri et al. (2012).

Three other significant reasons include, firstly, the country has long and varied experience of initiatives to deliver energy for sustainable development in rural and remote regions, broadening the insights that may be drawn upon in the research (Baland et al. 2007; Clemens et al. 2010). For instance, Nepal has over forty years' experience delivering rural electrification and clean cooking fuels whose methodologies exemplify a range of energy technologies, experiences and approaches (Mainali and Silveria 2011; Surendra et al. 2011). Secondly, energy access specifically for sustainable development in Nepal has been made a principal policy priority at regional and national levels since being recognized by community groups, development and state actors alike as the foremost development need and barrier and the priority has subsequently gained considerable support from the international development community (Gurung et al. 2012; AEPC 2013a).

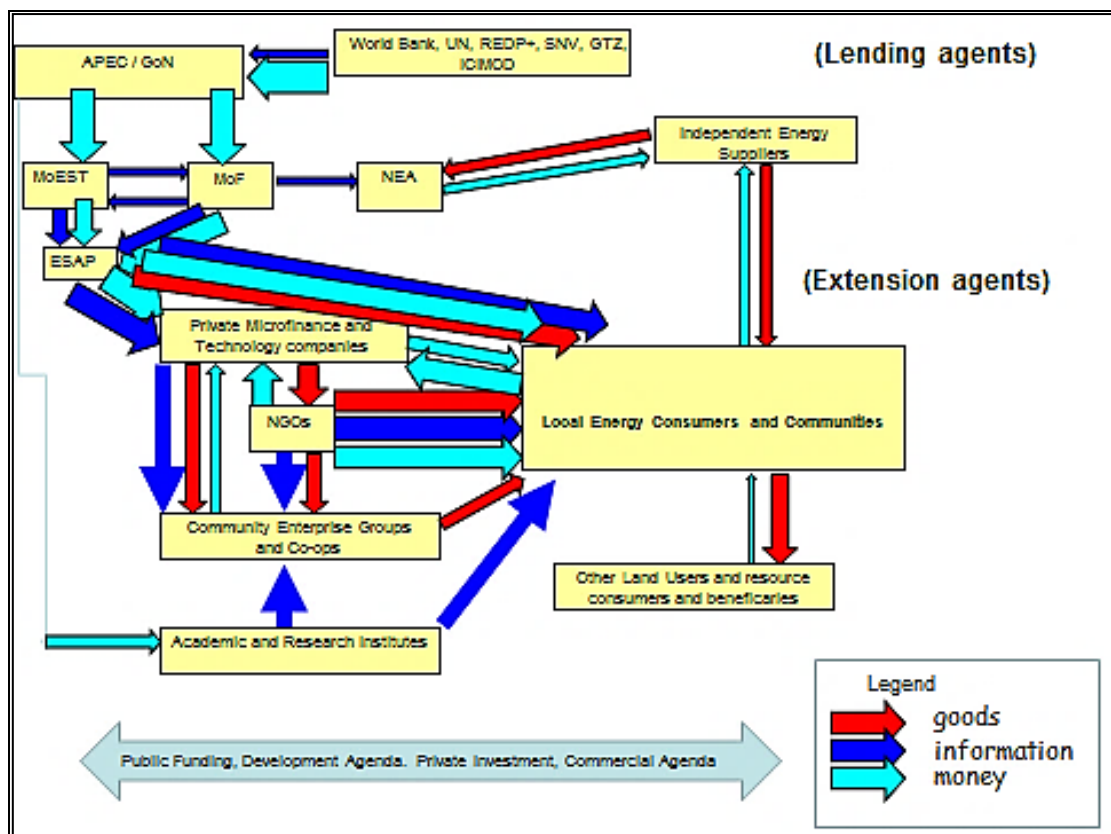
The final substantive reason for selecting Nepal as the primary fieldwork area relates to my pre-existing close engagement with, and interest in, the region following two periods of sustainable development research-orientated work experience in Northern India and Nepal. The former was conducting an accessibility and impact assessment on a new certified seed aimed for the rural poor to boost livelihoods and resilience. This research was supplemented by site visits, community placements, stakeholder mapping, interviews and comparing farming techniques and technologies. The work in Nepal was conducting an appraisal on the use of solar-powered multiple-use micro-irrigation systems over conventional irrigation methods in the hill and mountain zones of the country. Through these, amounting to 12 months, I developed linguistic skills, cultural understanding, strong rapport with key development actors and a contextualized perspective of everyday life and development issues in the region.

These developments are conducive to subsequent research and included an insight that key issues keenly overlapped with energy practices, institutions and services. These reasons signify Nepal as a fitting location for research into enhancing energy access pathways for sustainable development. Other reasons include the considerable potential the country has for exceeding energy needs and enhancing livelihoods and environmental sustainability with relatively low-cost renewable energy, namely through its substantial solar and hydropower potential. Furthermore, through foreign investment, the high upfront costs of above micro-scale hydropower development is not a barrier and surplus electricity production could be distributed to avoid wastage and boost foreign exchange and national development in the process (Sharma and Awal 2013). The research methods will now be further elucidated, starting with the first component of the fieldwork: institutional level, semi-structured interviews.

4.4.2. Institutional-level, semi-structured interviews

The fieldwork commenced with 30 semi-structured interviews or key actors in the energy and rural development sector in Nepal to pull out and pull together insights from an array of especially influential yet siloed stakeholders. They enabled exploring key themes, connections and gaps across a range of scales and positions that preliminary empirical and conceptual literature analyses signalled as significant whilst allowing new ones to emerge (Harvey 2010). The method also enabled developing a deep contextualisation an increasingly rich overview of perspectives and honing in towards resonating and marginalised issues before utilising these developments to refine the subsequent research and signal which areas to zoom in on (Harrell and Bradley 2009; Bryman 2012). Interviewees were selected through a thorough process. Firstly, a process of stakeholder mapping from secondary sources, predominately peer-reviewed papers, was conducted. This is presented in Figure 4.2. The basic links between the actors are included to move towards an understanding of the actor relations.

Figure 4.2. Stakeholder analysis flow chart of key actors for energy access in Nepal.



Source: Adapted from multiple secondary sources⁷⁸

⁷⁸ These include (ADB 2002; WECS 2002; Bhatt & Sachan 2004; Rasmussen & Parvez 2004; Dhakal et al. 2007; Pandey 2009; AEPC 2012; BSP-Nepal 2014; GoN 2011; Krishna & Panya 2011).

From this basis, the key bodies and individuals within the broad categories were identified in two ways. First, from secondary resources such as literatures, institutional websites and communication with pre-existing contacts (Colovito 2013). The second selection method was snowballing. Both methods are consistent with the objectives of maximising data vigour and the perspectives included (Baxter and Eyles 1997; Kvale and Brinkmann 2008).

From these methods, I compiled a list of as many key actors as possible and subsequently grouped them into five categories as follows: INGO and NGO development directors and project managers; governmental policy makers and coordinators; non-governmental community leaders and representatives; private sector directors and managers; independent consultants. I then purposefully selected the target individuals from these that would most enhance the range of perspectives explored and continually refined this list in reflection to the increasing body of insights rather than a pre-defined number, as per the quota sampling method (Miles and Huberman 1994: 27; Bryman 2012). This iteration until insight saturation and the selection methods employed are mutually compatible and enhanced positive response rates through referrals from prior interviewees and contacts (Taylor and Bogdan 1998; Sixsmith 2003). The amicable interactions were also consistent with suggestions that referrals mitigate power imbalances (Seidman 1998).

The interviews were conducted using thoroughly researched and planned questions after clearly locating the roles and wider influence of the individual and their office. Questions prepared were open-ended⁷⁹ and conducted reflexively and flexibly, allowing certain questions and answers to be prioritized according to the participant and unfolding data and additional questions pursued in response to the developing narrative and insights (Morrissey 1970; Hutchinson and Skodol-Wilson 1992). This was augmented through conducting the interviews personally, face-to-face and attentiveness to constructivist and social practice-informed concerns of interaction setting, non-verbal behaviour and expressions, tone, hesitancy, verbal and non-verbal interruptions and interpretation of the 'performance' (Goffman 1976; Sturges and Hanrahan 2004). This provided multiple forms of data beyond the discursive, supporting a clearer, fuller and more honest result that included the implicit, sentimental and contextual (Swidler 2001; Purgh 2013).

⁷⁹ A template of the institutional-level questions & participants is provided in Appendix IV & V.

This was also supported by premediated and ongoing efforts to record, reflect upon and respond to the unfolding research encounter and negotiate any power imbalances through the extensive interview preparation, an appearance and manner that reflected theirs and the use of verbal and non-verbal cues (Miller 1995; Sturges and Hanrahan 2004). Prompts, such as encouraging smiles, reassuring nods, respectful silence or disclosure of biographical, cultural or topical information, were often simultaneously relationship-negotiating/building ploys that mutually enhanced the research process (Gordon 1975; Shaffir 1991: 72-3). The approach thereby bolstered the co-construction and grounding of knowledge allied with the recognised importance of the role of researcher-participant relationships and interactions in the research process (Vaus 1991; Morris 2009) and that such interactions are rarely equal, may be fictionalised, and that a fuller data set helps mitigate and validate against this (Clifford 1983).

The interview approach thus enabled gaining an account of the issues in terms meaningful to the participants, exploring and substantiating emergent factors and enhancing depth via encouraging participant expansion (Aberbach and Rockman 2002; Allen 2004). It also enabled gauging the salience of factors for the respondents (Bogdan and Biklen 1982; Geer 1998) and augmented data validity through not confining responses to pre-defined categories (Barriball and While 1994; Richards 1996). The data generated during each interview was recorded with two Dictaphones and field notes. These did not appear to hinder respondent participation and the latter often stimulated greater elaboration while the former enabled me to engage more fully with the developing narratives and non-verbal data forms. This follows contemporary understandings of 'elite interviews' and explorative research best practice⁸⁰.

4.4.3. Ethnographic case studies

4.4.3.1. Justifying and selecting case studies: Preliminary field exercise

Case study research facilitates in-depth investigation into multiple forms of data, contextual and deeper understanding, and discovery of the links between the macro-level forces and individual practices and choices (Eisenhardt 1989; Yin 1984; 2011). Case studies also enhance exploration and data validity by enabling the illumination and testing of a problem from multiple aspects and measures (Yin 1994; Grisar-Kassé 2004). This is especially the case when multiple studies are conducted (Marcus 1995). Accordingly, three case studies were used to enhance the breadth of investigation and the rigor of the findings (Rowley 2002; Berg and

⁸⁰ (See Stephens 2007; Dexter 2006; DiCicco-Bloom & Crabtree 2006; Burnham et al. 2008).

Lune 2012). These were purposefully selected to provide meaningful diversity whilst being manageable (Stake 1995; Creswell 2007). This espouses the recognised value of purposeful sampling for both case study sites and participants to augment comparative analysis and knowledge coproduction (Danermark et al. 2002; Rihoux and Ragin 2009; Welch et al. 2011). The aim was for the case studies to illustrate exemplar characteristics and models of augmenting energy access in rural areas to maximise the insights that may emerge and facilitate maximising the range of perspectives and experiences considered (Ghauri 2004).

To support this, selection criteria were developed and case studies selected based on capturing the greatest variation within these (Migiro and Magangi 2011). Criteria included population size, socio-economic diversity and status, degree of remoteness, approach typology, degree and duration of energy access, access to subsidies and degree of off-farm employment. These variables are substantiated in the literatures and through the elite-level interviews as key influencers of energy access and dimensions to have variation between to offer the greatest sample diversity and insights⁸¹. All these variables have significant implications for energy access, social life and change through affecting social relations, conventions, capacities, stakeholder interactions, and technological feasibility, inter alia (Kowsari and Zerriffi 2011; Lachapelle et al. 2011). The variables for each case were assessed from secondary data obtained from various peer-reviewed and grey literatures⁸² after gaining a sense of specific suitable approaches and politically stable and safe regions through preliminary literature analysis and institutional-level interviews.

More general but essential criteria included community receptiveness to participating in the research, not being overly researched and experiencing research fatigue nor requiring monetary payment rather than enabling me to reduce researcher-researched discrepancies through reciprocity, conviviality and trust (cf. Ranganathan 1992; Corbin and Morse 2002; Hammett and Sporton 2012). A penultimate criterion was for approaches that offered alternatives to models that had proven of limited success and that were positioned as key prospects for long-term and scalable energy access solutions most closely aligned with engendering sustainable development throughout Nepal and elsewhere. Criteria for this included an approaches' energy sustainability, financial and managerial feasibility and social and environmental impact. The final criterion necessitated by the geophysical context was that the community be based in the same place all year rather than some which relocate to lower altitudes during the winter. This was a consideration to ensure the most be gained from

⁸¹ (e.g. Brown & Corbera 2003a; Kanagawa & Nakata 2008; Cook 2011; Mahapatra & Dasappa 2012).

⁸² (e.g. Appendix I & Kanal & Dahal 2008; UNDP 2012c; GoN 2011; 2012; Practical Action 2010; HPL 2015).

the pilot study in terms of developing a contextual and social familiarity to boost the subsequent research stages. Consequently, communities that practised winter migration were excluded as prospective case studies. Although this decision limits the inclusion of the most high altitude settlements and the possibility of additional insights they may enable, I consider that overall this decision facilitated the research and analysis process.

Insights into which approaches would be best for this in conjunction with the selection criteria described above were developed through an extensive process. This included mapping, academic and policy literature analysis and utilising social media and online reports throughout the preliminary year of the thesis. Leads developed from this were then tested and broadened through the expert interviews. The research schedule was deliberately engineered to allow insights from the former to be utilised to enhance the case study component and towards the end of each interview, I sought their recommendations on sites and models they thought would make exemplary case studies and match my criteria. From these methods 10 exemplar models were identified in 9 different regions of Nepal. These are presented in Appendix II.

The considerable limitations of being better informed about the sites for their suitability for the research and the objective of maximising research insights required I conducted preliminary fieldwork in these sites (Hurmerinta-Peltomäki and Nummela 2002: 167). These were conducted towards the end of the first field phase in December to allow the work to be informed by the preceding interviews and enabling gaining insights at a time when energy is most important (i.e. need for lighting and heating increases) to complement the most suitable timing for the main community-based research phase (not in winter).

The exercise proved invaluable both for shaping the case study selection and for nuances of how they would be best conducted in conjunction with the wider research methods and goals. This included forming and enhancing relations, understandings of the key actors, relations, procedures, needs and respectful and best ways of interacting and conducting research (Mandler 1984; Adler and Adler 1987). These included notions of, and words for, energy access and sustainable development, and allowing the relationships and cultural and institutional awareness to be utilized in the subsequent research and analysis (Marcus 1998; McDowell 1998). The three case studies selected from this process will now be described.

4.4.3.2. The three case studies

The three case studies selected were Jaidi, Sisuwa-Bala and Khimti. They are communities of 2,500, 3,190, and 15,000, respectively, located in three separate regions of Nepal as Figure 4.3 illustrates. The former consists of one state-defined village or village development committee (VDC) in addition to a neighbouring VDC, Chhisti, used for comparison. Sisuwa-Bala consists of two VDCs, the Khimti case study includes seven VDCs. Their regions all have very low energy access levels, with no access for between 70-80% of their rural populations and corresponding with very low human development indexes of 4.6-3.5 (WECS 2006). The communities themselves include extremely low to medium-level income households, constitute a relatively impoverished quintile of a very low income economy - $\leq \$730$ GNI per capita 24% under \$1/day (World Bank 2015) - and are indicative of the majority of the world's population without energy access (Bhatta and Sharma 2006: 1; GoN 2012: 44; Hodbod and Adger 2014).

Figure 4.3. Location of 3 selected case study sites.



Source: adapted from GoN (2002).

The models are highly contrasting and innovative. Jaidi, in Baglung District, between the Western and Mid-Western Regions, is a socially-driven and managed national grid extension project that has provided high quality energy access to its population of 2,500 since 2008. It includes one VDC with different socio-economic strata that signifies development projects through multi-community approaches. This illustrates a highly replicable energy access model for boosting sustainable development by forming sustained collaboration and projects in mixed 'communities' and facilitating this in contexts too remote with governments too underfinanced or underdeveloped to extend services effectively without community involvement (Haanyika 2006; Umree 2009).

Many of Jaidi's neighbouring villages, for instance, do not have energy access and would not until 2020 under current national plans (NEA 2012). The community is 4 hours walk from the nearest road with mountainous terrain 25 km from there to the district centre and classified in the state's only classification of remoteness, a three-tier ranking from A to C, as "category C", "moderately remote". This entitles the village to the lowest of three bands of renewable energy subsidy under the GoN's rural and remote areas energy policy (GoN 2013). The categorisation is a community-based score that eclipses the considerable remoteness variations and implications within the communities revealed through the qualitative approach. It is an exemplar of the imperative of thicker descriptions than quantitative analysis allows. To aid empirical investigation in the following chapter I accordingly developed a household-level composite index of remoteness from the data developed through the fieldwork but the national category serves here to illustrate the typical non-provision of energy access to only moderately remote areas in Nepal and the requisite of innovative approaches to overcome this (Sovacol 2012; Bhattachari 2013).

Jaidi's ethnic composition, a small majority of mid-level castes (Magar 28%; Chetri 19%) with the latter privileged over the former, followed by high castes (Brahmin hill 22%) and a minority of a low caste group (Kami 13%), is also relatively representational of Nepal and, more broadly, South Asia (Lewis and Patanayak 2012; GoN 2012). The model is a recent component of the state's rural electrification policy that uses the National Energy Authority (NEA) to provide connection to communities to the national electricity grid if they provide 20% of the initial financing requirements and all the labouring and management requirements. The case is compelling beyond its scalability in that, in being only the second implementation of the policy since its 2012 genesis, it exhibits the necessity of multi-level policy awareness and stakeholder interaction to forge interlinkages and shared meanings necessary to deliver national policies in rural areas. It also shows how the collective action of

community groups and institutions invaluable bolsters this. Finally, its proximity to neighbouring village Chhisti that subsequently gained energy access through the same program, allows for a useful lens into how capabilities and services may communicate and a comparison of consumption and management practices in relatively analogous settings.

The Sisuwa-Bala case is a 60kW micro-hydro (MH), community-driven project shared between Sisuwa VDC and Bala VDC in Sankhuwasabha district. The villages are 20 km from the nearest road, which is unsealed and so only provides access outside of monsoon season, 30 km from the district administrative and market centre, Khandbari, and 176 km East of Kathmandu. The ethnic composition is especially diverse in Sisuwa-Bala, composed of high and mid-level castes under the Hindu caste system (Brahmin Hill 6.6%; Chetri 19.4%) and two groups preceding and not belonging to the Indian originating system. They are Rai (23%) and Tamang (10%), the former a still dominant ancient indigenous Buddhist group of Nepal, the latter a Tibeto-Burman indigenous group with a religion, Kiratism, predating Hinduism and Buddhism, among 5 indigenous peoples systematically marginalised since the 1736 Gorkha unification of Nepal (Kumar 1991; Gellner 2007).

Ethnic diversity in the case studies was an ongoing consideration in this research for its implications on energy access and research through affecting access to resources, means and conventions of participation, social identities and spaces. Such research considerations are described more fully in 4.5. and are of significance here for illustrating how socio-cultural and political discords may be moderated in collective action for a shared development requirement (Pralhad and Ramaswamy 2000; Pretty 2003).

The case is an exemplar of the country's celebrated Renewable Energy Development Programme (REDP) energy access model devised collaboratively by national and international experts in 1996 and constituting the main energy access programme in the country until 2012 (AEPC 2012). A 60kW output for over 3000 people would classify the approach as basic-needs energy access. The institutional-level interviewees indicated that Sisuwa-Bala was the best example of this model, partly due to the exemplary work of a community mobiliser. It illustrates the value of close links between international, national, district and local actors, community-centric foci, management and ownership the importance of these links being maintained through continuous horizontal and vertical interactions and the value of active stakeholders for this. These relational ties and sustained energy access occurred despite the case being defined as "category A", "very remote" (GoN 2013). Although this entitles the village to the highest level of renewable energy subsidy under the GoN's subsidy policy for

rural and remote areas, the subsidy amount covered less than 50% of the project cost. Through such factors, as we discuss in the following chapters, the case yielded invaluable insights for energy financing, management, consumption and sustainability in contexts archetypal of the energy access problematic that show the prospect of community-based methods and wider requirements to overcome such challenges.

The Khimti case, utilising the Khimti River between Ramechhap and Dholaka districts, represents a pioneering model poised as an exemplar for future energy access-orientated hydropower projects in Nepal and other countries, reliant as it is not on limited community, donor and/or government financing (Thanju 2010; AEPC 2014). The private sector-led model is a response to the tension between the need for private sector investment to meet the goals of energy access in LDCs, the need for these to be above the micro-scale (below 50 kW) to provide sufficient investor returns and the prevalence of social resistance to these. Consequently, Norwegian hydropower company HPL developed a community-based model to facilitate a 600 MW project. The community model provides electricity and empowerment to the 7 villages surrounding the project site through developing with the communities a community-owned and managed 630 kW hydropower plant. This provides beyond basic-needs electricity to over 3000 households of a moderately diverse ethnic composition but a more binary power relation between them, with two high to mid caste groups forming a majority (Brahmin Hill & Chetri) and indigenous, non-caste marginalised groups composing the rest (mainly Tamang, Thami and Sunwar) (GoN 2011).

The democratically appointed community committee (KREC) tasked with managing it has expanded the capacity and household connections of the system through the addition of a 400 kW MH plant. This and additional facilities were provided by HPL with support from the Norwegian development agency NORAD in a flagship development model labelled Khimti Neighbourhood Development (KiND). The case study illustrates multi-level insights, including how actors interact, unequal power relations and meanings are mediated, resistance avoided and capacities and practices develop for communities to support, use and manage relatively large-scale energy access. It is also a compelling example of how sustainable development may be aligned with electricity developments of a scale attracting the most investment in the rural energy access arena that typically misses wider sustainable development goals (Martinot 2002). The characteristics of these case studies are summarised in Table 4.2, before discussing the research methods employed within them.

Table 4.2. Energy ‘access’ case studies: an outline of three pioneering models in Nepal.

Case: Village, District & Region	Approach type & energy system	Electricity output & start date	Key comments
Sisuwa-Bala. Sankhuwasabha, Eastern Region, Nepal	Renewable Energy Development Programme (REDP) approach: long-refined community-based, UNDP & state policy supported model run by Nepal’s Alternative Energy Promotion Centre (AEPC). Often initiated by either AEPC or communities but always demand-led. Requires diverse community inputs (more than finances, labour, support and knowledge). Micro-hydro project.	60 kW, 600 households, 2007	Approach evolved since 1996, influenced Nepal’s National Rural Energy Policy & present (2014-2019) approach to rural energy via the Renewable Energy for Rural Livelihood (RERL) programme. Like all case studies, project spurred diverse means & ends for sustainable development (e.g. improved education, leisure, IT, new livelihoods – e.g. poultry farming, high-value agriculture, engineering - & improving existing ones - agro-processing, carpentry, tailoring) via electricity of a higher quality (reliability, voltage & stability). These are improvements to dominant centralised electricity and development provision approaches, yet various structural inequalities in all three cases undermining aspects for sustainable development were not entirely resolved.
Khimti. Dolakha, Central Region, Nepal	Meso-scale private sector model with INGO support (NORAD). Now operated and managed by a community cooperative (KREC). 2 Micro-hydro projects.	400 kW, 3100 households + 630 kW, 4160 households, 2002	Pioneering model potentially very significant due to feasibility of scale, minimal resistance, utilising underused stakeholders (private sector & communities) & non-reliance on limited state or donor funding. Value beyond CSR. High sustainable development outputs vitally offering an alternative market-based approach. Includes 11 villages.
Jaidi. Baglung District, Western Nepal	Community driven electrification Model. Alongside REDP/RERL, a core component of the government’s electricity extension policy. Diversifies resources & actors via requiring community inputs to initiate and supplement state efforts.	kW tied to National-grid, 400 households, 2011	One of few cases of this model with no road access (3km & 45km from unsealed & sealed road, respectively). Model provides high quality electricity through the nationally produced and distributed network and resources enhanced by local engagement, support & management. High scalability potential, highlighted by its subsequent adoption in neighbouring village, Chhisti, which was also included in the same case study to enhance insights, viz. inter-community influences & learning.

Source: Author

4.4.3.3. Case study methods: selecting methods and participants

The second stage fieldwork was focused on gaining insights into the perspectives and practices of ordinary people living both with and without energy access in three communities trying to overcome their hitherto unmet need for modern energy services. Insights were sought through complimentary ethnographic methods and purposefully included both energy consumers and non-consumers, all marginalised groups and forms of livelihoods and a selection of local and regional actors influential in the energy services and practices. These actors, their relations and contingencies are conventionally overlooked in energy access strategies and evaluations. Aligned with the reasoned constructivist ontology, however, this research approached the end-users, non-elite and communities of energy access strategies as essential agents in the innovation, consumption and sustainable development process that accordingly represent essential experts into the effectiveness of the strategy and means to improve it (Williams and Edge 1996; della Porta and Diani 2009).

Yet the developing thesis has also situated the understanding that their agency is normativised, embedded and somewhat structured, demanding a range of sensitively applied research tools to gain insights from actors unaccustomed to being considered important agents, considering the mundane and automatic, and being empowered to participate (Foucault 1978: 25; Brigs 1986). This was especially significant as the research pertained to gendered contexts, the under-researched and the vertically and horizontally marginalized (Agarwal 1997; Mikkelsen 2005: 28). Indeed, the lacunae in the energy, rural financing and development field related to the localised realities and nuances of service access, demand, willingness and ability to pay, manage and incorporate into enhancing contextualised practices and facilities, positions (prospective) consumer perspectives as paramount for enhancing insights into energy access and sustainable development (Carney 2003; Kanagawa and Nakata 2007).

To best co-generate these embedded insights and ensure inclusion of conventionally overlooked actors, immersive “being there” was necessary (Whyte 1955; Sixsmith et al. 2003). This set the basis for the following ethnographic-orientated methods that invaluable interconnected, challenged and expanded the institutional-level data. These were household and community-level interviews, participant observation and engaging in social practices, groups and spaces. These were enhanced and became an ongoing process through living with

the three communities in a customary manner of staying with an ordinary family. I stayed in each community for between 1½-2 months as per the requirement of best answering the research questions.

The sampling method used for the selection of the non-household-level actors in the case studies is analogous to that used for the institutional-level interviews: selecting down from a process of stakeholder mapping and snowballing to include the maximum diversity of pertinent perspectives and iteratively continuing this until the point of experiential or conceptual saturation (Taylor and Bogdan 1998). The household-level actors to be engaged with the research methods were selected via purposeful sampling using a householder variable framework that I had developed over the course of the secondary material analysis, institutional-level interviews and case study pilot exercise to determine factors of most influence to household-level energy experiences. These included a geophysical remoteness index, socio-economic status, household size, caste, gender ratio, gender of head of household, distance from road, density of road and population size. The framework is presented in Appendix III. The variables are widely upheld as substantive selection criteria⁸³.

This selection method is routinely acknowledged as invaluable for augmenting insight diversity, extensiveness, and including minority groups that may be missed by other selection methods such as random sampling (Watters and Biernacki 1989; Sandelowski 1995). Through living within each community in a normal, accessible household and approaching the research reflexively, however, substantial data emanated beyond these sampling methods. Anytime I was in the house, for instance, such as before or during breakfast and once returned after the day's fieldwork, people would come to me to share their opinions on energy access, sustainable development and the community needs, inter alia. As evident in what they said, this reflected their exceptional interest in the topic and their perception of me as highly interested in them and aiming to promote their needs and means for improvement.

Although exhaustive, each of these encounters became a part of the research process for the degree of valuable information and relationships developed that augmented the subsequent research (Marcus 1998: 127). The communities' colloquial access to me, therefore, supported data access, blurring subject/object distinctions and rendering my positionality as continually negotiated and somewhat of an asset (Gupta and Ferguson 1997: 33). This reinforces the co-production approach, enhanced through viewing development constraints and affordances as

⁸³ See footnotes 98 and 97 for examples. Examples also cited in Appendix III

products of continually negotiated social activity (Orlikowski 2007) and iteratively reflecting on these to negotiate the complexities of 'insider-outsider' identities, knowledge and relationships to enhance research and development (Lee 1993; Jewkes and Letherby 2001).

The sum was participants and data encompassing a plurality of needs, positionalities, capabilities, energy practices and practice constraints. The participants can be categorised as household-level energy users or non-consumers and actors whose activities are more extensive and include advanced energy users in spaces beyond the domestic. The categories can be termed 'household-level' and 'community-level'. The former compose the largest cohort and, both male and female, are predominantly farmers and use modern energy services for limited applications. The latter include local teachers, doctors, retailers, various community groups, energy system managers and committee members, mill (electric, diesel and water-powered) owners, the village and district government officers, technicians and suppliers. The community-level actors were the most influential on the energy consumption and related practices of the communities and were the most mobile and exposed to, and conducting, a greater range of energy-based practices. It is thus pertinent to differentiate the research participants into the above groups.

The result was substantial research data from Jaidi, Sisuwa-Bala and Khimti of in-depth, semi-structured household interviews (N= 20, N= 18, and N= 16, respectively), community-level interviews (N= 9, N= 18, N= 15, respectively), informal discussions (N= 20, N= 20, N= 20, respectively) and extensive participant observation, practice sharing, field walks and site visits.

4.4.3.4. Semi-Structured Interviews

Household-level interviews

Although everyday talk was a constructive component of the research, purposefully selected interviews formed a key research tool (cf. Tracy and Robles 2013). The household interviews were semi-structured and conducted interpersonally and reflexively for the same rationale discussed for the institutional-level interviews, including facilitating deeper analytical depth, responses, data co-generation, contextualisation and attentiveness to, and involvement in, the diverse and circumstantial dimensions and co-evolution of each interview and suites of data (Blasco & Wardle 2007: 43). Key forms of data included emotions, experiences, beliefs and expectations (Carr and Gibson 2009; Longhurst 2010).

Considerations that were particularly essential and varied in the household interviews were techniques to mitigate the greater positionality and cultural constraints affecting the research, especially for marginalised groups to participate in the research as fully as possible (Denzin 1989; Agarwal 1997; Cornwall 2003). This included considering the specific and collective positionality and research mediation effects of me and my translator, tailoring the foci, questions and vocabulary to frames of reference most meaningful to each participant, using positive and circumstantial interactional stimuli to reassure, encourage and motivate, and giving participants as much time as needed (Schuman and Presser 1979; Mann 1985). I also found value in taking time throughout each interview to ask and encourage the participants to add or ask anything that they felt was important and wanted to discuss more. This enhanced interviewer and interviewee reflection, often resulted in a second wave of insightful data co-generation tailored to the participant's context and allowed me to become increasingly sensitive and responsive to the social needs and contexts (Foddy 1994; Ley 1998).

The notion and language of energy access, changing practices, development needs and sustainable development, for instance, varied considerably between the institutional-level (predominately male and considerably empowered), community-level and household-level participants along multiple axis of difference. The use of the appropriate forms of expression within each interactional setting and its specific and dynamic minutiae was thus a continuous way I mediated my identity and the research performance (Goffman 1978; Bauman and Briggs 1998: 68, 74). It thus evokes the concept of language as a fluid yet "situated practice" (Valentine et al. 2008: 380) shaped by different spaces and moments in which social encounters occur (Finegold 2001). In mobilising certain narratives and forms of practice, we thus reinforce or renegotiate social positions (Lévi-Strauss 1984; Lash 2002: 141). A prospect not equally possible and not unlike Foucault's (1980: 70; 93) notion of the 'tactical polyvalence of discourse'.

Household interviews were recorded exclusively using a field journal in situ, a practice they were familiar with rather than a digital recording device which would have been highly unusual for most of the householders and would have risked inhibiting their interactions (Spradley 1979; Whyte 1985). Additional dimensions of, and reflections upon, each interview were then expanded upon either immediately afterwards or the same evening, depending upon the situation (Emerson et al. 2001: 353). This included my and my translator's feelings, perceptions, experiences, struggles, what we learnt and thoughts for how to further refine our approach (cf. Dewalt et al 1998: 270). Thus data recording and first-level analysis were

simultaneous and interactive (Coffey and Atkinson 1996). This method proved effective and was repeated for all the case study methods.

The duration, setting and challenges of each interview varied considerably. Durations ranged from one to three hours. Situational settings were predominately private, personalised and intimate spaces and ranged from kitchens, living rooms, porches and gardens. Interactional settings ranged from one participant on their own giving attention exclusively to the interview, to participants concurrently mothering, cooking, cleaning and grinding flour, to multiple household members and occasionally additional participants. This enhanced the research by combining interviews with participant observation in everyday settings, indicating both the immediate interaction situation and its relation to its wider “situation” (Lamont and Swidler 2014: 8-9). It highlights the compatibility of interviews and ethnographies (Weiss 1994; Snow et al. 2003) and revealed the practice-packed lives and demands of particular social groups.

Challenges arose from the latter scenario, however, if one of the persons was inhibiting the responses of others and would not leave us to continue without them (or occasions where suggesting as much would have compromised the target participant’s response). This challenge reflected intra-household and intra-community power and role structures (Gosh 2006; Karim 2008). The effect was predominately gendered and the most effective methods of overcoming it to ensure I fully included female perspectives was to raise collective interest in the research and conduct the female interviews in the middle of the day when all male adults were generally not in or around the houses. The final noteworthy challenge at this point was the few occasions conducting household interviews when a particularly influential community member entered the setting and dominated the conversation away from the target participant or topics. Examples included local politicians and electricity and financial service committee managers. This is consistent with social power imbalances and researcher concerns being associated with an influential NGO rendering the respondent more guarded so as not to hinder a potentially significant source of support (Davenport et al. 1998; Liyanage and Mitchell 1994). An example of prepared questions that formed the initial basis for the household-level interviews is presented in Appendix VI.

Community-level interviews

Semi-structured interviews were also employed to capture insights from a purposefully selected range of key community actors as suggested by the research aims, context and developing insights (cf. Valentine 2005: 112). The interview approach was analogous to that described above. Primary questions and themes for each interview were tailored in advance to best reflect the actor's position and ensure the most pertinent points were covered (Bryman 2012: 471). Consistent with maximising the diversity, significance and credibility of the information co-generated through interrogating the unanticipated and emergent, however, these were again conducted reflexively and flexibly (cf. Mason 2002: 62; Kvale and Brinkmann 2008). Actors included operators, managers and committee members of the electricity projects, local development groups, teachers, doctors, government officials, entrepreneurs, technicians, banks and NGOs and ranged from the village to district-level. Interviews were conducted in the spaces most relevant and convenient for the actors and reflected the diversity of actors involved in energy access and sustainable development.

Settings included shops, committee and government offices, schools, health posts, and the generation sites and transmission lines as the operators and technicians went about, or took a break from, their work. As per the institutional and household-level interviews, this method of conducting the interviews in the actor's settings and forms of discourse reflected the situated nature of everyday life and social interactions and supported my ongoing access and positionality negotiation and ultimately data co-generation and contextualisation. Also of note was the temporal nature of these actors and settings.

Unlike conventional notions of ethnographies tracing enduring practices and structures, some of the key stakeholders showcased relatively very recent phenomena and social positions for the localities, such as female entrepreneurs, community groups and energy service providers (cf. Rosaldo 1980). The interview interactions, settings and the shifting conventions and meanings they implied thus helped develop an account of the dynamism and duality of social life (Mohr and Duquennen 1997; Eliasoph and Lichterman 2003). This complimented with the household and institutional-level research methods to more fully locate this dynamism and modalities of change within their larger institutional context. In so doing, the research methodology substantiates the potential for multimethod qualitative approaches to abate the recurrent meta-contextualisation and fluidity concern voiced of interviews and ethnographies

(Sixsmith et al. 2003; Lamont and Swidler 2014). A list of the community-level participants and an example of prepared questions that supported the interviews with them is presented Appendix VII and VIII. An example of the consent form completed with each participant in all the research methods is presented in Appendix IX.

4.4.3.5. Practices, participant observation & focus groups

Energy access pertains to innovations within key aspects and templates of everyday life. It relates to how we cook, how we heat our homes, how we source fuel, how we might save time and labour in multitudinous ways and the interplay of meanings, skills and materials needed to conduct such tasks. Insights into how sustainable development-enhancing energy practices can be best engendered within such routinised orders thus require methods that tap into the normativised, embedded and often implicit dimensions that may oppose or support social transitions. Following the constructivist ontology substantiated by the empirical literature insights and limitations of common conceptual frameworks, we proposed that only in the routinised doings and sayings of social groups do these dimensions come to bare.

Secondly, to best understand the aspects and structure of these processes, one has to share and, as far as possible, employ them. Consequently, the insights accessible through ethnographic interviews can be uniquely buttressed and expanded by both participant observation and engaging in their social practices. These methods were complimentary and often overlapped over the course of the case study research and so will be discussed jointly.

Participant observation is a well-established research tool in social science and engaging more actively with the subject and object of observation marks a burgeoning research interest whose complementarity has long been indicated (Ortner 1984; Appadurai 1988; Ochs and Taylor 1992). Indeed, as Dewalt et al. (1998: 260) illustrate, participant observation entails the researcher observing and/or enacting “the common and uncommon activities” of those being studied. Yet the performative aspect of this method is often overlooked at the expense of enhancing the research process and outcomes (Harris et al 2007). In explaining means to enhance data generation, for instance, Jorgenson (1989: 77-8) concludes:

Perhaps the most effective general strategy for solidifying sympathetic field relations is to engage in joint activities. By participating together, people

create shared experiences. Unusual experiences, ones characterized by a high degree of emotion, are especially effective in producing solidarity.

Shaffir (1991: 72-3) reinforces this importance of researchers participating in “sociable behaviour that respects the cultural world of his or her hosts” to enter the research setting and ensure the social cooperation required for effective research. Shared practices can thus be instrumental in mediating insider/outsider dynamics to support the data production process. This parallels with the understanding that researchers are not objective observers of a phenomena of study but are subjectively complicit in its production such that by actively participating in this process we can better account for the phenomena and our influence upon, and social location within, it (Phoenix 1991).

Observation alone thus risks concealing our understanding and influence on what we observe (Harvey 1990; Sack 1992). Involvement in the communities we aim to observe and understand thus allies with the importance attributed in ethnographic studies to researchers “being, living or working” with the communities of study (Laurier 2010: 116) and actively negotiating and utilising the position this provides us of being where “the action is” (Bernard 2006: 343).

The ongoing and emergent nature of social action, therefore, reinforces the value of explorative, flexible research approaches and indicates the compatibility of observational and performative methods to this (Cloke et al. 2008: 185)⁸⁴. Indeed, both are complimentary to continually reflecting upon and recording the unfolding pluralities of the research encounter, forms of data and the position of the researcher and participants within this, including *vis-à-vis* emotions, experiences and events (Coffey 2006: 216). Moreover, methods largely reliant on oral and recall data, such as interviews and surveys, are limited in this regard (Valente 1996; Beegle et al. 2012). Conversely, participant observation and practices are situated within the present-day encounters and settings of the research topic, overcoming the above limitation and opening additional lines of enquiry through allowing us to share the sights, sounds, temporalities, spatialities and interactions of those communities first hand.

This supports negotiating the mediating role of researchers and translators in the research process and apprehending the “range of dimensions in and of that setting” (Mason 2002: 84). This included important dimensions participants might not be able to verbally disclose, especially *vis-à-vis* social relations, interaction dynamics and power. Participant observation

⁸⁴ Reinforced by, *inter alia*, Pratt (1984), Harvey (1993), Dewalt et al. (1998: 26), Miller & Rose (2008).

of electricity committee meetings exemplifies this, as recorded in my field journal for one of the meetings (Box 4.1).

Box 4.1. Membership, power, participation.

“May 7, 2014 11am. This is a monthly electricity committee meeting. The committee is 15 persons. Only 13 are present. The general manager, Mr Singh, sits at the front of the room. We all sit around the edge of the room. The group is smartly dressed and the mood is serious, suggesting the collective sense of importance of electricity and their role in managing it. There are no females present despite 2 females officially being in the committee. To what extent is the committee representative and are all members equally empowered? Could greater attention to the constraints of female participation help? Mr Singh starts the discussions. The discussions are orderly and everyone is focused and listening. Not everyone speaks though and certain people interrupt others. The topic is who should be the next committee manager and there are evident conflicts in opinions. Mr Singh appears respected by the whole group but the tone and forcefulness of some members in their suggestions suggests the role to some represents more than the shared electricity system. The discussions continue with the same 3 or 4 persons dominating. Atypically from my experience in Nepal and Nepalese communities and meetings, this remains the case even as chai is brought in; the debates continue full swing. Committee membership and positions are thus negotiated, valued and could encompass wider dimensions such as social or political allegiances.” Field diary extract, Jaidi VDC, 2014.

Source: Author

This excerpt illustrates the various aspects that can be appreciated and inferred from observation whilst mitigating the mediating role of translators on the research process. It revealed the marginalisation of certain actors contrary to previous claims of committee inclusivity, facilitating the verification of data sources and prompting me to explore additional lines of enquiry, such as why the female members were not present and what could be done to support their participation. It also shows that in being attentive to the contingencies of social interactions, researchers can more fully co-produce an account of the shared practices, experiences and contexts (Katz and Csordas 2003: 278).

The research experience of this thesis found, however, that in addition to better negotiating one’s positionality, access and role within these settings, by more actively thinking and researching in terms of social practices, we can more fully appreciate the multidimensional “everyday life-world” of social groups the practices and ourselves our located within (Kitchin and Tate 2000). Moreover, conducting these practices helps us realise the intersubjective process of knowledge production and the established “understandings, procedures and objectives” and their “interconnectedness” that define and reproduce any practice (Warde

2005: 140; Reckwitz 2002: 250). Consequently, part of the immersive and interactive approach of my research methodology was both participant observation and observant participation. The observations and practices were conducted according to the unfolding situations and insights (Meehan 1995) and included observing and sharing everyday cooking, fuel sourcing, collecting water, eating, socialising, playing, studying, washing, livelihood, electricity and financial services management, community development, market access and mobility practices, inter alia. Doing some of these was an ongoing part of living reflexively within the communities, while others, such as accompanying, observing and participating in the meetings and tasks of fuelwood collectors, cooks, electricity managers, suppliers, non-domestic consumers and the various practices of those without energy access, including the disabled and elderly, required me actively pursuing these practices.

Doing so allowed me to share and appreciate, to a fuller extent, crucial embodied, performative and teleoaffective dimensions of everyday life and energy access for a range of different actors. This included something of the feelings, textures, tastes, smells, skills and meanings that accomplishing the practices and being a community member requires, communicates and reproduces (cf. Mack 2007). Only in trying to 'do' these practices, for instance, could I appreciate important aspects of 'knowing', consuming and social conventions otherwise occluded (Wenger 1998; Gaird 1999). This included the multi-sensory nature of firewood cooking, the resilience to the smoke stinging one's eyes only developed overtime, the physicality, aptitude and common forest management regulations required to source the firewood and the degree to which these become possible, gendered and reinforcing through ongoing practice. In doing the practices, I could thus more fully realise the extensive ways practices contextualise their constitutive settings and the significant competence and "reasoned use of the senses" required for their effective 'accomplishment' (Hunt 1990; Shove et al. 2007: 38). Researching the importance, conflicts and attributes of rules and 'technologies-in-use' within 'the social' thus avoided privileging any dimension through co-constitutively exploring the material and human (Douglas and Ney 1998; Orilkowski 2000: 47).

Similarly, in participating in the practices, I was continually negotiating my position in the community through sharing an appreciation of the skilled performances that constitutes their community (Giddens 1990: 4) and thereby enhancing the shared social trust, bonds and symbolism conducive to becoming more involved in the communities of practice and research process (Fairclough 1989; 1995; Wenger 1998). Over the course of each case study, therefore,

these methods allowed me to move along a gradient from outsider, participant observer, observant participant and active practitioner⁸⁵.

This was supported by repeated field walks throughout the communities whose patterned geographies made increasing sense as I became increasingly aware of their symbolic and material provenance and implications for different groups, energy access and everyday life. To bolster this, as advised by Wylie (2005), a number of the field walks were taken with community members of different demographics on their habitual routes, talking about what we saw, felt and did. This was a pre-planned but relatively unstructured method that gave an increased insight into the people's connection to their environment, sense of place and belonging and the rhythms, routes and social architectures of the situated practices that condition them (Solnit 2001; Kusenbach 2003; Ingold and Lee 2008) and are themselves materially negotiated. The immediacy of walking and the multi-sensory environment thus became progressively enriched by my co-evolving experiences in the communities depicting an increasing impression of their constitutive socio-technical landscape (Edensor 2010).

These findings have many parallels. It is supported by notions that we only learn by repeatedly doing; an embodied knowledge and understanding in and through practice rather than knowledge transmitted to us (Lave 1990; Ingold and Lucas 2007). It is also consistent with Creswell's (2003: 26) notion of place as a particular configuration of happenings that is both the context for, and product of, practice that only makes sense as it is lived. Living, understanding and being are thus interconnected and realised in systems of activity. 'Sense-making' embedded in situated activities, positioning practices as 'sites of knowing' whereby knowing is indistinct from practising (Nicolini 2010) and belonging and mastery dwells in practice (Polanyi 1958a: 195). This intimate link between knowing and doing underscores the value of performing the practices of the communities we are aiming to understand (Giard 2007: 206). Indeed, although the methodological implications of adopting a practice-perspective in research has been relatively overlooked, the works of Halkier (2012) and colleagues (Halkier and Jensen 2011; Halkier et al. 2011) and Pink (2004; 2007; 2009), emphasise the heuristic use of practices to further understand the performative, embodied and multidimensional nature of everyday life.

⁸⁵ My qualitative shift reflects the complexity & dynamism of insider-outsider relations, social conentions & sustainable development (Wright 1996; Rondinelli 2013: 183). An engaging focus on this is provided by Dwyer & Buckle (2009). Moeran (2009) similarly describes the qualitative value of shifting from participant observer to the more active observant participant as a negotiated process that enables a more nuanced analysis through embodied learning (Also Kuhn 2002).

A practice approach can thus support the increasing interest in how the visceral and affective can implicate embodiment, belonging, empowerment and place (Probyn 2000; Pain 2009)⁸⁶. Indeed, Pink (2012: 41) emphasises the methodological pertinence of this in stressing that such dimensions are seldom readily visible or verbalised and knowing and consuming become inseparable from doing, being and feeling⁸⁷. The research approach of conducting and observing everyday practices were thus complimentary to the research objectives, explorative methodological framework and self-consciously exploring and recording all the dimensions of the research experience (cf. Coffey 1999).

Finally, aligned with employing the specific research tool(s) that best probes and responds to the unfolding research encounter, in five instances when the occasions necessitated it, I conducted focus groups (cf. Johnson 1996). Such focused group discussions outside of committee meetings that I was able to direct occurred proved valuable for researching group dynamics and not jeopardising the research process. For instance, the occasions arose when unexpectedly meeting groups of interested stakeholders that would negatively affect the mood and research opportunity by splitting and researching separately.

These included upon arrival in one of remoter tolls of Sisuwa-Bala; with a Dalit development group in Sisuwa-Bala as I was returning from a remote village towards the end of a long day and before the start of an election in Jaidi where multiple key actors and householders were assembled. Field photos 4.4a-b portrays these last two examples whilst illustrating the intersubjective and social nature of the research process. Moreover, by giving my camera to a member of the group to capture this, we see the setting reproduced through a community member's eyes.

⁸⁶ This interest and its importance for diverse fields of research and development is further emphasised by other notable scholarship. Examples include Luchs (2001); Beck & Marinot (2004); Longhurst et al. (2009); Hayes-Conroy & Hayes-Conroy (2010); Luchs et al. (2012); Wright (2012).

⁸⁷ This understanding is widely conceptually reinforced, such as in notions of 'tacit knowledge': knowledge becoming meaningful only through interiorising/integration within social performances, rendering substantive distinctions between embodied and enunciatable knowledge (Polanyi 1969: 183), especially when the non-rational is incorporated within a non-idealised 'body' and related, diverse forms of knowing and consuming (Burrell 1993; Tsoukas 1996; Spender 1998).

Figure 4.4a and 4.4b. Conducting a focus group in Jaidi



Source: Author.

Through supporting the investigation of social dynamics, multiple viewpoints, commonalities and contestations, the ad hoc focus groups were thus complimentary to the interviews, ethnographic methods and ongoing co-production process (Miller 1998a; Eschenbach and Kohler 2002). Indeed, they also appeared to stimulate deeper discussion on certain topics, reveal what was most important to a group as a whole and mitigate the influence I had on the data or participant exaggeration (Vaughan et al. 1996; Pratt 2002).

Such exaggeration was reduced by the group corroborating claims, such as willingness to pay. Moreover, such group discussions among groups of the same actors gave access to groups that were more difficult to access than others, such as Dalits and females who generally had less time to spare, were sometimes reluctant to being studied on their own and were often dominated by other actors in mixed group settings. This indicates that group methods may support the exploration of structural solutions, which Kitzinger (1995: 300) comments is “invaluable if the aim of research is to improve services”.

Focus groups thus supported more inclusive participation in the research and provided additional forms of data, data contextualization and testing (Morgan 1993; Barbour and Schostak 2005). To support this, I recorded all aspects of the focus groups and conducted

them from the position of a learner (Millward 1995; Krueger and Kasey 2008). This was supported by my position being mediated and established throughout the course of the case studies and the focus groups only being conducted towards the end of these when my position was more accepted and my contextualized understanding of group interaction influencers - including power, setting, demographic and group size - better developed (Wilkinson 1998; Hopkins 2007). Finally, through continually reflecting on the insights in relation to the research aims and fieldwork timeline, I ensured the various methods employed did not render the research too 'busy' or unfocused (Ley 1988; Rowles 1980).

4.4.4. Data recording, analysis & interpretation

Data recording was primarily through the use of Dictaphones and field journals in which I collectively recorded multiple forms of data, from verbal, experiential and emotional to field maps and sketches (Coffey 2006: 216; Banks and Zeitlyn 2015). These complimentary methods, one passive, one highly active, enabled me to accurately record the data, who was speaking and not speaking, provide a validity check, and facilitate my engagement in the research process (Polger and Thomas 1995; McLafferty 2004).

At the same time, I considered issues of cultural suitability and the influence of digital recording devices on data access and production, and in contexts where these were atypical, decided to exclusively record through field notes (Sim 1999; Krueger and Kasey 2008). Furthermore, the field journal served as a stimulant for bond building and elaboration through signalling that I was deeply valuing their opinions and sharing the journal with participants. Finally, I also used photography where appropriate and found it as a similarly useful bonding tool and participation stimulant in certain contexts (cf. Gratton and Jones 2004). Figure 4.5 reflects something of these points.

Figure 4.5. Promoting the interactive nature of the research approach through sharing my camera, discussing openly, and transcribing attentively and transparently.



Source: Author

Data analysis was conducted as an iterative process between field notes, audio transcripts and secondary materials. It started immediately after each research method through expanding on all the points raised and experiences, perceptions moods and feelings felt (Dewalt et al. 1998: 270). This first stage of analysis was then integrated and advanced through an intensive period of analysis after the institutional-level interviews and between each case study (Creswell 2013: 47). This involved utilising the transcription process also as an analytical device whereby insights stimulated from transcribing were recorded and expanded in an appending document. This included continually reflecting upon the process of the data production, its context and decisions made during the data production process and, as Mason (1996) and Crotty (1998) advise, recording the decisions made throughout the analysis processes and re-reading, re-listening, rethinking and revising.

This was supported by doing all the transcription personally and attentively and recording reflections and decisions within a specific file (Bazeley and Jackson 2001). Continuously reflecting on the conceptual framework that informed the research and subsequent theoretical insights that emerged and could be expanded throughout the interpretation process further supported this (Jackson 2001).

The resulting transcription and analytical files were then further analysed through a comprehensive processes of inductive coding (labelling words or sections), code linking and comparing codes between the different sources (Ryan and Bernard 2003; Stonehouse 2007). Codes were then integrated into higher-level themes, overlapping codes subsumed into these categories, and themes explored through identifying relationships and patterns between themes, sub-themes, theory and broader phenomena (Corbin and Strauss 1990; Witzel 2000; Rowley 2002). These relationships were then interrogated, reassembled and refined in an ongoing process iterating between the data, writing, reflecting, rereading and rewriting (Rice and Ezzy 1999; Jackson 2000a).

The emergent levels of analysis thus became increasingly abstract yet remained grounded in the empirical reality of the study (Ley and Mountz 2001: 239; Guest et al. 2012). The analytical themes consequently reflected the collective positions of researcher, participants and the empirical world (Haraway 2006). This method helps enhance data 'richness' (Riesman 1992; Aberbach and Rockman 2002). By conducting it reflexively and iteratively across the multiple sources, I was able to support this richness representing the plethora of human, artefact and environment interactions that configured the empirical reality (Russell 2007; Fenwick 2015).

This task was supported by ensuring the codes started from the data and as much as possible 'in vivo', from the participants' own words (Fish 1980: 320). The process was hence both inductive and open through close proximity to the data progressing into codes of increasing degrees of abstraction from the immediate data (Witzel 2000; Charmaz 2006). Analysis was thus a tiered, data-up process resulting in meta-codes encompassing a conceptual component of the research integrating multiple grouped codes (Rowley 2002; Ryan and Bernard 2003).

These meta-codes constituted the penultimate stage of the analysis process derived at by progressively ordering, grouping and reordering the codes and themes and the relationships between codes within and across the higher-level themes into meta-themes. I identified these themes and their relations through examining their codes and identifying their co-occurrences, frequencies of these overlaps and their relationship to certain topics as suggested by the codes and clusters of codes (Mills et al. 2010; Schweitzer and Steel 2008). This iterative zooming into the codes and out to the compiled relationships was thus what Charmaz (2006) terms 'axial coding' that progressively defined and 'glued' the themes in relation to the multiple forms of data and wider theoretical debates (Jick 1979: 609).

The meta-themes provided the basis for the final process of analysis. This involved iteratively relating the themes back to the research data, wider materials and theoretical framework to enable bringing these together in relation to the broader concepts they signify (Jackson 2001; Bryman 2012). Within this final stage, areas were focused on that would most enhance the empirical and conceptual contributions of the research. Points of focus for this were areas that emerged as instrumental to energy access through the empirical material and supported by the conceptual framework yet marginalised within the wider empirical and theoretical approaches and debates. This Thematic Analysis process was suited to the non-linear nature of the research process and complexity of the topic of study as manifest in the fieldwork (Wilkinson 2010; Mills et al. 2010). The multiple associations and specific interdependencies it allowed me to trace, integrate, expand and challenge thus reflected, and allowed me to further develop, my conceptual framing explaining the phenomena of study.

Through these methods, the coding and analysis became increasingly complex, interconnected and detailed. Nvivo 10 was used to support this process. Nvivo is a computer-assisted qualitative data analysis software (CAQDAS) that facilitates, rather than substitutes, the data analysis process (Welsh 2002; Hutchison et al. 2010; Bazeley 2013). Although the functions of Nvivo programmes are increasingly advancing, the codes for this project were made manually and maintained the closeness of the codes to the empirical encounters.

The usefulness of Nvivo 10 for this thesis related to supporting the integration of multiple forms of data into a large yet clearly segmented and organised data set within which data can be assessed, retrieved, compared and interlinked based on the codes, coded notes, memos and documents, and queries the user makes (Basit 2003; Mason 2002). This included allowing me to compile in one digital location all the material utilised for the empirical and conceptual literature analysis, policy reports, transcripts and contents of five field diaries, and integrate coded references from all these sources within single categories. These were then easily located, assembled and ordered within parent nodes (core themes), nodes (themes or codes subsumed within these) and meta-themes (groups of parent nodes).

Figure 4.6. Excerpt of 1st stage nodes embedded in 2nd stage nodes.

Nodes				
	Name	Sources	References	Created On
+	EA	237	951	02/08/2013 10:28
+	Emotions	174	721	24/10/2016 17:33
+	Employment & Experiences, SERVICES, OPPORTUNITIES, FACILITIES	88	226	16/01/2016 12:58
+	ENERGY USE, INNOVATION, COPRODUCTION, UPTAKE	109	284	07/04/2015 15:44
+	ENTITLEMENTS, CAPABILITIES, ACCESSIBILITY, ETHICS	142	359	21/08/2013 13:25
+	Environment - cultural, relational, physical	97	178	29/06/2016 17:23
+	Family	29	129	11/03/2016 17:29
+	FINANCE - INC market & supply chain	175	541	15/09/2014 14:58
+	Food, COOKING & TASTE	110	332	16/04/2015 19:57
+	GOVERNANCE	51	169	16/01/2016 14:35
+	HEALTH	16	72	16/01/2016 14:18
+	Knowledge-power-differencing	52	171	08/03/2016 18:36
+	Learning	16	142	25/02/2016 17:19
+	Localism, localisation	13	46	15/03/2016 16:48
+	MANAGEMENT, Maintenance	125	368	16/01/2016 12:59
+	MEANINGS	71	168	16/01/2016 14:14

Source: NVivo10, Author.

Figure 4.6. illustrates the process of assigning codes to data and finding relationships within it based on the data's relation to the codes. Codes tightly interrelated to others can then be grouped together within another code that encompasses them. The terminology for these codes and encompassing codes in Nvivo is nodes and parent nodes. This image depicts parent nodes. Within these are multiple nodes. Figure 4.7. exemplifies this by expanding one of the nodes that became a key theme throughout the research. It shows that there may be parent nodes within an overarching parent nodes and that the nodes often relate in multiple ways. The extensiveness of the codes across a range of sources that constitute a parent node and the degree to which the parent nodes and its codes influence other codes, served as a bellwether for substantive themes from which I considered meta-themes, relationships and causality (Ryan and Bernard 2003; Bryman 2012).

Figure 4.7. Example of a parent node and embedded nodes developed for this thesis.

Nodes				
Name	Sources	References	Created On	
EA	237	951	02/08/2013 10:28	
Emotions	174	721	24/10/2016 17:33	
emotion - action, solidarity and order	5	22	24/10/2016 19:29	
emotion - learning	13	106	24/10/2016 19:29	
emotion - neglect	6	17	24/10/2016 19:29	
emotion - research	11	26	24/10/2016 19:29	
emotion - resistance, risk & anxiety	69	156	24/10/2016 19:29	
Emotion - sustainable development, service delivery & management	60	131	24/10/2016 19:29	
emotion mobilisation & exchange	8	55	26/06/2016 21:37	
emotion norms, bonds, learning, capital, commodification, consumption, regulation, labour	15	168	24/06/2016 21:03	
emotion practices, teleoaffectivity, materiality and sociotechnical order	15	138	24/06/2016 20:05	
emotion, needs, responsibility, moralities, identities, place, vulnerability, welfare	81	165	26/06/2016 22:20	
Emotional ASSESSMENT, accountability & REFINEMENT	23	41	26/10/2016 00:28	
Emotional capital, regulation, labour, maintenance and intelligence	8	83	24/10/2016 19:29	
Emotions and COOPERATION & COORDINATION	91	207	26/10/2016 00:28	
Emotions and CULTURE, cultural sensitivity, place and acceptance	55	150	26/10/2016 00:28	
Emotions as COMPETENCE and capabilities	108	220	26/10/2016 00:28	
Employment & Experiences, SERVICES, OPPORTUNITIES, FACILITIES	88	226	16/01/2016 12:58	

Source: NVivo10, Author.

The analysis derived from this process was corroborated by cross-referencing and triangulating between multiple methods of data production (Patton 1999; Guest et al. 2012). The robustness of this was supported by pursuing the research methods for insights until data saturation and replicating the methods in three different communities, enhancing data comprehensiveness and means for comparison (Sim 1999; Vaughn et al. 1996; Rowley 2002). Thus, the insights were led by the data directing the problem framing and primary themes and tested by comparing back to the data separately within each method and then testing the extent to which the insights aligned across the large data sets (Berger 1974; Bahrtdt 1975: 13).

Triangulation is a well-established validation method for comparing data across different methods and testing analytical insights (Jick 1979; Bryman 2006). The method supported accounting for the subjective nature of qualitative research and was reinforced as each data production method revealed complimentary yet slightly different dimensions of the same reality (Constas 1992; Onwuegbuzie 2000; Bruce and Lune 2012: 6). The resulting inferential validity was also enhanced through continually testing and analysing the interrelationship of data to theory and wider empirical findings (Denzin 1973: 300).

The final analysis was thus a corroborated integration of data compared across multiple sources that encompassed the implicit and explicit, the multi-sensual and relational, and the discursive and performative over multiple scales. It exposed both interdependencies and tensions that reflected the complexities of energy access and sustainable development (Murray 1984; Vince 2008) and was supported by continually reflecting upon contextual contingencies and challenges (Jackson 2000c).

These are discussed in three subsequent empirical chapters. The first empirical chapter introduces the discursive, symbolic and practical nature of 'energy access' in the three case studies through immediate and embedded substantive phenomena of energy use. This analytical focus provides a comprehensive overview of the everyday realities of energy development in rural communities and supports a more nuanced and abstracted consideration of the causes of these realities in the second half of the chapter. This results in a chapter that provides additional empirical material highlighting the often gendered nature of development transitions in developing contexts, illuminates further dimensions of differencing and presents significant yet neglected uptake influencing dimensions of the multi-sensory and embodied nature of co-dependent routines.

Chapter 6 explores these and other substantive themes through focusing on the second primary emergent 'access' scholarship gap and imperative of management. This expands the analytical lens further to bring in key considerations of multiple requirements, practices and actors and how they may be fostered to support ongoing and equitable energy use and wider benefits. Chapter 7 then combines tackling broad themes that emerged as significant for access and development improvements throughout the research with exploring a final substantive theme in greater depth: emotionalities. This results in close engagement with the sociology and materiality of energy access from distinctive angles that augment discussions in Chapters 5 and 6 of the importance of discursive, embodied and affective dimensions of everyday life and change subject to co-constitutive collective action and resistance, and a framework that accounts for this. Social practices are demonstrated as such a framework before a final concluding chapter, summarising the core thesis contributions and highlighting related implications.

4.5. Research access, quality & ethical considerations & challenges

4.5.1. Positionality, context and access

Positionality refers to how the identity of the researcher in relation to their participants and setting will affect the interactions they have with others (Valentine 1997; Philip 1998). Access relates to research through social interactions often limited due to issues of positionality, identity and power (Hoggart et al. 2001). Developing insights from people both most responsible for service provision in Nepal and most neglected was simultaneously challenging and insightful. Energy access is embedded in mundane routines that intersect both public and private life, social structure and intimate norms. This required research in spaces, social groups and pertaining to topics and processes that were often hard to access physically, socio-culturally and normatively, as well as being routinely (re)defined through these processes.

Approaching this required concerted sensitivity to participants, their needs and the context of the research whose challenges varied across the research groups and settings. Considering this both before and throughout the research triggered deep reflexivity about the nature of the research, the potential ethical considerations and the co-evolving positions, effects and identities of the research communities and myself as a prospective participant in their lives (Jackson 1991: 223). Through this process I aimed to put the values, needs and constraints of the participants as a foremost priority. This enhanced the effectiveness of the research process and developed social awareness and bonds that enabled me to ensure the research had no negative impacts. To aid this reflexivity, a number of considerations informed my research approach. Some of these have been discussed in the previous section regarding my methods of research and participant selection, however, I will now discuss additional factors that informed these approaches and my reflexivity.

The conceptual and empirical literature reviews of Chapters 2 highlighted the significance of considering social structure, power and agency for the different social groups in the research context and the data production process. Through the social location of the research and relational nature of power, I considered a diversity of stakeholders in order to more fully account for issues of power and considered myself an agent in this process (Routledge 1996). My positionality in relation to the participants and wider social structures was consequently a continual consideration to account for my influence on the data production process and to ensure all social groups were included and able to participate equally. This aligns with the

research objective of maximising insights, and thus the diversity of perspectives, into enhancing equitable energy access, and the dynamic coproduction of social interactions and meaning (Havlena and Holbrook 1986). The first step in gaining access to the diversity of perspectives was thus to consider my role in this and how I best support inclusive actor participation. I started by looking inwards. I reflected on my positionality and how my age, gender, race, marital status, nationality, manner, objectives and epistemology, among others, could influence the research process and how my 'otherness' could best be accounted for and utilised or reduced (cf. Burgess 1991, 49; Glesne and Peshkin 1999: 60).

I took this aspect very seriously and the significant efforts I made to support this were often exhausting but highly rewarding. Techniques that were most effective were always giving as much time as possible to participants, being well prepared, attentive, exchanging research interests, personal stories, concerns, emotions, experiences and practices (cf. Whyte 1984; Jorgenson 1989: 77). Of these, sharing food, feelings, manners, linguistic and tea customs were invaluable in all the research settings and routinely acted as a gateway to open and in-depth data, especially from more marginalised participants who were often more hesitant to engage until a greater bond developed. It also served different purposes according to the situation, from demonstrating prestige and power in some settings, to warmth, expertise and cultural values in others. Figures 4.8a and 4.8b indicate this. The former was received unexpectedly while waiting for a key member of Jaidi (an engineer and politician). The latter was with the family household that let me stay with them in Jaidi where every night we would eat this dish together that the mother and grandmother especially always delighted in my enjoyment of.

Figure 4.8a and 4.8b. Sharing identities, customs and values through food in Nepal.



Source: Author

In mutually exchanging these biographies and cultural and personal signifiers, valuable non-verbalised and symbolic insights were shared and trust and conviviality developed (Archer 1995). This enhanced my understanding of the research setting and modified the role and social location the societies had assigned me, enhancing the openness and self-reflexivity of the participants and the quality of the research and analysis (Jonson 1975; Harrington 2003). This included enabling me to more fully contextualise and refine the research approach and interpretations and include a greater range of forms of data and perspectives (Bahrtdt 1975: 13; Denzin 1989; Witzel 2000). Such interactions show the value of attentiveness to the materiality of research sites, how data may be embedded within the broader social context and how engaging with these can provide often overlooked and “inbetween” forms of data and understanding (Marcus 1995; Smith 1996: 165; Tedlock 2000). The invaluable exchange of food and feelings in this process substantives recent calls in human geography disciplines for a ‘visceral’, ‘affective’ and ‘emotional’ turn (Lorimer 2005; Bondi 2005; Whatmore 2006).

Secondly, the research took place within highly stratified socio-political geographies. Moreover, these structures are subject to constant struggle and negotiation and there remains no unified definition of ‘minority’ or ‘actor’ (Bhattachan 1999; Dahal 1996; Lawoti 2002)⁸⁸. I was thus attentive to a multitude of ways participation and narratives may be contingent and contested. These included issues of stakeholder representation, relations, interaction, resources, dominating voices, politicised spaces and common interaction influencers of age, socio-economics, gender, education, religion, available time, setting, group size and interaction timing (Kitchen and Tate 2000; Hollander 2004; Hopkins 2007). While these dimensions are embedded over multiple scales, they influence the conditions experienced by communities (MeinzenDick and Zwarteven 1998; Cloke et al. 2008).

Consequently, to further facilitate accounting for positionality and access, I assessed the significant geographies of difference in Nepal and considered these throughout the research process (Swyngedouw 1998; Peck 2000). Foremost considerations signalled by the literatures were distinctions of gender and caste (Biswakarma 2001; Dahal *et al.* 2002). Participation within all spheres of social life are influenced by these and while they are dynamic structures, gender remains indicative of power and caste the principal social classification structure in Nepal (Kijima 2006), underscoring sociocultural identity, profession and position and multiple forms of marginalisation (Hoffer 1979: 142). Inequalities related to these factors cut-across

⁸⁸ Stressing the importance of these factors and wider complexities (e.g. Blaikie 1979; Bhattachan et al. 2001). This is both the case in Nepal and more globally (UN 1991; Giddens 1993; Vickerman 1995).

other social and economic geographies yet in complex ways⁸⁹. Thus my consideration of these remained highly reflexive and nuanced (Deshpande 2000; Fletschner and Mesbah 2011).

Thirdly, energy access itself pertains to practices that are typically gendered, distributed and politicised (Celeski 2000; 2002). Indeed, notions of sustainable development meet the same concern (Sen 1999a; Rankin 2002). Consequently, how the geographies of difference played out within everyday practices, resource and role distributions and social and institutional narratives were ongoing points of reference. Yet these varied over time and place and among the Tibeto-Burman groups in Nepal, present in the Sisuwa-Bala and Khimti case studies, social geographies, cultural practices and signifiers of identity were generally distinct from the dominant caste-system structured groups (Levine 1987; Rijal 2010; Joshi et al 1996). Access to informants and their abilities to participate are thus highly varied, contingent and stratified, underscoring the importance of a reflexive and purposefully sampled approach to capture the range of voices and possible insights. Methods that especially supported this included conducting the research where the participants felt most comfortable, using ordinary and respectful language and providing time and support to answer difficult questions, especially for marginalized groups (cf. Cornwall 2003; Mikkelsen 2005: 286; Lehtomäki et al. 2011). Indeed, the effectiveness of these approaches mirrors understandings of discourse as agential and able to be utilised as an instrument to reproduce and share expectations of “normal”, belonging and “appropriateness” (Burr 1995; Glesne and Peshkin 1999: 60).

Fourthly, energy access and development approaches in Nepal, and to qualitative research more generally, illustrate an elitism and urban-centric focus that has been lamented as a “tarmac bias”, foreclosing insights and development pathway development (Bealieu et al. 2007; Porter 2011; Chambers 2014). Moreover, it eclipses the acute spatial variabilities of energy consumption modalities, resource access and sustainability implications (Kimberly and Evanisko 1981; Bhattacharyya, et al. 2006). This marginalises certain voices and actors and so concerted attention was given to participant mobility, geographical remoteness and access to information as variables influencing equitable development and participation (Bateson 1972: 489; Leydesdorff 1996). Actor inclusion and contextualisation was further accentuated by considering resources, processes and structures over multiple levels and how they reinforced certain narratives, capabilities and actors over others (Agarwal 1997; Dorward et al. 2004).

⁸⁹ A detailed account of the complexities of caste in South Asia is provided by Singh (2008). Its broader relation to development is explored further by Bista (1991), Deshpande (2001) and Dréze & Sen (2002).

This included ability to participate, make decisions and speak in public and private spheres. Considering this enabled me to negotiate access to actors conventionally neglected, including at the sub-household level, posited as especially significant for sustainable development (Kristjanson et al. 2009). The purposeful sampling technique and ethnographic approach I employed for the case study-level research supported this by embedding me in the communities and providing the time, contextualisation and flexibility to learn about, and include, all groups. Moreover, it prevented relying on gatekeepers that may bias the voices selected or render the researcher negatively associated with a particular allegiance, such as to community leaders or organisations (Valentine 2005; Kawulich 2005). Considerations of access thus overlapped with ethical considerations that collectively shaped the research process. The importance of research ethics, however, made it a notable consideration in its own right. I now briefly outline the steps taken to mitigate ethical concerns.

4.5.2. Research ethics

Participation in development is not equal (Katungi et al. 2008; Peterman et al. 2010). Through patterning abilities to interact (Kondylies and Mueller 2013), the effects of these inequalities may extend to research. Qualitative research requires particular and ongoing ethical considerations, especially in contexts pertaining to unequal social relations and sectors of society (Bins 2006; Hodge and Lester 2006). Before the fieldwork, the research was granted ethical approval by the University of Sheffield ethics committee. This was due to considerations of participant inclusion, access, sampling, safety and safety of all present, data and participant confidentiality, informed consent and (inter-)cultural sensitivity (Bennett and Bennett 1993). These were ongoing concerns anticipated in advance and mitigated through reflexivity throughout the research process (Subedi and Garforth 1996). Some of these considerations have already been discussed in relation to the research methods and so I will now describe additional considerations.

Firstly, informed consent was a prerequisite for all research methods. I ensured participants of all abilities were informed by providing each prospective participant information through an information form in simple Nepali, explaining the participation requirements verbally, that participation was voluntary, unpaid and optional, and they could refuse at any point. I also graciously respected unwillingness to participate and encouraged participants to ask questions if they wanted to know more (Terry 2011: 69). In practice, participants at all levels were generally eager to participate. This diligent initial process, however, rendered me more

sensitive to the participants, developed rapport and provided fuller understanding of the data generated and “their shades of meaning” (Smith 1996: 165).

Living with the communities in a normal manner, interacting with everyone equally, being receptive to actor commitments and emotions, and not being associated to an organisation or political cause that could cause tensions for the participants, also facilitated this (Liyana and Mitchell 1994; Valentine 2005). This approach reflects my perspective of agency as relational, contested and normative and requiring sensitivity to everyday encounters and understandings in relation to embodied attributes and larger social processes (Amin 2002: 386). Young et al. (1990), Flax (1993), Herman and Mattingly (1999) and Altenburg and Lundvall (2009) reinforce this through considering ethics as embedded and mediated in intertwined social practices.

Secondly, I decided participation would be voluntary and I would be clear from the onset that I could offer no monetary payment. This was to prevent participants contributing for financial reasons that might compromise the data quality and social relations and vice versa (Twyman 1999; Hammett and Sporton 2012). It was also an ethical consideration of not engendering and utilising misperceptions. At the same time, I was conscious of the service they were doing me for permitting me in their community and my social interest in, and respect for, them that is contrary to research that gives nothing back (Binns 2006). Consequently, I was honest about what I could provide and how what I hoped to achieve aims to help them and communities like them. This included relaying their concerns and suggestions to institutional actors in Nepal, studying how to best support these insights and aiming to disseminate the findings of a thesis in multiple ways to support this. Participants were very happy with this, however I took additional measures to ensure the exchange was mutual rather than ‘parasitic’ or compromising (Derman 1990: 110; Binns 2006: 19). This included providing food to participants, especially for those for whom participation meant pausing livelihood practices, reimbursing the families that housed me, and providing information, skills and items that they valued, such as policy information, chocolate, good pens, and teaching English and swimming.

Thirdly, my ethical considerations were embedded in a notion of justice as defined by the participants and concomitant with the equal ability for all to participate and express their needs, preferences and concerns. This is aligned with the rights and capabilities-based approaches discussed in Chapter 2 and notions of meanings, resources and capabilities from a social practice-ontology as multidimensional, distributed and stratified. To facilitate research ethics in this regard I was ensured I empowered all to participate equally, fully and safely through using language, actions and frames of references that were inclusive, avoided

normativity and were led by each actor rather than imposed externally or by higher-level actors (Cicourel 1974: 97; Escobar 1989; Young 1990: 34). Secondly, I considered how each participant felt, their welfare, constraints of disabilities and health, how they presented themselves, and their position in relation to me and how they interacted. This is informed by my perspective of identities, meanings, representations and roles as multiple, situational and contested (Cameron and Gibson 2004; Angrosino 2005), and ensured I remained responsive to the needs for all both to participate equitably in the research and as actors for energy access and sustainable development (Johnson 1975: 113; Jasper 1999; Anderson and Harrison 2006).

Through such considerations, I contextualised my approach to each research encounter to achieve participant access, trust, reciprocal dialogue and engagement, enhancing the data co-production process and accounting for my role as researcher and in their community and system of values (Randstrom and Deur 1999). This was supported by the previously discussed attentiveness to situational and interactional dynamics, my identity, epistemology and social placement and continually negotiating these through reflection, social interaction, praxis and learning (Glesne and Peshkin 1999: 60; Warren 2001).

Additional steps taken to provide sound research ethics included keeping all data secure, anonymised and confidential, reassuring participants of this, being transparent about my methods and objectives, sharing the information generated with the participants and ensuring they were comfortable with it (Pain and Francis 2004). I also ensured I gained consent for the use of photography, respected cultural norms, values and spaces; wore conservative clothing, took full responsibility for my research translator, and remained attentive to participants' and non-participants' feelings (Cloke et al. 2004).

My approach to research ethics was thus active and reflective and allies with considerations of welfare as processual, mediated and dynamic (Herman and Mattingly 1999; Kindon and Latham 2002). Collectively, these concerns allowed the research to address common constraints of development in Nepal and energy access and development approaches more generally (See Chapter 2). This included the neglect of women and the marginalised, unintended consequences and social dynamics (Chapter 2)⁹⁰.

⁹⁰ (e.g. Shrestha & Tanaka 2003; Upadhyay 2004; Kobayashi & Balakrishnan 2003; Agarwal 2010).

4.5.3. Working with translators

The research required the use of a translator and as such was an actor in the data co-construction process (Kobyashi 1994; Clifford 1997). I consequently remained reflexive to the effect the translator had on the research process and each encounter (MeHoul 1982: 114; Esposito 2001). To account for and minimize their effect, I critically engaged with the positionality of the translator, including their intellectual perspectives, social identity, motivations and feelings (Temple and Young 2004; Wong and Poon 2010).

Secondly, I undertook a concerted selection process to ensure the translator would best compliment my positionality and research approach. Selection criteria included openness to emergent research needs and adjustments, adopting the most appropriate manners according to the situation, respecting local customs, not reinterpreting the translated data (Threadgold 2000; Sparks 2002), familiarity with life in rural Nepal and ability to live and interact sensitively in these diverse environments and sensitive spaces (Trencher et al. 2014). Equally important was a candidate that could build social bonds, stay motivated with few of the facilities of urban Nepal, and live and work in close contact with me without compromising cultural mores (Fuller 1992; Adger et al. 2005). For this latter reason, despite reinforcing potential issues of gendered power relations due to my identity as a male, I considered it most appropriate I selected a male translator.

My selection criteria and this understanding was reinforced by the advice of field workers in Nepal and the development sector more broadly from whom I sought advice on this matter. It is also informed by a reading of translation as an active, contingent and social process that is subjective and for which linguistic skills are not the only requisite (Condon and Yousef 1988; Stanley 1990; Bassnett 1996). Finally, with few translator services in Nepal and the negative consequences of being associated with a development body, I selected a candidate from personal recommendations of, and an interview process with, recent graduates within Nepal. From this selection, before and throughout the research I took additional precautions to account for and limit the effect of translation on the quality of the research. This included working together to clarify local dialects, ensuring a thorough and mutual understanding of the questions, concepts, ways of knowing and forms and nuances of valid data and the research methods (Temple 1997; Bernard 2011: 220).

This involved ensuring attentiveness to what is said informally and what is not said and capability to sensitively probe respondents beyond initial answers for deeper levels of meaning (Jackson 2001; Stephens 2007). It also entailed appreciating the difference between silence due to incomprehension, institutional pressures or contrasting meanings, and silences of self-reflection, and how to best respond in those varied situations (Wiens et al. 1996; Esposito 2001). Finally, I ensured I was active in translation and the reading of the 'text' to reinforce these observations and the social construction of the data production process, used my position as a less capable Nepali linguist to more fully focus on the non-verbal communications and interaction variables (Song and Parker 1995; Tyman et al. 1999).

4.5.4. Quality and credibility of findings

I aimed for research quality and vigour throughout all stages of the research. This is especially paramount due to the significant nature of the phenomenon of study to social and environmental wellbeing and sustainability and its intimate location within the social. This concern and the value of enhancing research impact was reflected through the notable socio-cultural considerations that informed the research process, as outlined throughout this chapter. Additional considerations are now further discussed.

Knowledge, narrative and "doing science" are always subjective (Denzin 1973: 300), requiring researchers to identify these subjectivities and avoid undue claims of data representativeness and absolute interpretations (Corbin & Strauss 2008: 302). Sensitivity to the construction of knowledge, however, and more fully attending to the plurality of everyday life, is a primary value of qualitative research (Delyser et al. 2010: 6). To amplify this sensitivity I was transparent about the nature and influence of my epistemological and methodological approach for all stages of the research and continually interrogated and mitigated these, as well as the influence of my translators' and my positionality (Philip 1998; Tyman 1999; Harrington 2003). Openness to these was bolstered by concertedly recording these and the related decisions throughout the research process of design, conduct and analysis. This openness embodies Bailey et al.'s (1999) call for reflexivity throughout the entire research process and was further enhanced and utilised to boost the research quality by using highly appropriate, well-established and substantiated methods. These included integrated research and analysis, cross-referencing and validity checking through multiple sources of data, testing thematic codes and confirming results with participants as an ongoing, iterative process (Lincoln and Guba 1985; Creswell and Miller 2000).

Consequently, quality and credibility were supported by reflexivity, comparing multiple data sources and accountability (Denzin 1989; Bloch 2007). Finally, research vigour was reinforced by grounding the insights in the voices and forms of knowledge, meaning and everyday life that are often overlooked in energy access approaches specifically and in sustainable development and research more broadly (Charmaz 2006; Fransen et al. 2008). This included the sensory and normative, multiple forms of representation, needs and constraints, and including the diversity of actors, positions and experiences (Minkler et al. 2013). By continually corroborating these and staying close to the data throughout all stages of research and writing, I was able to best support these objectives (Bazeley 2013: 402).

4.6. Conclusions

The thesis research used an in-depth qualitative research design that included a diversity of actors influencing, and affected by, the energy and development sector in Nepal. The diversity of perspectives was to augment insights, include neglected stakeholders and ways of knowing and more fully consider issues of power and interdependencies whose effects may localise in energy access and sustainability challenges yet for which multi-level actors are complicit. To best support these objectives, a multimethod, explorative approach was developed and employed over a total fieldwork period of 11 months in Nepal amounting to 30 institutional-level semi-structured interviews and 3 ethnographic case studies including 54 household and 42 community-level semi-structured interviews, numerable informal discussions, participant observations, practice sharing, field walks and site visits.

This approach was informed by considerable preliminary preparation and determined by the unfolding research encounters and co-produced knowledge. The enthusiasm of the participants to engage with the research was humbling and uplifting, however, I made constant efforts to reflect upon, learn, record and refine my approach in relation to the dynamic research settings and demands to best support the openness and inclusivity of this participation and the quality of the research. Issues of ethics, access, social relations and positionality were constant considerations to best support this and resulted in a research project that whilst intensive, was illuminating, rewarding and responsibly included marginalised groups for which the absence of modern energy practices imposes the greatest burden.

CHAPTER 5

From 'energy access' to energy use in rural Nepal

5.1. Introduction

“Electricity is important for development but it is not very helpful for the poor who cannot use more appliances, for example, rice cooker or computer. Being able to use the electricity is as important as having the electricity.”

(Household interview, Male, 40s, disabled, low caste. Khimti, Nepal).

With 'energy access' programmes being increasingly rolled-out, it is imperative to explore what happens to that access. This chapter does this by evaluating primary empirical findings of the research that illustrates the central importance of routine use for the impact of energy in everyday life. It underscores the contention made in the preceding chapters to shift the 'access' and development focus from discrete actors and deterministic results to social agency, constraints and interrelated actors. There is, therefore, much more to understand in working towards frameworks that more fully support the leap from effective provision to sustainable development enhancing use. The preceding chapters supported this by thinking of development changes in terms of innovation uptake and dynamics. This was substantiated by the positioning of innovations in development policy and analysis as critical to addressing the challenges, and understanding the implications, of sustainable development (Sen 2009; UNDP 2012c; Khavul and Bruton 2013).

Through integrating the insights that emerged from an empirical literature review with evaluations of alternative conceptual frameworks for development, the thesis then outlined a picture of the innovation uptake process *vis-à-vis* sustainable development as co-constructed, contingent and requiring experiential learning and capabilities to choose, realise and sustain certain functions central to wellbeing, identity and daily needs. By considering these conceptual framings and empirical studies collectively, however, a depiction of the heterogeneity, complexities and normativity of use and change emerged that was eclipsed by the alternative frameworks and evaluations. This chapter aims to challenge these limitations in development and energy access thinking that currently reifies the privileging of technocentric interventions and limited sustainable development outcomes. It does this by scrutinising what happens to energy practices following community-level electricity provision

and then unpicking underlying reasons for the outcomes to indicate implications for enhancing energy access strategies. The focus then allows us to expand the analytical gaze in the subsequent chapter to explore how (non)use may be maintained, managed and improved, before zooming in on aspects that catalyse and constrain this in Chapter 7.

The chapter starts by presenting an overview of energy access in the three case studies through describing their energy consumption patterns. The section relates the initial findings back to the empirical uptake discussions of Chapter 2 and wider innovation literatures to reveal the pervasiveness of the patterns observed and 'energy access' as embedded in unequal energy practices. This problematizes the dominant discourse that access is primarily a matter of physical provision and qualifies the need for nuanced evaluations of consumption practices.

Section 5.3 does this through exploring the significant non-appropriation throughout the case studies of an innovation that is among the most instrumental of those available in the communities for propelling core dimensions of sustainable development: electric rice cookers. This focus is also compelling as throughout the multi-level research, it only emerged through ethnographic case studies. It indicates essential components of energy access, such as energy applications, cooking and gender, are overlooked at the institutional-level and require closer examination. The empirical rice cooker case allows us to start this process. The analysis of this is bolstered by thinking in terms of social practices and innovations in context of their everyday use, contributing to increasing calls for theoretical framings and empirical evidence to inter-communicate and broaden the development dialogue (Chapter 2.4). To start this, we now consider the nature of the energy access in the case studies.

5.2. Rapid uptake and a dichotomy in appropriated innovations

The institutional-level interviews provided invaluable insights into the difficulties of providing energy access in rural areas, focusing on renewable energy technologies and issues of supply chains, transportation, management, insufficient private sector investment and institutional constraints. They gave little insight, however, into what energy access means in everyday terms for rural and remote communities and how they could be part of the access and sustainable development solution. It was not until staying in the rural communities that I got a

fuller sense of this. I arrived in the first community in March 2013 and conducted the ethnographic case study methods from then, starting with Jaidi and ending with Khimti⁹¹. At this point, Jaidi, Sisuwa-Bala and Khimti had experienced electricity in their villages for 2 years, 6 years and 11 years, respectively. Despite this temporal variance, the consumption patterns within the communities were strikingly similar. We now unpick these patterns.

The case studies revealed that the journey to receiving electricity had been very demanding but for almost all the community members was perceived as the primary route to enhancing their lives. This interpretation was prevalent in their everyday conversations, practices and the considerable interest the community members had in talking to me about it. Indeed, electricity (“bisuley”), was a dominant component of the social narrative in the communities and more so than in Kathmandu. This narrative in the rural communities particularly was intimately linked to their normative concepts of rights, justice and community, with a common refrain being that the rivers and electricity thereof are “our resources for our community” (KHHi18). Within the discourse and performances, there was also a collective notion and feeling of electricity as sustainable, generative of wider development and superior than other energy systems and the nationally supplied electricity due to having fewer periods without electricity (Sovacool 2013; Shrestha 2010)⁹².

These positive associations of electricity and the ability to provide effective electricity have been found in other community approaches in ‘developing’ countries (Greacen 2004; Gurung et al. 2011; Palit and Chaurey 2011; Kaygusuz 2012)⁹³. They are also culturally consistent with electricity as more compatible with existing meanings and conventions of community resource and project management, cleanliness and purity in South Asia than alternative modern energy sources (Furedy 1988; Rozin 1996; Acharya 2004). Yet the applications of this electricity revealed that the substantive gains from energy access were less unanimous.

The focus on applications showed three key aspects: minimal use was extensive, the transition to minimal use was rapid, and consumption beyond minimal levels was gendered. To start, within the communities, over 90% of households had electricity and most had made the transition to using electricity in their daily lives. The uses were multi-purpose and occurred within differing timeframes. The majority of electricity use, however, was for household

⁹¹ In this order because the Khimti case promised to be the most conceptually complicated in terms of the greater divergences in the actors involved and because Jaidi was the most accessible, allowing me to more easily get extra provisions, connect to the internet or call up a back-up translator if necessary.

⁹² Dailyload shedding in the case studies & Kathmandu is 1-3 hours & 8-20 hours, respectively (NEA 2012).

⁹³ Others stressed by Hoffman & High-Pippert (2005); Ashok (2007); Kirubi et al. (2009); & Dulal (2013).

lighting, mobile phone and radio charging. All households used electricity for lighting immediately following electricity provision and within the first year the majority of households, between 72-87% and 56-82%, used it for charging and using mobile phones and radios, respectively. The nature of this use was minimal, typically consumed through the use of 2 light bulbs per household and 1 phone and radio in the households that had one. Other household electricity uses were appropriated much less extensively, namely TVs (17-20%), DVD players (0-9%), rice cookers (17-27%); kettles (0-7%), music systems (0-6%), computers (laptops/PC) (0-6%) and alternative cooking fuels (0-27%). Percentage variances account for differences between the three case studies. Table 5.1 depicts the various electricity applications appropriated and a measure of their frequency, and gender inclusivity, of consumption.

Gender-specific frequency of use provides a starting point for in-depth analysis (Celeski 2000). It appeared the most suitable metric for gauging the degree of consumption following their concurrence with the community-level sources and the absence of this depth of analysis in energy access studies despite commands for application, intra-household and gender-specific consumption data and analysis (2.4 2.5. Best and Maier 2007; Leck et al. 2015: 454). Moreover, as also introduced in Chapter 2, the metric also accounts for the limitations of conventional measures of innovation diffusion or consumption that provide a static, purchase-focused lens⁹⁴ rather than considering dimensions of use (Peterman et al. 2014). These include the time taken for the innovation to become habitually used, the non-linearity and continuity of consumption and how early, public and sub-household use affects ultimate uptake and impact. These considerations may be paramount for sustainable development⁹⁵.

⁹⁴ Also includes a focus on time of market appearance, procurement, aggregate sales, household ownership or income (Davis 1998; Barnes 2010; Sehjphal, et al. 2014).

⁹⁵ (cf. Goodchild & Rizzo 1987; Bowden & Offer 1994; Preda 2000; Fishbein 2003; Shih & Venkatesh 2004; Wood & Moreau 2006; De Graaff, et al. 2008; Gwyer, 2008; Belk 2014; Yettou et al., 2014).

Table 5.1. Gender-specific, household-level electricity uses in the three case studies.

Appliance	Use Frequency	Jaidi		Sisuwa-Bala		Khimti	
		Male use %	Female use %	Male use %	Female use %	Male use %	Female use %
	Daily	100	100	100	100	100	100
	2/7 days						
	Rarely						
	Daily	82	0	87	7	72	33
	2/7 days		18				
	Rarely						
	Daily	82	9	87	7	56	17
	2/7 days		18			11	11
	Rarely						
	Daily	18	9	20	7	17	11
	2/7 days		9				
	Rarely						
	Daily	0	0	0	0	6	6
	2/7 days						
	Rarely						
	Daily	9	0	0	0	0	0
	2/7 days		9				
	Rarely						
	Daily	0	27	0	40	0	17
	2/7 days						
	Rarely				7		
	Daily	0	0	0	7	0	6
	2/7 days						
	Rarely						
	Daily	0	0	0	0	6	0
	2/7 days						
	Rarely						
	Daily	0	0	0	7	0	0
	2/7 days		9				
	Rarely						
	Daily	0	9	0	27	0	0
	2/7 days						
	Rarely						

Source: Derived from multimethod qualitative case studies. Figures are taken from the 20, 18, and 16 household-level case study interviews in Jaidi, Sisuwa-Bala and Khimti, respectively.

The mean household-level use of appliances, tabulated in Table 5.1, illustrates a significantly patterned nature of energy use whose principal feature of male dominated use and use primarily for lighting, phone charging and powering radios holds across the three case studies. Use of appliances other than lighting was especially male-dominated. The household electricity consumed in practices using these appliances for the three case studies was predominantly, but not exclusively, from their respective community electricity systems and in all cases, the national grid-based supply in Jaidi and the local MHP supply in Sisuwa-Bala and Khimti was sufficient to power considerably more electricity consumption and applications. Within all case studies, however, electricity from the community systems was augmented in approximately 10% of the households by electricity from pre-existing SHS. The SHS are of varying capacities (15-60kW), implicating the range and extent of appliance use. All householders consider these SHS inferior to the community electricity due to their limited output, low functionality during the 3-month monsoon period and householder centred, relatively high maintenance requirements.

Within Jaidi 14/20 (70%) of the sampled households had electricity. Those that did not used kerosene lamps for lighting in the conventional manner of the community before electricity access. All but two households with electricity had and used mobile phones. All households used the electrical appliances they had to some extent. In Sisuwa-Bala, all 18 of the households sampled had electricity and had fully displaced the previous practice of kerosene use for lighting. Some, however, had appliances that they did not use. Two households, for instance, did not use the rice cookers they had. In Khimti 18/20 (95%) of the household sample had electricity through a diversity of energy sources. All the households in Khimti used the appliances they had to some extent except for one household that did not use their rice cooker. The only example of household laptop ownership and use was in Khimti. It was an exceptional case⁹⁶ not possible before the community electricity system. Finally, at the household-level, the non-use of cooking innovations such as electrical cookers and biogas is also notable.

The community-level electricity practices portray a similarly gendered pattern. Excepting tailoring, males were soul practitioners of these occupations. The practices pertained primarily to income generation activities and included metalworking, carpentry, tailoring, shopkeeping, poultry farming and food processing mills. Many of these activities included applications with no precedent in the villages, such as mechanised refrigeration, air extraction

⁹⁶ A college-level student not able to afford to live near his university but able to charge his laptop and work from it at his family's home.

and welding. For other applications however, such as drilling, sawing, sewing and grinding, electricity meant the transition for pre-existing practices from manual power to the more efficient, controlled and convenient electrical form. Electrical lighting enhanced all the above activities and were generally employed only by those with previously related professions, excepting poultry farming, shop keeping and food processing.

For all the practices, electricity led to their extension, intensification and more inclusive availability of their products. For example, the availability of lighting for off-farm income generation activities extended working hours by an average of 2 hours per day; and over 95% of all households in the three communities substituted manual flour grinding and purchasing cooking oil for regularly using the community electric-mill. The former extended practices and resulted in a collective temporal shift to working later at night. The latter displaced former practices, namely females grinding flour manually and purchasing cooking oil from the distant market at a higher price than producing oil from their farm-grown mustard seeds and community electric press, and exemplifies an increase in the range, cost-reduction and quality of locally available services. The three case studies show, therefore, the extension and diversification of livelihoods and services driven by electricity practices dependent upon community-wide interpretations of demands, needs and value.

Within this, however, are four important insights. Firstly, the electricity applications, especially at the community-level, signifies that certain pre-existing practices and conventions support the emergence of future practices that enhance the outcomes of development services or projects. The resulting practices may range from highly related, such as in the case of automated carpentry, directly enhancing pre-existing practices, or distantly related, such as poultry farming, facilitated by pre-existing community elements and related practices, such as demand for chicken and new livelihoods and practices and conventions of men diversifying occupations and society consuming chicken. Certain pre-established practices and practice elements and relations may thus be particularly influential in catalysing practice modification. Including these in project considerations may thus aid interventions. The practice-ontology supports this deduction in terms of 'proto-practices' (3.3).

Next, in addition to the applications of modern energy, the degree of use, innovations not used and the rate of uptake all exhibit significant gendered disparities. Firstly, comparing gender use with the differences in the durations communities and households had electricity (Jaidi 2 years, Sisuwa-Bala 6 years and Khimti 11 years), illuminates that the uptake of electricity innovations at both the household and community-level remained male-centric in

all communities despite a temporal variance of community electricity of 9 years between the case studies. The pattern suggests the prevalence of structural forces through which the principal household head in rural Nepali communities⁹⁷ extends to presupposing the principal modern energy consumer. This aligns with other studies in South Asia (Upadhayay 2004: 323; Rijal 2010). Examples include gendered firewood dependency for cooking augmenting existing patterns of marginalisation (Celeski 2000; Jerneck and Olsson 2013).

Secondly, excepting lighting, which was used equally and almost instantaneously following electricity provision, electricity uptake was most rapid and extensive for male practices. Most rapid and extensive of which was telecommunication and leisure-based innovations, followed by income generation practices. Thirdly, equally conspicuous in the gendered electricity consumption was patterns of non-use and the non-innovation of arduous daily female practices for which energy access is posited as an elixir (UNDP 2011; World Bank 2013). The uptake of innovations of any sort relating to female undertakings were comparatively negligible and those relating to manual labour-saving for female duties, such as food preparation, fuel sourcing, cooking and cleaning, were minimal. These outcomes jeopardise the development benefits of energy access (Greig-Gran et al 2006; Brauw et al. 2014) and bears strong parallels with both historical and contemporary patterns of electricity uptake⁹⁸.

The gendered prioritisation of leisure-based innovations and the gendered non-displacement of labour and discomfort, for instance, is a characteristic of energy and technological transitions in both contemporary developing and developed contexts (Sovacool et al. 2011). Barnes (1998; 2001), for instance, presents the greater incorporation of electricity into daily activities by males and predominately for leisure purposes such as television following electrification in rural India and Columbia. This concurs with my findings and others in rural communities, such as in rural Yunan, Punjab and Pakistan (Kelkar and Nathan 2005; Villamor et al. 2014). It follows the male decision-making dominance and unequal nature of roles and spaces (e.g. domestic and remunerated) that Chapter 5, advancing from Chapter 2, highlighted often undermines development efforts (Cowan 1983; Pearson et al. 2012). It substantiates the concern raised in Chapter 2 of the need to consider intra-household dynamics and that household income is allocated predominately by males and for their personal gain rather than available innovations that would improve female or family welfare (Reddy and Nathan 2013).

⁹⁷ Household ownership & decision-making in Nepali culture is typically patriarchal (NPC 2011b: 5).

⁹⁸ (See Chambers et al. 2004; Barnes 2010; Yoo & Kwak 2010; Oreglia 2014: 20; Lee et al. 2015).

This empirical finding also carries a methodological implication that reinforces the value of evaluating practices and absent practices. Although the finding was confirmed explicitly in certain household and community-level interviews (e.g. KKS15; JKS13; JHH11), it was only through studying the energy practices and non-practitioners that the insight clearly emerged, suggesting that a study of practices can reveal facets of social life beyond the reach of discourse. The result is the marginalised appropriation, support, evaluation and impact of significant development enhancing innovations. Studies also commonly report, consistent with my findings, that lighting is the first appliance adopted following household electrification and the move to non-traditional cooking fuel practices is generally minimal (Kelkar and Nathan 2005; Kanagawa and Nakata 2008). Accounting for these patterns may hence have considerable implications for energy access approaches.

Indeed, a similar pattern played out in rural America almost a century prior. Following the start of household electrification in the United States, the 1920s witnessed the mass procurement of electric radios and lights, followed by refrigerators (1930s-40s), clothes washers and vacuum cleaners (1940s-60s) (Tobey 2004: 23). The latter appliances pertained to female domestic roles (Tobey 2004: 26). The consistent findings suggest that although electrical appliances may enable substantial resource savings for women, such as time, labour and health⁹⁹, a primary uptake factor may be the degree to which the prime decision maker(s) perceive they personally benefit (Celeski 2001). As indicated in the diffusion literature study (2.6), in patriarchal societies, cost-savings, remuneration or male leisure benefits may be privileged over others (Sarin et al. 1998; Adhikri 2003). Such hierarchies of innovation use have intrinsic impacts that impinge upon which innovations are practised and outcomes realised (Toulouse 1997; Corbera et al. 2007b).

Other dimensions of (non)use are also substantive. In the case studies, this included improvised use, partial use, demographic-specific use, context of use and mismanagement. Although the approximately 90% of households in the three case studies had electricity, 88% had no access to clean cooking innovations and all households cooked with solid biomass¹⁰⁰. Biogas digesters, for example, were present in 12% of households across the case studies and used daily in only 25% of these cases due to malfunctions following being used for over 10

⁹⁹ (See Shepherd 1990; Greenwood et al. 2003; Gurung et al. 2011; Bensch & Peters 2014).

¹⁰⁰ There was no data available for this at the level of the case studies other than derivable from my case study research. Household-level and intra-household-level energy consumption statistics are notably absent from village, district or national-level reports or bodies.

years with insufficient maintenance or replacement (SBKSi3; Ili1; Ili5)¹⁰¹. Rice cookers were present in approximately 30% of the households but used regularly in less than 25% of the case study households. Furthermore, this belies significant variation across the communities, with daily use as high as 40% in Khimti yet 17% in Sisuwa-Bala and 5% or less in Jaidi and Jaidi's neighbouring communities (CKSi1; JKSi7). No other fuels were used for cooking, excepting LPG, used in 5.3% of households and only occasionally in exceptional circumstances of more mouths to feed than usual, such as during ceremonies (JHHi7; KHHi14). LPG was used recursively, however, in non-domestic community teahouse cooking (SBKSi6; KKS5).

Aspects of contextualised supply, use, demand and management thus appear more significant for consumption and sustainable development in the case studies than conventional focal points of standardised provision, durability, quality and 'affordability' (Chapter 2). Without the significant cooking energy component being modernised, however, the case studies do not exemplify the exemplary 'total energy access' benchmark (IEA 2011; Practical Action 2012). This situation is representative of energy programmes and is a key limitation to their sustainable development impact (Rehman et al. 2012; Groh et al. 2014).

Moreover, for all households that used electric cookers for cooking in the case studies¹⁰², it was employed as an appending rather than primary cooking fuel. This was also the case for other cooking fuels such as the marginal use of biogas and LPG. In all cases, the alternatives were used for cooking rice and boiling water alongside traditional fuelwood consumption to simultaneously cook other dishes. Rice cooker practices, therefore, reduced the amount of fuelwood cooking but did not fully displace it. This 'fuel-mixing' further challenges the linear diffusion and development model premises and suggests more nuanced energy access approaches are required to enhance their development impacts (Masera et al. 2000; Heltberg 2004; Horst and Hovorka 2008). Furthermore, rice is the main staple in the rural Nepali diet and thus transitioning away from solid biomass fuel may have notable development implications (Stewart et al. 2011; Campbell et al. 2014; Henjum et al. 2015).

Yet despite demand to divorce from *some* of the aspects of the original cooking practice and considerable actual and perceived relative advantages of rice cookers in their contexts of use

¹⁰¹ This notation represents the index used throughout the empirical chapters to refer to the sources they are cited by. It uses the case study initial & the initials HHi, KSi and Ili to signify household, key stakeholder & institutional-level interview, respectively. The number following the initials corresponds with the interview number for the household & community-level interviews, yet not for the higher-level interviews due to some requests for anonymity. A list of the interviewees for the former categories related to the assigned number is presented in Appendix III & Appendix VII.

¹⁰² Some 'reinvented' its designed purpose & used it for washing food, faces and storing valuables.

that correspond with these demands and other favourable uptake factors, such as material and financial availability, the transition to using cooking innovations was minimal. This outcome is especially notable in juxtaposition to the extensive uptake of mobile phones, which provided limited functionality and fewer relative advantages for the remote communities due to intermittent and low telecommunication services¹⁰³.

The energy access landscape is thus complicated by dimensions considerably more than material supply. Indeed, the more extensively owned and used TVs were of a comparable cost to rice cookers and more damage prone. The low cooking fuel transition problematic is hence beyond the conventionally upheld couplet of availability and affordability or a rejection of the commodification or acculturation of cultures (Maslow 1951; Teske and Nelson 1974). The preliminary analysis, therefore, concurs with key community-level actors that:

There is definite potential for people to use more electrical appliances, especially, rice cookers, kettles and water pumps. This would enhance both their development and the energy system. This is important (KKS13; CKSi1).

This section suggests that strategies to this end need to be consider social dimensions and their structuration to enable inclusive choice and use. We now explore this and wider implications by zooming in on the low rice cooker uptake.

5.3. The global importance & low uptake of rural cooking innovations

Exploring the low uptake of the rice cooker in this section allows us to contribute to understandings of innovation non-appropriation in relation to key components of everyday life: cooking, food, families, households and traditions. It also returns us to the archetypal example of the uptake paradox in energy access: the prevalence of fuelwood cooking despite available innovations (2.2, Pohekar et al. 2005; Ahamed et al. 2014). Yet as we outline in the following paragraph, this example of the uptake dilemma is a global phenomenon that suggests the extensive importance of cooking practices for sustainable development. Thirdly,

¹⁰³ Mobile phone use in Jaidi & Sisuwa-Bala required innovative practices due to network signal being limited to hilltops. Common innovative practices included throwing mobile phones in the air to reach a signal to receive & send messages, bulk-message sending, drafting messages prior to planned sending, & scheduling sending & receiving. The normality of these practices also shows the demand for such services and the transient, situated & co-constituting nature of social norms & practices.

in considering this paradox from the perspective of rice cookers and a social constructivist approach, the analysis marks a first for the debates whose empirical studies have overwhelmingly focused on improved cook stoves (ICS) from a technical perspective and have failed to suggest the mechanism underscoring effective uptake (Ruiz-Mercado et al. 2011; Rehman et al. 2012; Smith and Sagar 2014). There are few studies considering social aspects of cooking in the development field and alternative cooking innovations, such as solar cookers, biogas, solar dryers, electric stoves, extractor fans, ovens and kettles, and only the former pair have received more than negligible attention despite their limitations and those of ICS¹⁰⁴.

Indoor solid biomass cooking is the conventional cooking practice in developing countries. It provides the primary energy needs for over 3 billion people yet the emitted smoke is responsible for 4.3 million premature deaths in the 'Global South' every year, more than induced by malaria or tuberculosis combined (Martin et al. 2011; WHO 2014). Yet the cooking problematic remains relatively neglected within sustainable development considerations (Wan et al. 2011), despite its considerable negative impacts on health, livelihoods and human development becoming increasingly highlighted (Dasgupta et al. 2006; Gurung et al. 2011). These impacts centre on the rural poor, especially women and children (Von Schirnding 2002), exacerbate inequalities in mobility and capabilities, yet are avoidable by adapting cooking practices (Smith et al. 2004; Lambrou and Piana 2006). Such practices, however, exhibit particularly embedded patterns of conservation rather than change (Leach 1992; Davis 1998).

Moreover, this patterning is a global phenomenon, especially in rural areas of LDCs, and persists despite the 'availability' of alternative fuels (Cooke 1998; 2008; Arnold et al. 2006). The significance of this is compounded as the conventional daily manual collection of approximately twenty kilograms of wood for cooking purposes alone,¹⁰⁵ is the most time and labour intensive daily practice in rural and remote households (Leach and Mearns 1988; Tinker 1990). Kumar and Hotchkiss (1988), for instance, demonstrate that women in hill regions of Nepal spend 2.5 hours per day on fuel collection, while in Botswana, the average diurnal demand is 3.3 hours (Karekezi et al. 2005). These means, however, mask extremes: in rural northwest Pakistan women may spend up to 6 hours per day collecting fuelwood (Jan

¹⁰⁴ Highlighted by their evaluations in use. ICS & biogas is problematic for equitable EA in mountain communities of Nepal as the former only reduce the effects of firewood consumption, the latter is limited to the wealthiest households with sufficient livestock or other biomass sources (Nepal et al. 2011). Low temperatures in high altitudes also prohibit biogas (Perez et al. 2014).

¹⁰⁵ The low combustion efficiencies of solid biomass require five to ten kilograms of wood to cook an average household's meal (Kumar & Hotchkiss 1988; Hanna et al. 2012). On average, a minimum of two meals worth of wood per family is collected manually every day for households consuming firewood in LDCs (Muneer & Mohamed, 2003; Pohekar et al. 2005; Jerneck & Olsson 2013).

2012), whilst the Nepal case study fieldwork calculated such a duration to be the norm in rural Nepal. This daily collection demands the greatest daily calorific and time obligation for women and comes with wider costs to income generation, health care expenditure, food security, education and social empowerment (Fullerton et al. 2008; MacCarty et al. 2008; Romieu et al. 2009). The cooking problematic accordingly constitutes a compounded opportunity cost and burden on survival (Winterhalder et al. 1974; MacDonald et al 2001), set to exacerbate in forecasts of increasing resource depletion, especially in rural communities (Chopra and Dasgupta 2000)¹⁰⁶.

The traditional practice's spatial variances, inequalities, time, calorie and opportunity costs, however, remains largely invisible in current energy analysis and considerations of labour supply (Vogler 2000: 209; Arnold et al. 2006). Furthermore, the consumption of solid biomass for cooking catalyses environmental deterioration, including deforestation, water scarcity, soil erosion, landslides, floods and concomitant impacts on soil fertility (Trossero 2002; Jerneck and Olsson 2013). Impacting on society, environment, economic and wider development thusly with low substitution and transition rates to alternative fuels in rural areas and the reasons for this not being clearly understood (Masera et al. 2005; 2006; Pundo and Fraser 2006), it is not surprisingly that Bailis et al. (2009: 4) proclaims conventional cooking practices "the killer in the kitchen". The resulting 'cooking crises' (Arnold 2006) remains among the greatest challenges for sustainability and development (Hart 2005; Lewis and Pattanayak 2012) and relates to wider concerns of energy needs and practices for health, welfare, livelihoods, environmental sustainability and education, inter alia (Jerneck and Olson 2013).

Solutions that remedy the crises are, therefore, significant for sustainable development specifically, and for understandings of the dynamics of energy access, innovations and inequality more broadly. This and the age-old innovation diffusion paradox, therefore, remains paramount (Jaffe 2006; Foxon and Pearson 2008). Yet approaches to rectify it predominantly espouse the neo-liberal diffusion/development model: the cooking conundrum thus undergirds the unsuitability of the model for sustainable development. Furthermore, in programmes in which the constraints for rural women to benefit from development initiatives have been considered, innovations have been deployed as the cure without testing the assumption that it would result in their participation or gain (Boserup 1970; Schmidt 1988). The predominant push of ICS despite low use and impact rates and viable alternatives

¹⁰⁶ Solid biomass stocks are contested (Leach & Mearns 2013), yet despite the material component of the "fuelwood crises" (Arnold et al 2006), the diverse impacts of its indoor cooking use cement grounds to research ways to intervene in it & in ways that include all social groups & constraints within any 'community' (Lloyd-Ellis & Bernhardt 2000; Sesan 2011).

epitomises this and the need to revise the incumbent approach (Deweese 1989; Singh et al. 2014; Bansal et al. 2014). We consider this now in the context of rural Nepal.

5.4. The low uptake of cooking innovations in rural Nepal

Approximately 1.8 billion people in India and Nepal are without clean cooking options, more than double the next greatest affected region. The problematic is most pervasive, and impacts most pronounced, in remote communities (Shrimali et al. 2011; Rahman et al. 2014). The problematic and cooking transition paradox is particularly acute in Nepali communities, despite concerted efforts to overcome it¹⁰⁷. The acute spatial, social and temporal variabilities of energy consumption modalities and impacts (IEA 2011), however, demand more nuanced evaluations¹⁰⁸ than the current method of district-level surveys and focus on rural-urban consumption differences, despite this being significant, as Table 5.2 indicates (cf. Kurmi et al. 2008; DCEP 2011; GoN 2011). Indeed 2012 assessments depict that firewood accounts for 59% of cooking fuel on average in rural areas while a 2014 surveys suggests the figure is 71.9% and 94.4% to 99.2% in my case studies (NPC 2012; 2014)¹⁰⁹.

Table 5.2. Mean household-level cooking fuels consumed in rural and urban Nepal

Area	% of total	Daily cooking fuel							
		Firewood	LPG	Animal dung	Biogas	Kerosene	Electricity	Other	No data
urban	19.3	5.0	13	0.3	0.4	0.4	0.0	0.1	0.1
rural	80.7	59.0	8.0	10.1	2.1	0.6	0.1	0.3	0.5
% Total	100.0	64.0	21	10.4	2.4	1.0	0.1	0.4	0.6

Source: Derived from GoN Census data (2011). ‘Others’ includes bio briquettes and plant residues (Khanal et al. 2011).

¹⁰⁷ Further details provided by WorldBank,1978; ERDG 1979; Blaikie et al. 1980; Bajracharya 1983; Pandey & Yadama 1992; Chaurey et al. 2004; Mahat, 2004; Gawande et al. 2013; Rhodes et al. 2014).
¹⁰⁸ Commanded further by (Reid 1986; Bajgain & Shakya 2005; Baland et al. 2010; Sharma et al. 2015).
¹⁰⁹ Calculated from the VDC-level National Population Census, NPC (2012), the most detailed available statistics. The fuelwood dependency reported for my case studies was Jaidi, 99.2%; Sisuwa-Bala 98.3%; Khimti, 94.4%. For Jaidi, no data was available, a comparable neighbouring VDC, Chhisti, was taken as a proxy. Khimti case study consists of 11 VDCs, Khimti is representative & used as the proxy.

Firewood cooking assessments predominately fail to consider the significant factors of socio-structural constraints, collection and cooking time, risks, opportunity costs, fuel sustainability and related anxieties (Alam et al. 1998; Lohani 2011) and the complex nature of innovation appropriation (Heltberg et al. 2000; 2003a). Through the empirical research of this thesis, however, we develop insights into these significant factors and can start to provide the more nuanced spotlight on the uptake paradox required (Miller and Mobarak 2014). Firewood cooking conventions appeared interwoven within the communities. For the practitioners, they conceptualised the practice as entailing two core daily components, collecting and cooking. A female participant’s explanation that resonates across the case studies exemplifies this:

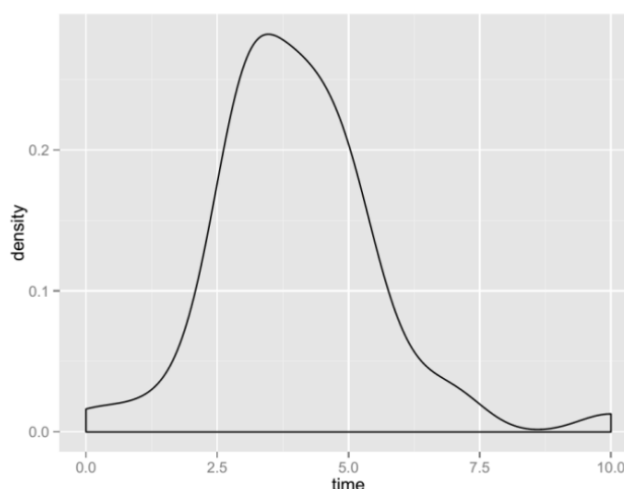
80% of the time we cook with firewood. Sometimes with rice cooker, but not as frequently 20%. And biogas also 10%. The wood collecting and cooking takes most of the day (KHHi5).

Principally, however, the females of each community focused on the daily collection time requirement in explaining their cooking duties. This empirically consolidates suggestions of the importance of considering collection time in analysing the firewood problematic (Hyde and Kohlin 2000: 294). The durations showed significant variance both between the case studies and internally. Indications of this are the mean fuel sourcing time for each community and the community and household-level standard deviations of these durations. These were calculated from integrating data from the household-level methods and are presented in Table 5.3 and the adjoining density plot, Figure 5.1.

Table 5.3. Daily mean time required to source household cooking fuel per household

Case study	Mean fuel sourcing time (hours)	Standard deviation	Household-level deviation
Jaidi	4.1	1.4	1.9
Khimti	3.9	1.6	2.5
Sisuwa-Bala	4.0	1.8	3.2

Figure 5.1. Total variance in firewood sourcing among the 3 case studies.



Source: Derived from multimethod qualitative case studies. Figures are taken from the 20, 18, and 16 household-level case study interviews in Jaidi, Sisuwa-Bala and Khimti, respectively.

These descriptive statistics are limited by the relatively small and purposefully selected sample sizes from which they are derived (N= 54), yet provides an initial insight into the considerable daily temporal requirements for women of only one time-consuming component of the conventional cooking practice in rural communities. It shows a mean fuelwood sourcing time per household for the three communities of approximately 4 hours per day yet with significant household-level variance from this, illustrated well by Figure 5.1, suggesting considerable inequalities in the experience and impacts of the practice for rural households and that the temporal demands of collecting are over 6 hours per day for some households.

To start to account for the sourcing time variance, a precursory analytical step was to use inferential statistical analysis to indicate the influence of household variables on collection times. To do this, the household sample selection criteria of remoteness, ethnicity/caste, household size and affluence described in Chapter 4 were used to test for relationships to household collection time. This required converting the 4 discrete variables into compound indices representing the degree of each dimension¹¹⁰. Affluence, for instance, is a socio-economic proxy assigned over the course of the case studies to each sampled household based on multiple indices of wealth, namely: their stated income, remittance flows, assets, household ownership, size, quality and area of land under household management. These proxies for affluence are consistent with comparable studies¹¹¹.

A score from these assessments using the same index as per the other variables 1 relatively high, 5 relatively low, was then assigned to each household included in the study. A linear model was then employed¹¹² to both individually and collectively test the degree of association between sourcing time and the four compound variables for the 54 household sample cases. The four variables were the independent variables used to test the degree they may influence the firewood collection time, the dependent variable. The resulting outcomes provide an overview complimentary to the wider qualitative analytics and taken as indicative rather than statistically conclusive. An adjusted R-squared test was used as a standard means to compare the values of multiple regression models with different numbers of independent

¹¹⁰ The indices are presented in Appendix III yet to exemplify here for one of the factors, 'remoteness', four primary locational differences of community members appeared: distance and geo-physical (relief, terrain, obstacles) position of households from 1) the community forest, 2) the market 3) any private forest and 4) the amount of forestry resources on household land. These were individually ascribed a distance value which were collectively summed into a remoteness index for each household. The index is thus a relative measure for that community and between the communities 1-5 representing from relatively very high to relatively very low (remoteness). Same for income index.

¹¹¹ Including Batliwala & Reddy 2003; Pundo & Fraser (2006); & Lewis & Patanayak (2012).

¹¹² Using the statistical software package R.

variables (Kvålseth 1985; Field 2013: 217). The higher the resulting R-squared values, the more likely the model (selected variables) explain the sample's variability. The resulting R-squared values were highest for remoteness and household size across all three case studies and households, suggesting that time consumption most strongly relates to fuel source proximity and household size.

An R-squared value of 0.54 for the association between time and the remoteness and household size metrics with a P-value of less than 0.05 provides a robustness tested conservative signal that 54% of the variance in the time constraint can be explained by these two indices. Caste was also influential, presenting increasing time impingement with lowering caste 'level'. It suggests a pattern of increasingly constrained access to firewood with greater degree of remoteness, human dependents and ethnicity/caste. It infers that traditional energy source availability and impact in the communities is socio-culturally and geographically prefigured. Household economics appeared to be a negligible associated variable.

Although studies considering predictors of fuel use are limited, the preliminary analysis concurs with other case study findings. Heltberg et al. (2004), and Heltberg (2005) for instance, find that household size in rural India, Nepal and Guatemala, correlates with fuel modality, and suggests male household-head education level also has some influence. This allies with Gupta and Köhlin (2006) and Khandker et al. (2012), using regression testing to conclude that factors beyond income and price affect fuel choices. This corresponds with findings that tradition and remoteness-based inaccessibility are more significant influencing factors (Pundo and Fraser 2006; Gundimeda and Gunnar 2008). The household size and caste correlation is also consistent with Lewis and Patanayak's (2012) meta-analysis of 32 fuel choice studies in Africa and South Asia, revealing key influencers of choice are household size and a compound variable for socially marginalised status based primarily on caste and ethnicity. Finally, in an interesting parallel to my remoteness coefficient, Pattanayak et al. (2004) find that collection time considered as a 'travel cost' (opportunity cost of time for household members collecting, multiplied by time per trip), encourages fuelwood substitution.

The significance of these results is to illuminate that multiple dimensions may affect resource consumption and the potential inequalities, overlooked factors and unintended negative impacts of energy assessments and access pathways that fail to take a multi-dimensional approach¹¹³. Indeed, the results are consistent with historical social structures, inequalities

¹¹³ Stressed also by (Kobayashi & Balakrishnan, 2003; Shresha & Tanaka, 2003; Upadhyay 2004; Kondylies & Mueller 2013; Quisumbing & Pandolfelli 2010; and Hodbod & Adger 2014).

and resource marginalisation in Nepal attributed to exacerbating innovation uptake and practice dichotomies and reproducing a persistent 'exclusionist differentiation' (Fragoso and Florentino 1993: 104)¹¹⁴. Moreover, the negligible influence of affluence on cooking modalities in the communities and other regression models further challenges the focus on affordability and incomes in conventional energy analysis (2.3; Sehjpal et al. 2014). Bhagavan and Giriappa (1995) and Hiemstra-van der Horst and Hovorka (2008), for instance, discover that fuelwood is chosen by all households regardless of incomes in rural Botswana and India, respectively. It further implies that the potential for market-based energy interventions relates more to socio-cultural factors (Purohit & Michaelowa 2006; Bergek et al. 2008). The coupling of collection and cooking practices and impacts by the participants in my case studies suggests that the influencing factors may be better assessed by considering practice relationships.

Qualitative analysis allows us to explore these factors further. For practitioners of firewood cooking, vital concerns were the accumulative health and capability impacts of the practice, presenting further dimensions of the practice, particularly age and capability, missed in dominant fuelwood literatures and policies (cf. Ibrahim et al. 2012; Miah et al. 2014). Cataract damage, for instance, was evident in all females of the case studies above the age of sixty and most women reported experiencing sight problems decades earlier (JHHi3; JKSi7; SBHHi16). The capability implications this can have is exemplified by the chairperson of one of Sisuwa-Bala's FSGs. The only member of the ward capable to manage its only credit and saving service, she explicates that her:

Deteriorating eyesight means I am less able to do my duties as chairperson and will not be able to it at all soon as I can no longer read. I have cooked with firewood all my life and think this is the cause (SBKSi6).

Qualitative analysis thus indicates further development implications of the conventional cooking practice. The implications signify 'dispositional conditions'; capability constraints that further limits wellbeing and development (Sen 1999a; White 2010; van Dijk 2011). The problematic is further compounded, however, by the majority of the female community members in the case studies wanting to employ alternative cooking methods (e.g. JHHi3;

¹¹⁴ These effects of forms of co-dependent forms of power and exclusion etched into systems of differencing in Nepal are highlighted further by Furtado (1973: 43), Freyre (1990; 2003a: 11), Cameron (1998), Lama & Buchy (2002) and Whelpton (2010). Its extension of marginalisation rather than sustainable development is highlighted broadly throughout the development context (cf. Lawoti 1990; Irwin 1995; Albuquerque 2007: 677; Benjamin 2008; Fortier 2010; Emery 2016).

SBHHi5; KHHi11), while the majority of males did not (e.g. JHHi1; SBHHi9; KHHi4). Principal household cooks, here a young mother highlighting opportunity costs followed by an elderly lady, exemplify this gendered and unmet demand further:

I'd like to change to cooking with rice cooker so I don't have to spend 4-5 hours a day collecting firewood or cooking in smoke that hurts my eyes and chest. It's especially difficult for me as I have a young baby to look after (SBHHi3).

We have no mobile phone, rice cooker or radio. The only thing I'd like to use electricity for is rice cooker (JHHi15).

Rice cookers are hence positively perceived and demanded in relation to the practices it would displace by most potential consumers in the communities, factors considered key determiners of uptake in conventional diffusion models (2.2). These excerpts also signify that part of the perceived relative advantages pertain to affective dimensions that conflict with other meanings and practice demands, such as mothering. As an extract from my field journal, Box 5.1, and a photograph, Figure 5.2, taken at the same time indicates, however, these dimensions and implications of the conventional cooking on other practices were not confined to the practitioner.

Box 5.1. The experience of cooking

I'm in the small kitchen with grandmother [Ama] of the family I am staying with in Jaidi. There is almost no ventilation – no chimney, doors are closed and window (glassless) is small perhaps 40cm². Ama is starting to cook and immediately smoke fills the room. It's a strain to see and read or write. Studying, doing homework etc. would be very hard. After 5 minutes, my eyes are seriously stinging and automatically closing. The room is also getting warm. Ama is managing much better. She tends the fire with concentration and carefully selects from the assortment of wood next to her. She smiles at me and seems to know that I'm impressed. Why doesn't she open the external door though? There are very few mosquitos up here, which is one reason houses are chimneyless and almost windowless elsewhere. The door could be kept closed for privacy, security or warmth. 8pm April 11, 2013.

Figure 5.2. Conventional cooking in a typical rural Nepali household



The dimensions of the cooking practice were thus somewhat social and interrelated to the feelings, meanings and materiality of the space. The low uptake of alternative cooking practices is further complicated by various wider merits of the rice cooker being perceived by the users and females they regularly interact with. Sisuwa's aloo group chairperson provides a representative illustration:

Now we have more time for income activities due to more efficient cooking via using rice cookers and not collecting wood or kerosene candles. Peoples' work time and quality has also improved due to better visibility from good lighting and smoke-free environments with rice cookers and without kerosene (SBHHi15).

The opportunity costs of low uptake in addition to demand, affordability, material access and technical know-how to consume alternatives are, therefore, recognised by some members of the communities. These are premised as primary precipitators for uptake in the diffusion literatures and indicate uptake barriers beyond those conventionally considered. Moreover, the demand was also observed in peripheral social groups, further challenging conventional diffusion wisdom that intones that social marginalisation precludes demand and uptake for want of key resources to overcome risk and develop the necessary interpretations (Mokyr and Stein 1996: 195; Peterman et al. 2010). A case in point is one of the poorest, oldest, lowest caste and remotest females in the case studies, without electricity access and the sole provider for two disabled sons and a very young daughter:

I want to learn to use a rice cooker because of its benefits. It would be my primary benefit of electricity because it saves time and health (SBHHi4).

Even with conventionally unfavourable innovation uptake factors, therefore, necessary dimensions of meanings for appropriation may be present. Furthermore, other participants illustrated low rice cooker consumption with both favourable social, meaning and material elements present, suggesting the need to consider how the operationalisation of these in practices are structured. A high caste household that seldom use their rice cooker, despite the senior female thinking "it's good and wants someone to teach her" and the junior adult female in the house asserting she prefers "rice cookers and uses it when she is cooking", exemplifies this (KHHi15). Both the household cooks desire, have the material availability and, through the youngest, the competencies to uptake. Moreover, favourable meanings are also

held by some male community members and the rice cooker demand is in negligible competition with other innovative cooking modalities. A male householder summarises this:

We don't know about biogas or ICS; only know their names. There isn't biogas or ICS in this VDC nor any information provided. We know about rice cookers. They are very good as don't need to collect the fuel, they are quicker, easier and don't cause smoke which cause women problems... More people should be using rice cookers, it is better... the women have health issues from the smoke (KHHi17).

The rice cooker demand and awareness of relative advantages is, therefore, not solely confined to marginalised groups and the non-decision makers of the community. The dominant community narrative, however, was focused on electricity as a community right and pathway to community development rather than adjusting notions and structures of community. A final notable dimension of the perceived relative advantages of the rice cooker is that for most, broader implications of resource and environmental sustainability were foreshadowed by more immediate and socio-cultural concerns. Exceptions included deforestation induced landslides, habitat loss and increasing fuelwood collection difficulty (SBKSi4; JHHi7). Critically, these concerns were primarily felt by those without private assets for fuel sustainability (forest, livestock), i.e. the most vulnerable, and only in one case did these factors significantly influence practice modification, principally due to the practicalities of the latter factor, resulting in partially substituting collecting with fuelwood purchasing (SBHHi16). Moreover, not all at the household-level perceived the rice cooker's relative advantages over the practice it would displace. The more senior household female often did not want to change their cooking modality and males would generally prefer the food cooked in the conventional way.

The implications of these empirical dimensions are threefold. Firstly, the variegated nature of demand, perceived needs, preferences and power in the communities present that the foundations for an innovation or intervention may be contextually situated, highly socially variable and complicit in maintaining social inequalities and order. This suggests two conclusions: the intersubjective shaping of demand and doing and, secondly, forewarning against normative assumptions that miss such contingencies. This is particularly apt in the current climate of sustainability and energy access (Ailawadi and Bhattacharyya 2006; Erikson 2011; Nassbaumer et al. 2012).

Thirdly, elements conducive for uptake and constituting a practice may be in place at some levels in society, yet remain not routinely integrated in a specific, commonly associated way necessary for their wider socialisation and constitution of social practice. It suggests that the presence of conducive meanings, skills and materialities may need to interconnect across social groups and distinctions in everyday social contexts for more extensive innovation uptake and that how routines and practitioners are organised may be critical for practice conservation and dynamism (Lubell and Fulton 2008; Laurent 2012). Indeed, in relating this back to the favourable elements of rice cooker practice shared predominantly by women and usually in contrast to males and senior females, we see practice elements and dynamics may be in tension with contextual structures that condition them (Nicolini 2012: 80). The case studies thus illustrate how aspects of social life play out to delimit certain pathways and signifies the analytical value of considering the properties, relations, boundaries and socialisation processes of practices and how these may interdepend, conflict and change. We do this further in the following section by further zooming-in on the meaning and affective dimensions of the cooking practice that emerged as significant throughout the case studies yet overlooked by the institutional-level actors and understudied in development research.

5.5. Overlooked reasons for the low uptake of innovations & implications for sustainable development pathways

5.5.1. A sense of taste: the sensual & symbolic as practice signifiers & anchors

'Taste' appeared a notable barrier to cooking practice innovation in the case studies. This was signified in three prime ways. Firstly, almost all participants stated extremely positive sentiments for, and interpretations of, the sensual taste of firewood-cooked food. Secondly, this was generally discussed inseparably from tradition, the traditional practice and maintaining tradition. Thirdly, was the juxtaposition by many of the participants between ascribing 'taste' as the only positive trait of the conventional practice whilst strongly expressing a range of advantages for transitioning away from it in favour of rice cookers. 'Taste', therefore, appeared significant as both an immediate, sensual, socially appreciated quality intrinsic to firewood cooking and as a signifier of the society itself. Exploring 'taste' through the cooking practices in this section thus allows us to examine nuances of everyday life and their relation to broader constructs that appear intrinsic to, and anchored by, certain

routines, providing an underexplored window into routinisation, structuring and innovation (non)appropriation (Taylor 2000: 135). The importance of the sensual dimension of cooking resonates throughout the case study research. All participants, for instance, shared the view that:

Food tastes best cooked with wood; we prefer the smoky flavour (KHHi5).

Furthermore, approximately 95% of male participants and half the female sample asserted that this was the foremost reason to continue cooking in the traditional manner. The prominence of this reason, its gendered dichotomy and outcomes and power over perceived factors to innovate, suggests the social structural and cultural significance of 'taste' beyond the sensual. A female, a direct recipient of the practice's costs, provides a compelling example of this by stating the most comprehensive range of reasons to uptake the rice cooker of all the participants, yet concluding:

Electricity has made a great difference. It's made life better because in the kitchen I have better light so can cook faster than before and the rice cooker makes cooking easier. I only sometimes use it though because food from firewood tastes nicer and we have no firewood restrictions as we own a section of forest (SBHHi13).

This household, however, representative of many others, could afford both the initial and operational costs of the rice cooker and the household head, male, also harboured favourable views of the innovation. Together, a plurality of reasons to uptake emanate from both genders. These include positive task-orientated innovation perceptions, awareness, competence, materiality and experiences. It demonstrates the significance of 'taste' as a conservative factor for wider energy access-related sustainable development in rural Nepal. Yet the above example also allows a reading of firewood continuity related to its unlimited access and zero monetary cost, consistent with literatures highlighting that collection costs are generally deemed negligible in rural contexts due to the limited valuing and opportunity costs of female labour (Celeski 2002; Dixon-Mueller 2013).

Fuelwood access and sustainability perceptions are not equal in the case studies, however, as elsewhere (Bajracharya 1982; 1999; Kelkar and Nathan 2005), and this is widely understood, compounding the complexity of the cooking practice. These aspects are highlighted by the community members (e.g. JHHi5; SBHHi7; KHHi13), key intermediaries such as local community forest managers, government officers and district forestry officers (e.g. JKSi2;

JKSi4; SBKSi7), and national level experts (Ili3; Ili7; Ili21). Indeed, elderly community females and those without personal and proximate forest access stressed significant and increasing difficulties in obtaining sufficient firewood for the whole year and “mental and physical tension” this causes them (JHHi11; SBHHi15). The perceived and actual costs of firewood cooking, as others find elsewhere, thus exacerbates existing inequalities and vulnerabilities (Arnold et al. 2006; Argwal 2013: 98). Yet another aspect of this, not highlighted in the literatures, is illustrated by a Janajati (marginalised group) lady:

Getting enough wood is hard for me as I have to go very far for it and it’s dangerous (JHHi15).

The affectivity of cooking practices in the case studies thus extends to the collection process. Indeed, during each case study, I directly experienced, through observing and trying the practice, the physical effort and risk the collection duty imposes that is augmented for the vulnerable (Brent and Kruger 2009). In each community, for instance, the daily-filled wood baskets, one per person, would tower over the carrier, weigh approximately 40-50 kilograms and be carried along narrow paths by females for up to 2 hours. Figure 5.3 indicates this. This routine is punctuated by falls that seriously injure the collector (JHHi5; SBKSi1). In Sisuwa-Bala, for instance an elderly man was rushed down the mountain past me to the nearest hospital (1-2 day walk plus 4-hour bus) after falling from a high tree whilst collecting fuelwood and in one of the preliminary sites during my stay a women broke her leg falling off the path. These were apparently unexceptional events (SBKSi6; JHHi15; KKSii2).

Figure 5.3. Collecting fuelwood in Sisuwa-Bala



Source: Author

Firewood access and implications are, therefore, socially disparate. Yet this inequality bears negligible correlation with cooking practice transitions and undermines the stated reason of ease of firewood access for practice conservation. It suggests limitations in participants' articulations, that other factors are primarily responsible for anchoring cooking practices and the possibility that 'taste' symbolises underlying dimensions. This indicates the advantage of complimenting discursive methodologies with observational and performative methods attentive to structuration, the "unspeakable" and "feelings" (Simonsen 2001; Pile 2002: 5) and is supported fivefold. Firstly, the inability of the majority of participants to articulate why they prefer the traditional cooking practice other than sensual taste and the contrast of this to their multi-faceted explanation of costs of the practice and advantages of electric cooking signifies uptake factors that were not articulated. This is supported by the successful diffusion of other innovations in the case studies, reinforcing the need to look specifically at the associated practices rather than seeing the community, anti-consumption and commodity rejection as uniform phenomena (Franzen and Smith 2009; Vue et al. 2011).

Secondly, the conspicuousness of taste and wood render these dimensions simple to comprehend, detect and assert. Wood and the effects of its combustion are everywhere in the communities and characteristic of rural life: the buildings, furniture, fences, ladders, ploughs, transmission poles and so on; multi-sensory emissions, thick in clothes, the air, the kitchen walls, ceiling and cooking equipment, distinctive odour, sapour, visceral effect stinging the eyes and chest of even the accustomed. Wood and the smokiness, therefore, may be such a definitive aspect of rurality and food that it is as much a part of their culture and social identities as language and conduct (Lévi-Strauss 1997; Douglas 2004: 145).

Consequently, smokiness may signify place, refinement and order such that anything that changes it may be instinctively avoided (Elias 1939: 301; Becker 1964a: 63-66). Moreover, the manifest sensory qualities of wood cooking signify that any change will be highly apparent and hence unlikely to develop in practice undetected and unchallenged (cf. Pink 2004: 300). The rice cooker not reproducing the valued smoky quality and some of its merits being contingent and slow to manifest reinforces this (Smith et al. 2011; Baumgartner et al. 2012). These factors are increasingly shown as hampering the adoption and sustained use of sustainable development-enhancing innovations (Ruiz-Mercado et al. 2011; Rehufuses 2014).

Thirdly, providing short, limited responses encompassing easy to convey entities (e.g. smokiness/tastiness) is far easier than articulating fuller accounts. This is especially the case for embedded routines which include feelings, are socially located and for which one has never been asked questions before (e.g. why do you not cook with other fuels) and performs systematically. Indeed, Mintz (1985) expounds that the difficulty in explaining taste preferences and food conventions is their inseparability from a broader social system¹¹⁵. Moreover, as the female practitioners show, this difficulty may be compounded for marginalised actors with little discretion to change the conventions (Acharya and Bennett 1983). From this logic, the taste could be intrinsic to manners and distinctions of conduct, decorum and class manifest and produced through refinement of, and reaction to, 'taste' (Bourdieu 1984). This 'culinary capital' (Jackson et al. 2013) is commensurate with more simply prepared food being associated with inferiority (such as of the food, cook, family or recipient), lack of skill and care, and accordingly being culturally significant and rejected (Wilk 1997).

Fourth, the seeming importance of taste on rice cooker-uptake may also be reinforced by the evaluations of firewood in the case studies seldom relating to other functions and opportunity costs other than health and time¹¹⁶. Wood consumption for cooking, however, competes materially, spatially and financially with daily resources and practices, including labour, lighting, health, childcare and reading (Katuwal and Bohara 2009). An exemplar of this was reports of time expenditure in wood collection displacing supplementary practices of organic clothes making (e.g. SBHHi7). Wood practices thus both interconnect with, and compete against, other contextual elements and practices. The failure of most to include this in their evaluations of cooking options and costs (Guta 2014)¹¹⁷ would hence consolidate the apparent virtues of the incumbent practice. It may also explain Cecelski's (1987) finding that many dependent on fuelwood do not judge its shortage as a priority (Baumgartner et al. 2012).

Finally, the perception of the superior taste quality of traditional cooking did not always result in the rice cooker not being taken-up. Some habitual rice cooker users, for instance, mentioned the taste superiority of wood yet maintained the alternative practice because "it is better for avoiding smoke and health problems" (SBHHi10). This indicates that practice change may occur when other teleoaffective dimensions subordinate the formative aspects of

¹¹⁵ Marx (1976: 163) argues similarly that anything, by virtue of its social location, "transcends consciousness". The importance of this effect apropos development transitions, stressed by others in terms of the "hidden transcripts" of agency and order (Scott 1990), is explicated throughout the thesis.

¹¹⁶ Only 6/58 household & 3/42 community-level participants considered wider costs of firewood use.

¹¹⁷ Further costs are highlighted by (Anderson et al. 2002; Sundell 2004; Wang et al. 2012; Gwavuya 2012; Gwavuya et al. 2012; Plumb et al. 2012; Munslow et al 2013: 10 110; Lee et al. 2015).

the incumbent practice. Seeing elements and prospective elements of practices and potential practices in relationships that may be adversarial and out-competing in this way may also further explain how taste could be prioritised above favourable meanings of the rice cooker and unfavourable meanings of wood cooking acknowledged by the same people. It was only in exceptional cases, however, that the formative aspect of collectively defined taste were judged secondary by practitioners to the point of practice change by teleoaffectivities such as health problems, causal awareness and intentions to avoid them. This indicates that our analysis needs to look at what else conditions practice values, choices and patterns.

Collectively, the points indicate that assertions of firewood taste and access pre-eminence mask and reproduce a broader, unequal social system. 'Taste' may thus symbolise the cultural setting, structure and processes as much as an objective attribute of the practice. A collective, rather than individual, subjective construct (Mennel 1996). This insight comes during increasing interest in food transitions and the intersectionality between resource consumption, culture and practices (Shove 2004; Warde 2016), such as between food and energy, and when few have empirically considered the role of taste in this, on innovations and effective interventions. Those that have, also evidence the barrier of sensory taste to innovation uptake (e.g. Cardello 2003; Grunert 2005) and suggest the cultural significance of taste for peoples' food practices (Nestle et al. 1998) that may override meanings and feelings for changing the practices (Korsmeyer 2002). This allies with scholarship predicating that even minute differences in the initial distribution of preferences or ordering of activities can have considerable impact on the degree of an innovation's uptake and meaning (Granovetter 1978) and that we are variously conditioned to avoid such changes (Douglas 2000; Fischler 2002).

By considering practices from the positions of different social groups within their relationship to, and constraints structured by, other practices and the broader organisation of practices, however, we can take these insights further. Halkier and Jensen (2011) indicate this by highlighting a national food policy in Denmark that advocated 'proper' food practices that overlooked, and undermined, the significance of differing taste preferences and nutritional knowledge embedded in practices of minority groups (cf. Spaargaren and Van Vliet 2000). Our 'taste' analysis thus brings us to consider the social construction, meaning and location of consumption patterns and change wherein 'acts of sensing' are 'inherently tied' to the cultural fabric of daily life (Desjarlais 2003: 242; Baerveldt and Voestermans 2005; Pink 2005).

This fabric appears to transcend the material and immediate qualities of consuming: it encompasses a communities' codified 'ethical ideas and moral sensibilities' and positionalities

(Desjarlais 2003: 243; cf. Ingold 2000). 'Taste' and the sensory may thus enhance insights into daily life, order and change. The analysis thereby allies with others suggesting the overlooked importance of sensory and cultural taste for aiding insight into the symbolic and affective content of sociality and change (Warde 2014; 2016)¹¹⁸. For phenomena that relate to intimate spheres of daily life, therefore, considering their relationship within the society's sensory, moral and political economy may be formative for effective transitions (Stoller 1989; Hodbod and Adger 2014). This manifests further as we explore additional underlying factors to the taste factor and cooking conservation in the case studies.

5.5.2. Taste & tradition in (re)producing the moral & political economy of social life

Throughout the research, conventional cooking practices appeared interwoven within, and reproduced by, the cultural norms of the communities. Exploring this develops an account of how practices become entrenched within normative systems that they become constitutive of and constrained by. Doing so develops insights into the appropriation, prefiguring and 'lock-in' of certain practices and their interdependencies to deeply-rooted signifiers of social life. Discussing this through the empirical case of cooking in rural Nepal substantiates the importance of considering how practices and their elements are interlinked for furthering insight into their relative susceptibility to change or be path-dependent and implications to everyday life, power and development pathways.

Understanding cooking practices in rural Nepal is to understand 'tradition'. For the community members, wood consumption, its taste and rules, was synonymous to 'tradition'. Although this was often implicit and emergent through studying routine narratives, performances and rituals, many members articulated this explicitly:

Tradition is an influence on people still using firewood. Tradition is maybe 60% responsible and availability 40% responsible (SBHHi8).

Tangential with 'taste' however, the research participants were unable to define what they meant by 'tradition'. Following the implication from the above section that these are intersubjective and require understanding from the practices and culture they represent and

¹¹⁸ Also, inter alia, Wallendorf & Arnould (1991), Smith (1996), Desmet et al. (2000), Walmsley (2005).

co-create, the case studies revealed the centrality of wood cooking practices to a multitude of other practices that have also undergone negligible innovation in the communities (Stewart et al. 2011). The web of embedded practices may hence signify what the participants meant by 'tradition' (Berg 1997; Giddens 1979: 2000). These practices include the particular associations, making and consuming of food, alcohol, tea and rituals and their diverse, interdependent requirements, from methods, equipment, expectations, understandings and skills, to assigned practitioners, schedules, spaces and co-constituted identities whose performances reinforce them (Quitau and Røpke 2008; Bartiaux et al. 2011).

Any one of the above could be expounded at length to substantiate this. Food, drink, meanings and ceremonies, for instance, were intertwined in the case studies. In the higher altitude communities of Sisuwa-Bala, a defining custom was offering guests a local alcohol called roxy. Wood appeared intrinsic to its preparation and taste and the method and appreciation of these were tied to the practices cultural provenance, purpose and propagation (Cf. Rawls 1999: 386). Prepared in the specific way, sharing the drink demonstrated the household's ethnicity, competence and identity that was distinct from others, conveyed inclusion and value and reproduced its Rai and Tibetan culture (SBHHi9).

Sharing smoky food throughout the communities appeared to serve similar purposes. The plurality of these purposes – representing and reproducing meanings, feelings and customs of Nepali, rural, competency, roles, patriarchy and so forth – thus allows insight into the importance of firewood practices for certain societies and the array of implications cooking interventions may signify. Moreover, the necessity of these dimensions and practices to multiple other regularised practices, indicate that firewood cooking practices and its elements are critical to the continuance of the components and arrangements of the system they are enmeshed in. The central role of wood and its related practices within this system suggests its deep intersectionality is a considerable anchor against change and a primary agent in the social positioning of social groups and agency. This includes occluding the community's articulation of the dimensions of firewood practices, what they mean by 'tradition' and capabilities to innovate from this (Bourdieu 1990a: 69). An elderly lady reinforces this interpretation:

I want to supplement firewood cooking for something else so I don't have to collect from the jungle or cook in a smoky environment. I spend 5 hours collecting firewood daily but because I've been doing this since I was 14 I know no other way. I want to learn to use a rice cooker and this is my main need for energy access (KHHi5).

The lady highlights that the aptitudes relate to specific modes of doing whose specificity occurs from an early age and renders 'no other way' without learning, despite strong ambitions. She also underscores that her ambitions are interrelated to, and reinforced by, practice-specific affectivities. Yet her role-related experiences disable her from having the agency to change them. Socially located routines, therefore, constrain the resources necessary for using an innovation, perpetuating the distribution and reproduction of capabilities, power and conventions, and playing a structuring role in the means and ends of social life and change (McLanahan and Percheski 2008). The case studies manifest however, that this structuring includes the non-performers within the society. A prime example is typical male aspirations viz-à-viz female cooking:

I Prefer firewood cooking as I like it and we've been doing it for so long. It's part of our tradition so I want to preserve it (KHHi12).

Desires, intensions, firewood and 'traditions', thus appear embedded in and by social practices. Doing cooking consequently preserves a relationship where the emotional and symbolic appear significant and are shared and co-constructed by both the doers and non-doers of the community. It suggests that change pathways need to involve social actors that are both directly and indirectly involved with the related practices and elements of practice and that teleoaffectivities of both groups may interdepend, be augmented by their ongoing repetition and be instrumental to the dominance of practices even when new materialities and teleoaffectivities emerge. Taste preferences and practices may thus reflect a shared social system as much as an inherent quality of the practices. Reassuring the actors of the stability of the system may hence be one-step to supporting changing certain practices within it. This is supported by recent empirical evaluations showing the significant anchoring effect of norms on subsequent understandings and practices (Aitken et al. 2011; Ibnouf 2011) and luminary scholarship on taste preferences.

Hartley's (1954:20) explanation, for instance, that "mankind has always liked the food he was accustomed to", concurs with accounts that people like what is familiar, and that taste aversion is a product of the unknown (e.g. Douglas 1972; Stoller 1989). Similarly, Norgaard (2006) and others illuminate a parallel insight: unfamiliar and unpleasant affects and emotions can drive nonparticipation and nonconsumption (Cherrier 2009). Delectability, experience and

disgust are hence inseparable (Lupton 1996: 3) and changes to the known may thus be concerted avoided (Menell 1996). This concurs with knowledge and power as synonymous and products of practice and suggestions that people do not know what they will come to like yet are prefigured in this by their experiential context (Kahneman and Snell 1992). Considering taste and norms through social practices thus challenges presumptions that society would consume more discerningly “if people only knew” (Gutham 2008: 387).

Instead, we can see that much more is required. The female participants emphasising that they “know no other way” because they have always collected firewood reaffirm this (KHHi5; SBHHi4). Indeed, their emphasis on learning indicates this as a key requirement for enabling the enhanced uptake and sustainable development effects of innovations yet a process that is social distributed and mediated. Another female community member followed by a male respondent indicates this further:

I only use electricity for lights because my husband showed me how and I don't know how to use it for other things (SBHHi12).

I know how to use electricity for small enterprises and lighting to extend my productivity as learnt from seeing and doing it elsewhere (JHHi12).

Consumption patterns and capabilities are thus unequal and mutually reinforcing. Hartley's (1954:20) account that “taste preferences are learnt, they are culturally acquired and conditioned” may thus be noteworthy for the social construction of capabilities and uptake of innovations beyond the immediacy of food and single practices. Moreover, the relationship of learning to practices is signified by the male participant. His household and social position and income generating responsibilities, practices and expectations enabled him to augment them through experiential learning in various settings (Kolb 2014). This catalysed his capabilities and the social distinctions (Grewal and Kaplan 1994). Thus, although innovations were supported by external practices, their contextualised use was essential to their fruition, reinventing them through the society's distinctive rules, values and requirements (Stewart 2005). Innovation and learning is hence dependent on capabilities to socially use within pre-set moral and political ‘grammars’ (Barthes 1997: 168).

Consequently, as the gendered uptake of electricity practices testify, practice requirements may extend cultural codes and inequalities through differential learning processes unless the structural codes are considered (De and Ratan 2009), predicating considering innovations in

relation to cultural routines, capabilities and contexts and how these may interdepend. Following this line of analysis, four implications emerge: interventions function through social practices, are capacity-dependent, capacities are interrelated to routines, and routines and their requirements are socially codified, situated and organised.

These points are embodied in the communities' notions of 'tradition', 'taste' and knowing 'no other way'. They are also apparent in the commonly voiced concern from female participants of "what else can I do", and the gendered notions and experiences of changing practices and 'free time' as something only associated with males (JHHi5; SBHHi8; KHHi11). Appropriating labour-saving devices in such a context hence requires not just material access but the societal reconfiguration of existing meanings, structures of power, and links to other social meanings, competencies and materials to accept, act for and consume saved time in their everyday contexts (cf. Southerton 2000)¹¹⁹. Difference, control and meanings thus occur amid the social routines of daily life and prefigure imaginings, possibilities and empowerment.

This can be expounded further through considering the cultural location of cooking. Cooking in the communities is bundled within various interdependent routines, including collecting, storing, organising, scheduling, sharing, cleaning and household, community and forest management. Firewood cooking is central to this bundle and constitutes the primary task of women in rural Nepal and a principal thing the society and sub-groups identify themselves with (JKSi3; SBHHi13; SBKSi6). These roles and identities are social structures whose performance requires elements that become etched into these structures through competent re-enactment that sustains the elements and structures (Leonardi 2007; 2009). The normatively scheduled, spatialized and interrelated (such as to skills, materials, time, space, values, other duties) conventional cooking practices, for instance, demonstrates socially recognised competencies and meanings that enables 'gains in distinction' to be achieved yet reproduces how these competencies and meanings are structured (Bourdieu 1978: 828).

This includes contextualised strength and knowledge due to the large amount of environment and varietal-specific solid biomass required; the technique of cooking with a variable, dangerous and imprecise heat source; the ability to do this with little ventilation and perform

¹¹⁹ The objective nature of materials through contextualisation to & within social routines & the instrumental effect of this on consumption & transitions is portrayed further, for instance, in mediating the relationship between subjects & objects within everyday lives (Ong 1992; Boisot 1995; Bennett 1999), manifest in the uptake & impact of printing techniques via the co-constitutive evolution of energy practices (steam-power), citizen rights, values, education & workplace reforms, & domestic leisure changing the meaning, materiality & ends of reading (Goody 2010: 147), the 'enculturation' of money (Leyshon & Thrift 1997), food (Mennell 1996) & world making (Goodman 1978).

it faithfully in concert with other daily demands and functions. Employing the rice cooker, however, requires a new skill-set and time-space ordering that showcase competencies and meanings to a diminutive extent. Although it allows food to be prepared in the same way, for instance, the rice cooker has no variability in temperature once turned on, requires, no physical collection, storage or visible fuel and is automatic, reliable and easier, quicker and cleaner than wood cooking (Kowsari et al. 2011; Guta 2014).

The rice cooker thus internalises the techniques required for cooking and requires new abilities, conceptualisations and procedures, altering the practice from one replete with, and illustrative of, competence, identity and culture, to one lacking these. The firewood competencies and meanings, however, also delimit roles and their spaces ('household practices'), are highly esteemed and hence likely to be protected, especially as the implications of not enacting and maintaining them are highly uncertain (Tamang 2011: 282). This was widely manifest, such as in the care the cooks took (Box 5.1), through males routinely emphasising in conversation and sharing food that their wife was the best cook, and the cook commonly asking how the food is and taking delight in positive appraisals. Personal and social value, identities and positionality are hence attained, conferred and reproduced in the communities through the social performance and narratives of cooking and the nuanced qualities they achieve.

The conservative effect of this duality on practice transitions is likely to be reinforced in the case study context where male opinions matter most in influencing outcomes and women have limited choice, especially for activities that directly impact on the husband and the household's status (Acharya 1998; 2004; Glenton et al. 2010). Changing this practice is thus likely to be perceived as undermining a political-moral cultural framework that hence implies multiplicities of uncertainty, causing significant negative affectivities that further curtails agency to innovate (Marriot 1978). This is a key point as considering emotional, power, ethical codes within the template of daily life that may affect consumption and technological modalities, transitions and impacts, may further understandings into the nuances and importance of social contexts and practice-relationships for enhancing development pathways (Sooja and Hooper 1993; Warde 2007). In the case of cooking in Nepal, for instance, the negative affective response is likely to be exacerbated due to the considerable degree women are tasked as changes to any one task could unsettle the highly coordinated time-geography of everyday lives (Momsen and Townsend 1987; Pred 1996).

Moreover, the innovation performance and impacts are concentrated on women, enhancing the gendered anxiety associated with the innovation (Celeski 2002). As Shove (2003a: 156) suggests, this may be further exacerbated as the practitioners are central to the reproduction or revision of 'normal standards'. The negative response to the rice cooker could hence also relate to a desire to provide 'proper meals', maintain relations, identities, family health cultural cohesion, knowledges and relationships (Geertz 1973; Jackson 2000b; 2009) and appear 'hardworking' (Hitchings 2013: 108). Yet as Tamang (2011: 282) suggests for women in Nepal, the anxiety and constraints may include a pressure to conform to national narratives emphasising gendered roles, routines and spaces. Roos (1998), Lakoff (2004) and Hand and Shove (2007) express similar conclusions in the Western contexts.

Conventional cooking is hence interlinked to other practices and 'achievements' within often conflicting demands and 'role strains' (Goode 1960: 485). These include personal and social expectations (Biddle 1986), pleasures (Warde and Martens 2000: 171), norms and their materialities (Miller and Rose 2008)¹²⁰. Indeed, eating alone represents a profusion of organised dimensions, integrating the embodied and socially experienced (Howes 1991; Borthwick 2000), symbolic and virtual (Warde 1997; Spurling et al. 2013). Moreover the cooking-eating practice complex is the principal occasion of family and social integration, not least in Nepal (JKSi7; SBHHi16; Ili9). It may thus be an especially formative 'practice bundle' to maintaining socio-cultural relations and order (Charles 1995; Hand and Shove 2007; Evans 2012).

Furthermore, following Lévi-Strauss's (1997: 32) indication that the nature of the food to which the innovation relates influences its appropriation, the significance of the prospective cooking change is augmented as it pertains to the foremost component (rice) of the bi-diurnal meal whose firewood cooking imbibes it with distinctive attributes that non-wood cooking does not¹²¹. This includes smell and flavour, but also culturally embedded and produced meanings underscored in everyday patterns of speaking, doing and ordering¹²². The traditional firewood-based practices accordingly form a focal point in social templates that may hence be highly valued and entrenched (Holm 2003: 22-24; Moiso et al. 2004: 265-67).

The conventional cooking practice and practitioner is thus "a crossing point of practices" and dimensions instrumental to the coordination of daily life (Reckwitz 2002: 252). Any change

¹²⁰ (See also, Rose 1993; Giard 1998; Massumi 2002; Lupton 1998; 2013; Halkier 2009b).

¹²¹ Hobbs & Adhikary (1998) & Rana et al. (2007) emphasise the primacy of rice in Nepali cuisine.

¹²² This signifies the value of social practice-based methodologies to researching matters of consumption. This point is highlighted & expanded throughout the thesis.

could hence risk these and signify the erosion of clear rules, values and imperatives (Warde 1994), undermining identities, 'the home' and abilities to care for the family (Hoggett et al. 2006: 14), "gender inauthenticity" (Keller 1987), and social-temporal discoordination (Franklin et al. 2001). Through such interdependencies, the labour-saving device could transform the sequencing and character of other significant activities, as the diffusion of TVs and freezers illustrates, influencing defection from former practices and reordering family conventions and spaces (Silverstone 1993; Hand and Shove 2007). These interpretations may particularly stimulate negative meanings and emotions that constrain uptake in the field context as it pertains to key practices, relations and elements that have remained unchanged over time (Leonardi and Barley 2010).

This relatively homogenous context - everyone eats the same food, cooked and shared in the same way, etc. - provides a "generations-old" (Gawande et al. 2013: 6), relatively "universal experience" and system (Waters 2008; Henjum et al. 2015). Thus, rather than different visions of rural and family life (Hand and Shove 2007), the consistent interactions consolidate the cooking practices into an order of 'pure routine' that structures everyday life within shared contexts (Warde 1997; Campbell et al. 2014). Changing this 'order' (Byrne 1991), "a kind of infrastructure through which human activities coordinate and aggregate" (Schatzki 2009: 35), is thus beyond the individual and innovating it, such as through practitioners modifying cooking, may appear impossible and "the object of anxiety par excellence" (Lacan 1991: 191).

This practice embedding is consistent with the rise of cooking related innovations in contexts (the practice, practitioner or their habitus) accustomed to change. This may include increasing resource competition, demands and 'time-space compression' (Harvey 1989) related to increasing work and life commitments, mobility and speed associated with modernity (Cockburn 1985: 81). The development of such forces may support innovations or constraints in practice (Warde 1999; Southerton et al. 2001), as contextual changes to food sourcing, preparation, and setting indicate. These include ready-meals and the 'Bimby' food processor (Jackson 2010; Truninger 2011). This is consistent with post-industrial switches to faster fuel sources, food sourcing modalities and eating out (Warde and Martens 2000)¹²³.

Supporting such 'convenience consumption' in western contexts in contrast to food practice conservation in the case studies, suggests that industrial societies have fewer dualisms (economically, ethically, spatially) that resist innovation appropriation (Maybury-Lewis 1989).

¹²³ (See also, Reilly 1983; De Solier 2005; Poulain 2002; Mestdag 2005; Warde et al. 2007; Holm 2012).

A corollary conjecture is that practice change is also likely to encounter less resistance in contexts where significant modifications for the potential recruits or other influential actors has already occurred. Examples include greater “emotional binds” to spend time at non-domestic work (Hochschild 1997), female remunerated employment (Costa 2000), male domestic cooking (Aarseth and Olsen 2008: 287) and changes to women being the traditional keepers of family order (Leach et al. 2012). Such changes may foster the “transformation of the traditional relations between food, femininity and care” and bolster further future innovations (Aarseth and Olsen 2008: 287).

Finally, the spatiality of cooking also appears notable in the Nepali context. The immediate location of the cooking is the household, central sites of the construction of identities, values, expectations (Hirsch and Silverstone 2003; Cieraad 1999), private/public distinctions and order (Cowan 1983; Conran 1977). Practices and dimensions thereof are particularly routinised in households and constrain innovation by subordinate power holders (Rosaldo 1984; Tamang 1999). Yet the case studies show that this politicisation and enculturation of space that delimits practice change extends beyond private spheres and includes community forests and their systems of governance. Defined by their forest management practices, their purposes of providing a sustainable supply of firewood, and the pride the community members take in them, the forests themselves come to legitimise and reinforce the social organisation, bonds and consumption of firewood (JKSi3). The conditioning of spaces with associations of practice may thus further order how interventions may occur and impact.

Interventions thus pertain to practices within the ‘moral economy’ of the household and community whose structures of rules, routines, meanings and feelings delimit ways of doing through defining ‘normal’, ‘appropriate’ or ‘ideal’ (Taylor 1984: 22)¹²⁴. Smoky rice, taste and tradition, therefore, like other normative constructs, may hence be instrumental to maintaining the domestic and cultural system within which the practices occur (Shove 2003b: 145). It further predicates the importance of socialisation processes and structures that develops and internalises these practice anchors (Parsons and Bales 1956; Shove et al. 2007).

Intra-household cooking roles between females consolidates this deduction. In the communities, cooking practices are partitioned along lines of seniority that express not just the principal and best cook, but also which woman within a household is the primary decision-maker. Position of head cook thus affords status and power in the household and community

¹²⁴ Signified also by Kaufmann 1998; Foley 1999; Fineman 2000a: 11; Hand & Shove 2004; & Shukla 2009.

and hence cooking innovations may be related to undermining this system and be further met with resistance that prevents innovation. An interview with a typical household signifies this:

We have a rice cooker but only sometimes use it as mother-in-law prefers fuelwood. On the occasions the rice cooker is used it's because Ama is ill. She's the main cook. I prefer the rice cooker and use when it when I can (KHHi15).

The Ama could provide no explanation for this preference and thus the intra-household power boundaries appear significant in limiting the latitude to learn, integrate or otherwise adapt innovations (Agarwal 1997; Ashforth et al. 2000). Social structures may thus variously constrain agency to uptake, both in the resources they enable and responses they prefigure. Literatures highlighting the former stress lack of social, stakeholder and financial support (Wade 1995, Sen 2009), and volition and aptitudes (Bhavnani et al. 2008: 4). Associated responses delimiting innovations include fear of reducing these (Braverman 1974), their status (Attewell 1984), social derision and lost legitimacy (Douglas 1978: 59)¹²⁵. Similarly, the powerful are often the primary adopters due to assurance of social position regardless of uptake (Valente and Davis 1999).

The inhibiting responses are likely to be further amplified because the discontinuance or modification of the established practice is likely to be judged as an infrequent, once in a lifetime and permanent one whose 'sunken costs' will be a lost by displacing it (Rosenburg 1974). The change may accordingly be conceptualised by the community members as an unsettling 'macro-transition' (Ashford and Taylor 1990). Moreover, as these costs are central to social histories, positions and capabilities, performers may be unable to perform supplementary tasks. The perceived extent of the change and destabilising of valued orders and 'deskilling', may hence signify significant uptake barriers (Meah and Watson 2011)¹²⁶. These counter dominant assumptions of affordability and uptake as standardisable, emphasising embracing and building their situated capacities of users (Chaskin 2001).

Within the heterogeneity of everyday life, the rice cooker, therefore, may symbolise the decay of traditional securities (Beck 2002: 10), compounding the daily issues of risk prevention

¹²⁵ (See also, Sokoloff 1974; Tolbert & Zucker 1983; Zuboff 1988; Pennings & Harianto 1992; Robey & Sahay 1996; Clarke 2001; Edmondson et al. 2001; Young 2004).

¹²⁶ These points are underscored further by the following (Braverman 1974; Sokoloff 1974; Attewell 1984; Merleau-Ponty 1991; Levitt & March 1988 Barnett & Hansen 1996; Foucault 2000; Faulkner 2001; Ingold 2007; Robinson & Barron 2007; Castell 2010; Vankatesh et al. 2014).

tasked to rural women (Flitsch 2008) and presaging a fundamental shift to more decisions, uncertainty and risk (Giddens 1999). The importance of this is consolidated by the considerable meaning, sensual, material, competence and inter-practice dependencies of the incumbent practice that are articulated and interplay at multiple levels. Consequently, maintaining 'taste' may equate to "powerful forces in structuring routine and practice" that define and sustain the capabilities, feelings and experiences central to everyday life (Shove 2003a: 404). This insight adds epistemological and heuristic vigour to development pathways and assertions of food and cooking as tied to identity, status, belonging and being (Barthes 1961: 167-9; Meigs 1987). Hence, 'taste' and anxieties do not just articulate key implications for rice cooker uptake in this context, in emanating from the intersection of role, material and emotional content of manifold practices, the thesis suggests that it is key for framings of social life, change and uptake more broadly (Phizacklea and Wolkowitz 1995: 15; Silverstone 2005).

Although food studies in Nepal are limited, Lowdin (1985) substantiate the above findings by concluding that Nepali food culture embodies the principal components of the social structure that includes inclusion/exclusion, family solidarity, patriarchy and intra-gender power. Further aligned with the case study analysis, they conclude that these structures encourage food convention conservatism, reinforced by anthropologies of food in Hindu cultures playing "a strong affective role" that communicates key cultural distinctions (Appadurai 1981: 494). These include aspirations, rights, and solidarity, continually structured by their social dimensions and behaviours into an order that makes life possible (Vidyarthi et al. 1979; Shweder et al. 1997: 136, 148). These deductions also ally with the social contingencies of technological change and consumption reproducing multiple dimensions of social culture and structure, as Douglas (1977) discusses for food traditions and norms, and social roles as "the building block of social systems" (Katz and Kahn 1978: 219-220) and role anxiety common when people change routines (Rescorla and Wagner 1972; Luhmann 1993).

The uptake of innovations is thus socially located, occasioned and socio-technically dependent and prefigured (Tukker 2010; Gram-Hanssen 2010a). The case studies show particular significance of emotions, senses and meanings in these prefiguring processes and structures whose diverse interdependencies routinize social life, variously oppose change and predicate new considerations for effective and equitable development pathways. It suggests not just considerations of social spatio-temporalities and materialities for limiting discretion to change conventions, but also how these are imbued and politicised with specific teleoaffectivities whose implications are compounded through being multiply embodied.

Moreover, the significant collecting/cooking dimensions embedded in private and public spaces and practices show the significance of considering how social embodiments and experiences intersect and self-augment over multiple practices and spatio-temporalities. Interrelations of practices, therefore, appear crucial to the uptake of innovations that transform the cooking and smokiness into diversely entrenched and emblematic entities (Lévi-Strauss 1984: 85). It shows that although choice may be an 'elementary entitlement' (Nussbaum 2003) and social performances manipulate the world (Latour 2000: 113), social structures delimit them (Nussbaum 2001).

Patterned practices may thus obstruct innovation for the lack of required social resources and safeguards against "social risks" and the unknown (Silverstone 1994: 81). Considering practice interdependencies in this way contributes additional insight to other studies finding the significance of emotions, identity and meanings on uptake (Wood and Moreau 2006: 44) and the embodied, relational, affective dimensions of food related preferences and practices (Probyn 2000; Mahon et al. 2006). Indeed, these may be more influential than the material (Leonardi and Barley 2010), suggesting that how feelings, values, capabilities and so forth are constructed and coordinated and may be instrumental to advancing approaches to sustainable development. This chapter has shown this by suggesting multiple overlooked reasons for the gendered uptake of practices since electricity and the low uptake of cooking innovations and associated sustainable development benefits. Indeed, after now summarising these insights, we see in the following chapter how rather than practice conservations, the construction and coordination of normativised emotions and meanings can be actively utilised to catalyse new practices for bolstering sustainable development-enhancing energy access.

5.6. Summary of insights: Sensory taste, embodied distinctions & practice systems

This chapter discussed the reality of energy access in the three rural case studies through considering everyday energy practices. Doing so revealed the differential nature of abilities to use, and outcomes of, modern energy services that reflect embedded social structures and problematizes notions of, and approaches to, energy access that overlook the contingencies of consumption. To enhance the potential implications of the analysis, the chapter then focused on the conservation of firewood cooking practices that undermines the sustainable development impacts of energy access. It revealed the significance of the highly interlinked, multi-sensory and multiply embodied nature of certain practices for signifying and reproducing social identity and order and that these become embedded within, and presupposed by, the routinised schemas of daily life that they construct (Goodman and Redclift 2002; Hayes-Conroy and Hayes-Conroy 2013).

Secondly, through exploring the significance of 'taste' and 'tradition' for the communities' cooking practices, the significant symbolic, competency and affective content of sociality, order and agency emerged that intersected multiple social spatialities, functions and temporalities. It predicates the value of considering the sensory, moral and political economy of a group's routines for identifying markers of difference and 'culture' that signify barriers to change and sustainable development that development projects must not overlook, and social practices and structures as means for advancing these and sustainability pathways.

These appeared inscribed within various relations of 'taste' and 'tradition' that conserved consumption patterns within a cultural system in which they are constructed, interrelated and reproduced. Codified meanings and emotions appeared integral to this system that prefigured agency and opportunities to innovate through being interlinked to everyday encounters, rules and values (Schatzki 2012: 23). These manifest through their recursive relations to cooking and associated interactions. The interrelations, both implicit and explicit, thus appeared vital for the resources and orders of cultural life and inseparable by the community members due to the extensiveness of the normalised interrelations authenticated and reproduced by everyday routines (Cavett 1993: 118). This rendered its constructs and conducts, such as firewood practices, meanings and feelings, 'interlocked' (Giddens 1979: 216).

The unelaborated emphasis the communities ascribed to 'taste' and 'tradition' is thus best explained as contextualised features of practice, complicit and co-produced in the production and maintenance of community distinctions and arrangements of daily life that hence conditioned agency, innovations and sustainable development. Throughout the analysis of this, the discussions demonstrated the value of considering the nature of the practices to which an innovation or intervention may relate, how the practices may complexly interrelate and structure intimate domains of daily life, and the overlooked importance of sensual and cultural taste for aiding insight into these.

Doing so suggested distinctive implications for enhancing innovation uptake and development interventions. This included the importance of integrating both the prospective consumers and non-consumers in a community in development efforts to account for the collective occasioning and unequal distribution of socio-technical capabilities to benefit from development interventions and the prospect of experiential social learning to bolster these capabilities. Considering practices from the positions of different social groups within their relationship to, and constraints structured by, other practices and the broader organisation of practices, signalled ways to enhance this whilst mitigating the exclusion of already marginalised actors. This includes the socially constructed, stratified and revisable nature of development barriers maintained in dominant pathways, such as affordability, elitism and uptake (Palit and Chaurey 2011). Seeing how these constraints routinise and spatialize in heterogeneous ways through practices also highlighted the importance of development efforts to consider the nuances, normativities and interdependencies of spaces they often take as mutual, such as households, intra-gender relations and communities (Ansari et al. 2012).

Instead, through practices we discovered that these are unequal, partially implicit and prefigure the 'right' way of acting, such as 'doing cooking', being a good wife, mother and community member (Giard 1998). Within this, patterns of embodied sensory evaluation and production appear crucial to how we 'know' and construct 'proper' practices (Pink 2004: 287). Producing the firewood taste is thus part of maintaining the normalised social identities, rewards and embedded securities of the societies that prefigures it and the cooking problematic (Bourdieu 1990b: 125-126; Truninger 2001). It signifies the performative ways norms are made, distinguished, structure and effect society, agency and change and whose values, senses and feelings may be instrumental to these and maintaining the cultural system within which they occur (Smith and Guarnizo 1998; Routledge 1999). Constructions of 'taste', therefore, may be important in and of itself for the maintenance of certain practices but is always woven together with broader facets of social life, such as power, roles and othering

(Rose 1999: 457). 'Taste' may thus be a significant marker of, and lens into, a community's 'grammars of living' and how 'appropriate' is performed, governed and reproduced (Rose 1999: 153; Woodfield 2000).

The rice cooker, therefore, may extend the 'physical landscape of material possibilities' (Shove et al. 2007: 37) yet requires considerable material-human arrangements for extensive uptake (Halkier 2009a: 373). These relate to how people may process the demands of practices in different ways as presupposed by their social location and consequent relations of practice (Wenger 1999; Gram-Hanssen 2008). Consequently, rice cooker use relies on, and 'belongs to', social practices (Røpke 2009: 2492) and hence where it occurs is a configuration of contextualised components; a social-technical 'hybrid' (Shove et al. 2007). Those relations, however, presuppose performances and developments, expanding the diversity of factors distilled within the literatures as significant for innovations and suggesting that practice performances and their effects may support overcoming the pervasive antinomies of overlooked actors, impacts, power dynamics and low uptake symptomatic of development pathways (Sylwester 1994; Vince 2008).

Moreover, the chapter illustrated how these and practices interrelations may also further understandings of the key influencers of uptake and sustainable development revealed in Chapter 2, including social learning, risk, needs, capabilities and inclusion. The findings thus expand the diffusion debate beyond the dominant discourses and pathways of Kantian concepts of individual choices and household electricity provision to behave immersive consideration of the sociology of capitals, materiality, consumer patterns, possibilities and daily life to ensure the plurality of needs are equitably met (Geertz 1975; Srivastava and Rehman 2006)¹²⁷. It substantiates that although people contest, resist to do or believe things (Klein and Sorra 1996), especially when there is a lot at stake (Cohen 2007), routines and their context are critical (Child et al. 2005). This emerges as multiscalar, socio-material and supported by thinking in terms of social practices. Doing so may aid efforts to better frame development pathways.

¹²⁷ Expanding notions of 'capitals', resources and 'assets' for development via social practices is established throughout this thesis. It builds on conceptual foundations provided by Bourdieu (2000: 169, 233, 242) and insights from, inter alia, Nonaka (1994), Boisot (1998), Nahapiet & Ghoshal (1998), Moser (1998), Maxwell (1999), Lesser & Storck (2001), Adler & Kwon (2002) and Stavrakakis (2008).

5.7. Conclusion

Exploring the nature of energy use through the empirical case studies and a practice framework, this chapter found that rather than dimensions such as income and innovation price emphasised in dominant discourses and approaches to sustainable development, the nuanced social-institutional processes and context undergird intervention and energy access effectiveness. The analysis found that partial considerations of these led to unequal consumption patterns that undermine the development benefits of modern energy services. Accounting for these signalled extensive implications, including numerable reasons for the dichotomies that appeared entrenched by factors conventionally overlooked. Instrumental factors were the sensory and symbolic properties of everyday routines and systems that underscored how social groups and conventions are distinguished, function and interconnect, and how these may be reproduced, redefined or rearranged. These dimensions signified and structured their communities and journeyed across to the energy practices mediated by electricity provision but rooted in these dimensions and structures.

Revealing this advances the argument of, and avenues for, considering key and unanticipated influencers of sustainable development and how these may co-produce development constraints and implications. Yet only through studying the practices and the array of social practitioners and non-practitioners, did the insights emerge, suggesting that practices can reveal essential facets of social life and change and provide an invaluable heuristic device for development pathways. The chapter thus contributes to rectifying the lack of conceptual-empirical alignment in approaches to social action and sustainable development and accentuates the necessity of examining the routines and repertoires of social life to which an intervention may relate. We substantiate and explore this and the implications for development pathways further by now turning the analytical gaze from innovation (non)use to intervention management.

CHAPTER 6

Managing energy, energy use & sustainable development

6.1. Introduction

Management is paramount for effective sustainable development yet marks a persistent limitation of development efforts (Selsky and Parker 2005; Welford 2013). This has led to increasing emphasis on management standards in relation to the poor performance of development projects amid commands for re-framing how management is achieved (Diallo and Thuillier 2005). This situates the thematic focus of this chapter, contributing to this reframing and wider implications by applying insights developed from the previous chapter to unravel distinctive mechanisms responsible for the managerial success exhibited in the case studies and how these can be augmented. It suggests management is a necessary progression from the evaluation of innovation (non)use and signifies how forms of use may be sustained and amplified. The chapter demonstrates that communities can effectively manage projects for equitable and long-term outcomes if supported through the independencies of their everyday practices. This relocates management within a practice-framework, rectifying the atheoretical, short-term purview that typifies the field and advancing numerous debates with a stake in refining 'collaborative' working, participation and management.

To this end, the chapter runs as follows. 6.2 outlines the principle management approaches, converging precepts and barriers for sustainable development, emphasising the imperative of the subsequent empirical analysis. The core features that underscore the effectiveness of the management strategies showcased in the case studies are then presented in 6.3 in three reinforcing sections. The first, 6.3.1 reveals the importance of ongoing interactions between all necessary stakeholders and that grounding intervention approaches within pre-existing norms of social structures and processes of interactions supports this in a self-sustaining and reinforcing manner.

The second, 6.3.2, builds on this to show various other pre-existing dimensions of social contexts that can be actively drawn upon to enhance the utilisation, emergence, adaptation and reinforcement of supporting social elements, bonds and practices in a similarly self-augmenting relationship. Dimensions include informal routines, mutual values, social

relations, purposes, meanings and feelings, and overcomes managerial issues of insufficient legitimacy, accountability, commitment, suitability and related user-producer practices.

The third subsection, 6.3.3, demonstrates how such practice interdependencies support community-based management of even relatively large-scale projects. The following section then augments some of the emergent insights by expounding two core challenges encountered in the case studies and prospects of overcoming them related to practices between different social actors 6.4.1, and temporal interdependencies of performances, 6.4.2. These foci develop programme and policy implications for enhancing project management for sustainable development that are summarised in section 6.5 before concluding the chapter.

6.2. Refining the management lens for sustainable development: towards collective management?

Management modalities in development studies are classifiable along axes of centralised/decentralised and technocentric or econometric/sociological¹²⁸. While, the former are associated with large-scale interventions via corporations, state or multilateral institutions (Ika 2010), NGOs and civic organisations are typical agents of the latter typologies (Brosius et al. 1998; Crawford and Bryce 2003). The former set, however, dominate development proceedings yet reflect linear, deterministic conceptualisations of agency, change and impact (Armanios 2002). These reduce dominant management strategies to externally derived “applications of knowledge, skills, tools and techniques in order to meet or exceed stakeholder requirements from a project” viz-à-viz dominant stakeholders, or, more narrowly, on mobilising technical resources for marketplace gains (Thamhain 2013). The approaches thus reflect the ‘parachuting-in’ of paradigms into contrasting and co-evolving settings and applications.

This marginalises the diversity of agency, effects and actors (Hales 1986: 85), confining ‘success’ to partial metrics - cost, time and quality/performance – and discourses that tend to be fixed, overly normative, prescriptive, require resources inaccessible to actors in developing contexts and overlook interdependencies (Gibson-Graham 2002; 2006; Li 2007). This includes how objectives, strategies, ‘success’ and stakeholders are systemically, unequally and socially defined, ordered and experienced through mechanisms that are as much symbolic and

¹²⁸ Reflecting the reductive approaches to development (Redclift 2002: 137; Welford 2013: 41).

affective as material or rational (Jackson 1993; Gasper 2000; Crawford and Bryce 2003; Falgari et al. 2013). Considering these through social practices in the following analysis substantiates pathways that overcome limitations to sustainable development and contributes to the commanded reframing of development innovations, management and participation¹²⁹.

This management approach hegemony however, presides over a landscape of alternatives that emphasise socio-cultural context, long-term, reflexivity and local participation. Models include Participatory Rural Appraisal (PRA), various integrative approaches and the ‘co-management’ approach following the 1992 Rio Earth Summit. They further accentuate the importance of factors revealed in Chapter 2 and 5, namely stakeholder inclusivity, collaboration between levels of government, civic organizations and local communities, multidimensionality and overcoming structural constraints to these through experiential, iterative, collective user and institutional learning and collaboration (Hulme 1997; Bond and Hulme 1999). The convergence of these managerial principles with other areas of sustainable development indicates the necessary interconnections for development and the limitations of frameworks that hinder such interconnections (Fowler 2013).

Despite this, contentions apropos achieving effective management remain related to the tensions within participatory/non-participatory working and centre on how project management can mediate the subjectivities of agendas, expertise and responsibilities to best meet the needs of marginalised social groups and develop ‘transformative’ development effects (White 1996: 7-9; Cleaver et al. 2001)¹³⁰. The tensions underscore concerns raised in Chapters 2 and 5, notably who chooses the actors, goals and strategies, how to negotiate normative pressures, expertise, resource inequalities, positionalities, needs and objectives and what constitutes the most appropriate ensemble of actors and interaction methods between them (Ottaway 2001; Adams 2003: 375). There is thus an imperative to address these tensions (Khang and Moe 2008; Shackleton et al. 2002). Exploring energy access management in the case studies through a practice-lens supports this.

¹²⁹ See also Brown & Duguid 1991: 47; Crawford 2000; Golini & Landoni 2014. The latest dominant NGO guidelines & ‘alternatives’ – e.g. ‘new aid architecture’, its Poverty Reduction Strategy Papers (PRSPs)” (Farrington 2001), the ‘new aid management orthodoxy’ (Hubbard 2005), & the ‘programme approach’ (World Bank 1998; European Commission 2007), reproduce the orthodox approach & its caveats (Nyamugasira & Rowdne 2002; Hüge & Hens 2007; Hermano et al. 2012; Ika & Saint-Macary 2012).

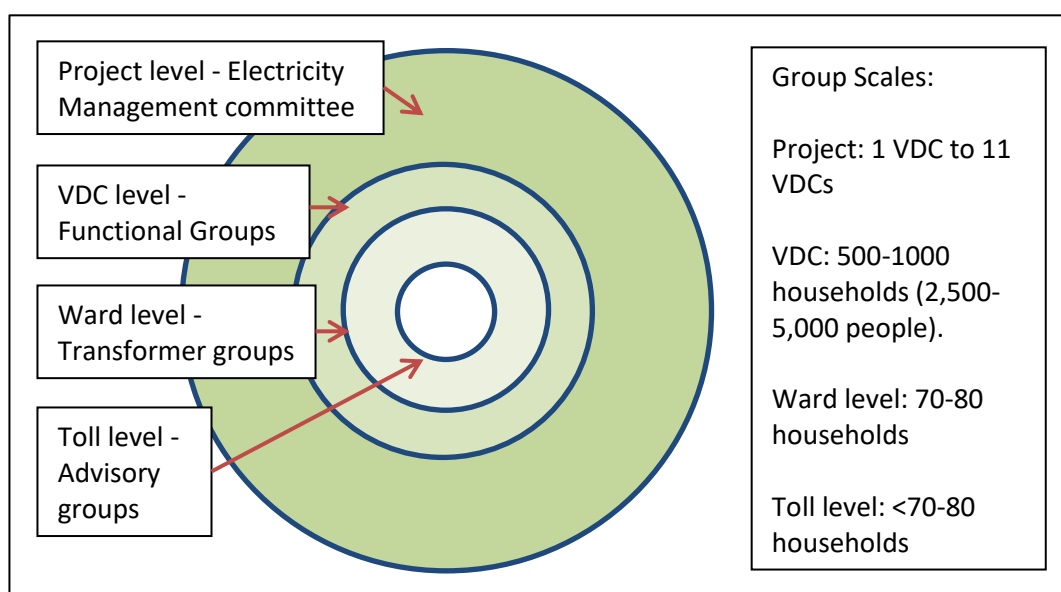
¹³⁰ For an extended account of alternative managerial models & participatory approaches, their precepts & caveats, see Appendix I. It adds to points made in chapter 2.

6.3. Communities for sustainable development

6.3.1. Management via mobilising & using interactions & social structures

The case studies showcase differing typologies of collective management ('co-management') with high-levels of participation (cf. Arnstein 1969; Biggs 1989). This section discusses these approaches and the mechanisms for their effectiveness. The first notable feature of all the case studies viz-à-viz their managerial success was their use and development of a network of decentralised and collectively understood cooperative groups that related to pre-existing structures of interaction within the communities. These groups are schematised in Figure 6.1. In all approaches, electricity management committees (EMCs) were responsible for the overall project, constituting the highest strata of management. At the sub-project scale, key management institutions included transformer groups in Jaidi, functional groups in Khimti and advisory groups in Sisuwa-Bala. They operated throughout VDC, ward and toll-level.

Figure 6.1. Group-based managerial structure of the three case studies

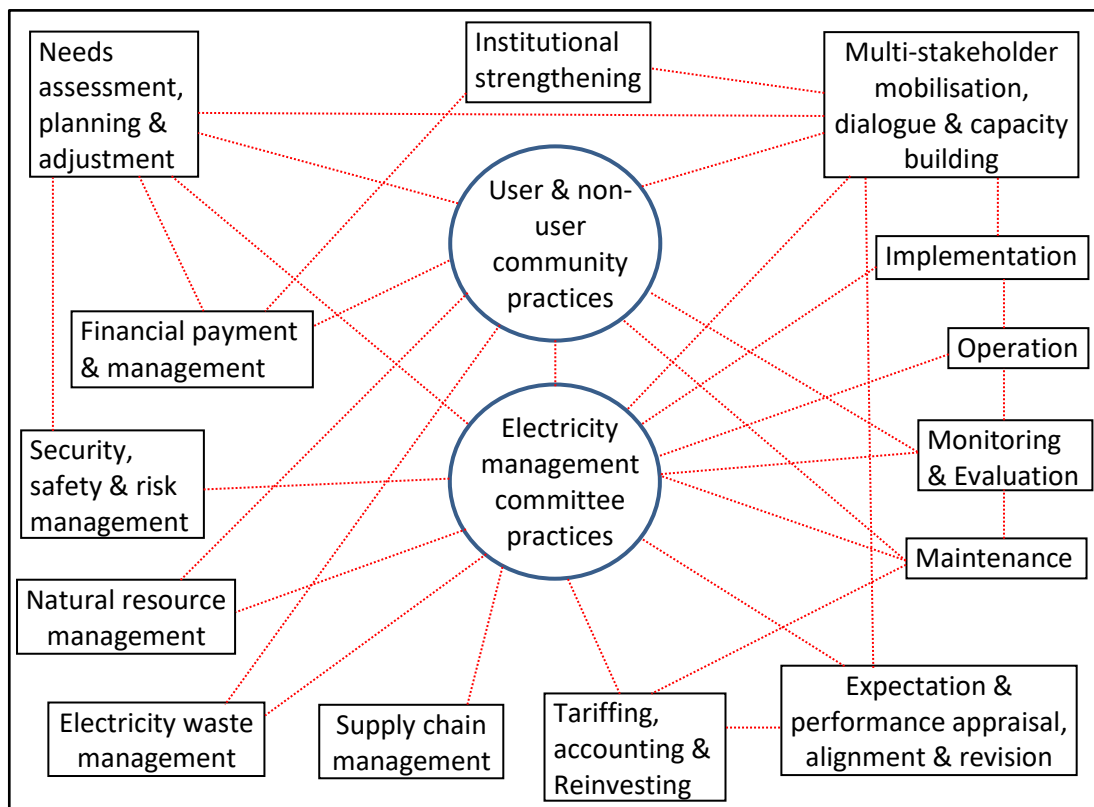


Source: Author. Derived from multimodal qualitative case studies.

Examining the functionality of these systems for effective management signifies the importance of practices and their specificities within and between social groups (Gilchrist 2000: 269; Polletta and Menta 2001: 310). These include forms of action, expression and exchange and from a considerably more nuanced and embedded order than the managerial

structures might suggest (de Certeau et al. 1998: 85)¹³¹. This includes individuals, households, family life, 'public' spaces and external organizations, presenting management as co-dependent on multiple practices and their institutions interconnecting key domains over diverse geographies (Potter de Jong 1994; Piore 1995). Figure 6.2 symbolises some of the key practice domains and relationships affecting the (non)consumption and management of electricity in the case studies specifically and energy access field more broadly.

Figure 6.2. The domains of practices and their relations for effective project management



Source: Author. Derived from the fieldwork research and supported by notable literatures (e.g. Sovacool and Drupady 2016 and Appendix I). 'Effectiveness' is relative to the amount, duration, reliability, equity, uses and impacts of electricity on sustainable development at diverse scales for all social groups. Links are contingent, indicated by dash line.

¹³¹ Contrasting with the focus of dominant managerial approaches on spatiality, actors or objectives, emphasised by their primary tools, namely logical frameworks, progress reports, work breakdown structures, issue logs, Gantt diagrams, risk analysis, responsibility assignment and stakeholder matrices (Jaeger & Kanungo 1990; Baccarini 1999; de Witt 1998; 2002; Carlsson & Berkes 2005).

The practice-network indicates the multi-faceted interdependencies for effective management. It also introduces the notion that complexly interrelated domains orchestrate the world around us and are made by common routines that belie their complexity (Thévenot 2001b). This, on both these counts, strongly challenges the conventionally isolated approaches of these components (Ika and Hodgson 2014; Golini and Landoni 2015). Project maintenance, for instance, is essential for long-term energy access and development impacts yet depends upon a consortium of practices and practice domains (Winter and Checkland 2003). These include household to project-level monitoring, maintenance and financial management requiring budgeting, planning, evaluation, training, purchasing and fluvial and forest management to mitigate damage-inducing floods, landslides and forest overgrowth, in addition to 'wiretapping', and equipment theft (Ili3; Ili21; Bhattacharyya 2012).

These were collectively influenced by electricity users, non-users, district and state policy makers, forestry officers, markets and financial institutions, inter alia, yet were most effective when routinely coordinated apropos the specific practice context (O'Toole and Bennis 1992; Amin and Thrift 1995). Community forest practices, for instance, affected electricity demand and management relatively more in Jaidi than Sisuwa-Bala due to contrasting firewood availabilities (JKSi5; SBKSi3). Similarly, Roe (1991) illustrates the interlinkages between user and management practices for governing rural water services influenced by a wider practices interrelations which vary between villages and countries according to local practices and regulations (Gasper 2000; Crawford and Bryce 2003).

In all cases, practices were essential for the management requirements and were engendered and reinforced via ongoing user-user and user-manager interactions (Schank and Osgood 1990). The requirements for project maintenance mentioned above for instance, were met by cooperative surveillance and reporting practices enhanced by the degree of actor interactions. A farmer in Sisuwa-Bala explains this further:

We all try to help the maintenance and management of the electricity. For example, if we see any problem or misconduct we report it. This is easy as in every toll there is someone in an electricity committee (SBHHi11).

The collective nature of the meanings and behaviours illustrated here appear instrumental for the emergence and effectiveness of the managerial practices (Woolcock and Narayan 2000; Grol and Wensing 2004). The communal interactions and structures appear interrelated in orchestrating the elements and effective outcomes, suggesting the value of group-based,

interactive working and management within and between diverse groups (Maznevski 1994; Wenger and Lave 2002). Indeed, the case studies illustrated that this value extends to the creation of wider benefits typically missed, such as maximising cost-effectiveness, use, capacities and benefits (Stern et al. 2002). These extend to traditionally excluded groups and may be especially amplified in the case of energy access (Pretty 2003; Barnes and Toman 2006). A disabled householder in Khimti exemplifies these points:

We can all participate now because we feel more united since seeing what our inclusive effort can achieve. It's caused more inclusive participation in other areas also, including saving, farming and market groups (KHHi13).

Such examples represent an embedding and expansion of development modalities, activities and capabilities as meanings, competencies, feelings and protocols modified through extensive, sustained experiential interactions. Inclusive practices and groups appeared interrelated and essential to this. It indicates how cooperatives can, through ongoing "inclusive effort", become assets through engendering the suite and structuration of elements required to stimulate and transform 'practical interest' (Habermas 1972) and 'common knowledge' into action (Levy 1997). The significance of these developments is emphasised by two additional developments that formed further assets for the projects and the prospect of sustainable development. First, the inclusion integrated marginalised groups such as women and deprived social classes, which others also link to enhancing project sustainability, management and sustainable development impacts (Upadhyay 2005; Agarwal 1989; 2010).

Second, is the integration and development of meanings and desires in this process. This is voiced, for instance, by the majority of the community members "initially not wanting to help or thinking we'd be able to get electricity, now we feel we can do anything" (JHHi5) and the common articulation that:

Grouping more of the community than anything else we've done and working together for over 3 years makes us all want to keep helping and make it successful (SBHHi3).

It infers that performative, group-based practices aligned with social meanings, emotions and relations may be instrumental for effective behavioural change and project management (Morris and Feldman 1996; Bamberg and Möser 2007). Demonstrating this further, all participants elaborated that cooperative consumption and reporting practices developed

mass support because the project stages were conducted via iterative, interpersonal dialogue and activity between the communities and managers (JHHi1; KHHi14; SBHHi17). A young man, representing others that without the electricity would migrate to Dubai, and one of Khimti's project operators, elaborate this:

We feel more united now because we all worked together for the electricity from the start and know the people who manage it because they are from our community and listen to us and we know we can increasingly benefit from the electricity so now we also want to work together for it (SBHHi11).

The feeling of collective ownership, involvement and closeness is significant for the community and energy access (KKSii3).

Social cohesion, effective collaboration and management thus emerge as ongoing social constructs invoked by social practices developing interconnecting relationships, understandings, desires, intentions and actions (Carley and Christie 2000). Moreover, the cases show the discursive and embodied dimensions of this social construction and two interlinked supporting features: bi-directional exchange and 'unity' or 'closeness'. Firstly, perceptions that electricity users, non-users and official managers could routinely and effectively share narratives and tasks largely eroded conventional barriers for mutual interaction and exchange (JKSi3; JHHi7; Vaara and Whittingdon 2012). Multiple participants exclaimed that this engendered previously precluded inter-group working, creating increasingly mutual repertoires and routines that overcame dominant intervention barriers of exclusion, non-representation and 'being ignored' (Bene and Neiland 2006; Ika and Saint-Macary 2014). Inclusive social practices, therefore, redefined power and development capabilities and structures.

Secondly, the significance ascribed by all the stakeholders to mutual feelings and closeness suggests that the relational contingencies of social practices propel increasingly collective elements and practitioners of practice, reinforcing their overarching feelings, impressions and behaviours as a low caste male exemplifies:

Maintenance is good. If there's a problem we call the local technician and it's easy and he is good and quicker than others elsewhere so we report all problems, not just those affecting our personal electricity (KHHi14).

Mutual feelings and interpretations thus reinforce related performances and are influenced by pre-existing, multiscalar norms, such as perceptions of standards elsewhere (Rogers 1995; Bresnen et al. 2003). This resonates throughout the case studies to indicate that project management pertains to plural contexts and interactions (Simonsen 2007)¹³². The successful communication and responsiveness between the community members and technicians, for instance, relates to their compatibility to socio-technical norms. The new cooperative modalities were deemed “easy” and “good”, for instance, because they were consistent with existing group relations, capabilities and valued practices of interpersonal communication and mobile phone use (KHHi4; SBHHi11; McLeod et al. 1999). Accordingly, integrating these elements and routines into additional practices rapidly gained high volumes of practitioners.

Consequently, the model’s cooperative groups, scales and modes of interaction were fine-tuned to the specific routine-based contexts of the communities. This enabled recursive experiences, learning and improvisations that reinforced the interconnectivity, contextualisation and effectiveness of the management modalities and consumption practices (Mitchell and Sackney 2011). The value of the contextually specific interactions is reinforced by a less successful communication method required by Jaidi’s EMC:

If there’s a problem we must submit a written application and 55 NPR and then wait 10-15 days (JHHi7).

There was widespread dissatisfaction with, and limited ability to perform, this method (JHHi13; 16; 17) and comparing it to the free, interpersonal, “friendly” approach consistent with everyday practices in Khimti (KHHi15), denotes the contextual specificities required for effective methods learnt through social interaction (Carlsson and Berkes 2005; Chambers 2007). For example, illiteracy rates are approximately 30% in Jaidi (GoN 2014) such that “many could not complete the forms” and the only instances in which paper application formats are familiar are in contrasting environments and tasks associated with government, elites, bureaucracy and distrust (JHHi7; Ili3; Ili21). The prescribed mechanism thus prevented common practice by jarring with entrenched skills, meanings and interpersonal routines. In consequence not being routinely performed collectively, the social embedding and interlinking of broad sets of actors did not occur (Wilk 2002; Andrews et al. 2013).

¹³² This plurality is revealed throughout the energy access research and framed throughout the thesis as ‘socio-technical’, extending to bodies, elements, relations, performance and contexts of practice. We unpick the diversity of this as the thesis unfolds through considering overlooked dimensions that emerge in the analysis in relation to ‘structure’, ‘place’, ‘community’, ‘culture’ and ‘timespace’.

The contrast depicts the diverse contingencies of 'suitable' approaches and their appropriation in mundane routines influenced by pre-existing practices and their socio-technical milieu that condition everyday coping, adaptation and management strategies (Olson and Folke 2001). The mobile telephony suitability, and wider benefits largely overcoming conventional issues of malpractices, neglect, exclusion, unequal participation, gains, resistance and engagement and information in unsuitable forms, also indicates that this context may include relatively recent transitions that may extend or mitigate such barriers through how they are seized in the social operationalisation of technologies.

The nuances within this context thus also highlight that the contexts where innovations are to function must be scrutinised in development planning, research and interventions for such diverse factors and their multiple temporalities and spatialities for their impact on sustainable development outcomes (Buchy and Suba 2003; Pandey et al. 2012). Revealing this social operationalisation and co-evolution of the methods and context of development in the case studies suggests social practices as the medium through which 'formidable constraints on interventions' were surmounted (Hickey and Mohan 2004: 127). In the case study contexts of high social diversity, often considered aggravators of project and service management barriers¹³³, it is especially essential to further examine how these were addressed.

Sisuwa-Bala epitomises this. To initiate the project 20% of the project cost needed to be raised from the community, requiring community-wide contributions. All groups contributed because the relative advantages of electricity, community over household or national-level systems, the legitimacy of the approach and the need to collectively contribute, was widely perceived, enacted and embodied (Rindova and Petkova 2007; Rinkinen 2013).

Ongoing inter-actor discussions and practices, including "meetings and house visits from the electricity committee" (SBHHi7) and "the lots of conversations about it", developed this and the shared meanings and support (SBHHi8; JHHi10; KHHi16). Collective procedures, therefore, enhanced conceptual and enacted uniformity, resulting in "people working together more now" (JHHi10). Although such productive outcomes of collaborative methods do not always materialise (Longoria 2005), Shapin (1984: 491) and Gray (1989) emphasise similar reinforcing results of collective procedures. It culminates to suggest a significant self-sustaining and self-augmenting effect of approaches that integrate social practices and structures (Urry 2004: 27;

¹³³ Emphasised especially in South Asia (Arnold & Campbell 1985; Lama & Buchy 2002; O'Reilly 2004; Ely 2005), yet also more broadly (Bettenhausen 1991; Milliken & Martins 1996; Iles & Hayers 1997).

Geels 2004: 20). Notable examples substantiating this include the emergent financial saving groups (all case studies), the aloo¹³⁴ cooperative (Sisuwa-Bala), electric mills, agricultural and market cooperatives (all case studies), computer group (Sisuwa-Bala) and path improvement groups (all case studies). The development of such subsequent services through collective projects is a common outcome (Porter 2001; Sanchez 2007; Palit 2013), indicating how local groups can enhance multi-level outcomes (Gross et al. 2001; van Wijk-Sijbesma et al. 2001).

Some of these groups, such as the aloo cooperative, path improvement and IT education, emerged directly in response to the enhanced organisational capabilities that co-evolved in the collective practices of the electricity approaches (JKSi5; SBKSi5; SBKSi8). The success of all, however, pertained to the cultural embedding of these through the ongoing electricity and emergent practices that reconfigured their habitus (Bourdieu 1984: 72). Reconfigurations included the new organisational, electricity and working modalities and normalised solidarity, empowerment, financial prudence and duty-related pride and enabled increased practitioner enrolment, abilities, performances and benefits (e.g. KHHi5; SBHHi18b; Aveling and Jovchelovitch 2014). The prospective development of a minimal rate rental service for high-cost electrical appliances for the community by Jaidi's EMC and plans to boost community development through state-level power purchasing agreements (PPAs) and providing neighbouring villages with electricity in Khimti, substantiates this further (Ili1; JKSi1)¹³⁵.

Social practices thus co-create the conditions for their production, reproduction and expansion in a co-constituting relationship that appears instrumental for interconnecting symbolic, rational and sentimental dimensions and integrate actors even over power-laden differentials (Katz and Sara 1997; Khwaja 2001; Christopher 2005). This is further illustrated in the case studies by the advised matching of electricity generation, consumption and payment to enhance benefits, saving and reinvestment and bolstering the shared sense of purpose and ownership it engenders (Prokopy 2005; Zang and Kumar 2011). Recommended mechanisms to support this further indicate the importance of considering the processual and structural interdependencies for effective practices (Bullen and Whitehead 2005)¹³⁶. Payment and management mechanisms must then reflect these variables, such as via enterprise training

¹³⁴ An indigenous textile made from local resources. It is highly valued in South Asia.

¹³⁵ Trading surplus electricity in this way would ensure, if brokered well, long-term income streams on terms that further boost essential meanings & competencies of decentralised action & empowerment, inter alia (SBKSi1; Sovacool 2013, whilst boosting local, regional & national energy security, economies & capabilities (Ei5; 6; GoN 2011; AEPC 2013b). Further, such strengthening boosts abilities to attract extra resources (Westley & Vredenburg 1997; Rao and Ibanez 2003; Rogers & Weber 2010).

¹³⁶ Including via joined-up, multi-sector projects & actions (Hart 2002; Jacobson 2007) & flexible tariffing viz-à-viz characteristics of existing & prospective productive applications & abilities to pay (Monroy & Hernández 2008; Palit & Chaurey 2011: 274; Schmidt et al. 2013).

and flexible payment methods (Martinez 2012). Moreover, the group routines were responsive to both their structural limitations of exclusive interactions and their changing environment, illustrating social practices as mechanisms to achieve the reflexivity and heterogeneous capacity building required for sustainable development (Yuval-Davis 1997: 88; Doku 2013; Rensburg et al. 2014).

Interrelatedly, the inclusive approach overcame another formidable set of barriers: financing and productivity impacts. Energy projects function to economies of scale (Barnes and Floor 1996; Toman and Jemelkova 2003). Significantly, these savings apply at both the production and consumption side (Deichmann et al. 2011) and pertains to both software and hardware dimensions that can collectively enhance the electricity consumption and development ends (JKSi1; Ili27). This includes the uptake and sustainability of modern energy services and enterprises (Martinot et al. 2002; Bhattacharyya 2007; Zang and Kumar 2011). In Sisuwa-Bala, for instance, the collective inputs enabled installing a high capacity electricity generation system, replete with its high cost and competency requirements, enhanced the project size, households included, quality, and financial security, boosting the electricity system and its application potential (SBKSi4; cf. Gray et al. 2005; Morsink et al. 2012). Indeed, all the case studies testified that with greater common demand and contributions, the more feasible sustained, reliable and substantial electricity access is (Ili1; ili22; Baland et al. 2003).

The examples thus show the prospect of inter-actor approaches to embrace diversity, increase availability of key resources and develop and sustain new practices (Petty and Ward 2001; Pandey et al. 2004). These appear co-constructed and aligned in the doing of social practices (Wenger and Snyder 2000; Wasko and Fargaj 2005). The resultant actor bonds are thus socially made and presuppose action. HPL's in-country director accentuates this:

We have very strong relations with NORAD because we know each other well and know each other's aims and priorities. Through that, one can make things happen (Ili1).

Social unity, structures and action are hence significant generative resources, augmenting development finance and capabilities (Blau 1964: 61; Durkheim 2014: 228). This generative effect is further evidenced and significant in the remote context for overcoming another formidable constraint: transportation limitations (Mulmi 2009; SBKSi7). With effective intervention management requiring access to specific materials and expertise, the road quality and paucity associated with remote regions severely restricts the access of these in

most remote communities (Ii5; Müller-Böker and Kollmair 2000). Most such communities lack immediate road access or feasible mechanised transportation alternatives, requiring materials be conveyed by foot, often only human due to the nature of the equipment and paths (Walle 2002)¹³⁷.

As a VDC secretary and others emphasise, this requires considerable coordination and effort which limits all services and, due to costs, must be achieved by the beneficiaries (SBKSi9; Ei3; Ei11; Ei21). This was largely solved, and associated tensions mitigated from tasks not being equitably distributed, by all groups comprehending and participating (Ei15; Ei3; Gellner 2007: 44) through ongoing negotiations and learning in practice. It represents the work and iteration involved in developing effective cooperation, collective action and inclusive development (Child et al. 2000; Ostrom 2014). Conducted as a multi-dimensional, ongoing process, however, it manifests as being able to engender key sustainable development 'assets', including labour, finances, coordination and cohesion (Law 1999; Birkenholtz 2007).

These outcomes are also evident in Jaidi and Khimti. Its lesser emergence in Khimti may indicate that cooperative practices may evolve more extensively when necessary meanings and competencies are more inclusive, when communities are collectively incorporated from the onset and the influence of scale (Norris et al. 2008). Comparing Sisuwa-Bala and Jaidi to Khimti, for instance, reveals that the idea, intentionality and a greater proportion of the planning and resources originated from the communities in the former cases, rather than externally, and that the communities' key interpretations - especially expectations and attitudes - were also more conducive for collective action from the inception.

These conjectures are commensurate to dichotomies in other rural services, such as effective road maintenance in Nigeria yet absent in East Africa and Ghana due to differences in community practices and their attendant social meanings, such as responsibilities and perceptions of ownership (Airey and Wattam 1998; Porter 2002). This signifies problematics for interventions involving actors from contrasting positionalities and inclusive interactions throughout the project-cycle to mitigate these (Klimpt et al. 2002; Boxelaar et al. 2006).

¹³⁷ (Stressed further by Estache & Fay, 2007 and Gurung et al. 2011). Although donkeys are an effective means of transporting goods where lack of roads prohibit motorised transport, especially in high relief terrains, they are unsuitable for carrying fragile, cumbersome or particularly heavy items (Keyserlingk 1999; Hilling 2003: 303; GoN 2013). This precludes vital parts, including PV panels, circuit boards, poles (transformer, transmission), generators, gear box and control panel units (CPU) (SBKSi17; 18; Ei22).

The case studies indicate, therefore, that including the common elements, processes and structures of a community's practice in project management may engender advantageous collective support, control, modifications and productivity rather than resistance and exclusive governance and consumption that extensively defines management failures (Chaskin 2001; Wade 2002; Wates 2014). The case studies also signal that thinking of management in terms of social practices helps reveal interdependencies of these processes and structures whose specificities may vary socially, spatially and temporally, yet by developing routinised commonalities within and across groups, such as unified demand, feelings and ways of communicating, enables effective participation, management and intervention (Boorman and White 1976; Radwan 1998; Bresnan 2003).

This allies with others highlighting the importance of the performance, relations and details of routines for the ebb and flow of innovations, social activities and development (Shove and Pantzar 2006; Abell et al. 2008). Modalities centred on routines and what binds them, therefore, may offer persuasive means to overcome collaboration and sustainable development constraints (Hofstede 1980; Turner 1994: 510; Blunt and Jones 1997). We explore this further in the following section by illustrating how modalities can more actively develop these and the value of attentiveness to pre-existing dimensions upon which they rely.

6.3.2. Management via pre-existing skills, meanings, emotionalities & procedures

The centrality of elements, processes and structures of practice to the effectiveness of electricity management presented in the previous section indicates that aspects for enabling and enhancing intervention management are prefigured by the contexts within which they are located and influence. It suggests the value of considering the nature of community practices to gain a deeper understanding of what constitutes these contexts and how intervention approaches may align with them to be more effective. This section elaborates this by presenting four primary ways the community approaches became compatible to their settings and thereby supported the emergence, continuation and expansion of supporting practices that augmented their managerial and sustainable development efficacy.

These examples are then reinforced by presenting a notable feature of the community contexts that was missed by the approaches yet manifest as able to further support the electricity management. The five examples show that social bonds, structures, learning and

practices are mutually reinforcing and intervention approaches attentive to these can significantly enhance the management and effectiveness of interventions (Friedmann and Abonyi 1976; Pinto and Slevin 1987; Jarvis et al. 1998).

The first is aligning with pre-existing norms of community management. In all the case studies, the cooperative structures initiated by the project managers resemble the extensive remote community convention in Nepal of resource and service management via local community groups managing community practices. Examples include forestry, irrigation, drinking water and school governance (KKS_i2; Ili₃; Adhikari 2000). These relate to both higher and lower-level institutions and their practices, from formal state regulations to intra and inter community politics, rights, needs, skills and roles (KKS_i2; KKS_i4; KHH_i3).

By using these structured conventions of cooperative working, the project managers were aligning with key features of the project setting that constituted socially expected, valued, capable and multi-level aspects of everyday life. These normativised features and ways of working subsequently supported the uptake of the management requirements by providing preformed rules and resources and requiring fewer changes to highly embedded routines for which no single actor is responsible (Voronov and Vince 2012). This was the case for monitoring, reporting, payment and labour requirements of the project management mentioned in the previous section. It also bolstered other aspects that constitute barriers to rural project management, including their socially perceived legitimacy (Hollander and Leroy 2001; Woolvin et al. 2012), and demonstrates the second key way the managerial approach aligned with and developed pre-existing practices.

Legitimacy was developed through the projects utilising the respected community practice of democratically appointing committee members (JKS_i3; JHH_i2; SBHH_i6). The elections were deliberately conducted at sub-village level to further conform to commonly understood and valued procedures. Moreover, the decentralised approach enhanced the degree of social interactions between the community and candidates, augmenting awareness of candidate capabilities, mutual trust, responsibility and “raising the voice of the people” (e.g. KHH_i7; JHH_i7; SBKS_i3). This promoted committees composed of the most capable people rather than misinformed voting or pre-selecting partners undemocratically (Blowers 1998; Ottaway 2001). The social closeness also enhanced subsequent representativeness, transparency and responsiveness (JHH_i7; SBKS_i3; Gaventa 2004; Chou et al. 2009) and the committee and election method was considered as “perhaps the best way for sustainable development” by community members, managers and institutional experts alike (KHH_i5; JKS_i1; Ili₉).

The responsibility and representativeness bolstered by the locally democratic method, practices and related social bonds (including familiarity, trust and understanding), stimulated and reinforced certain desired actions that maintained the effectiveness of the management (Galston 1998; Becker 1999). This included commitment to both salaried and unsalaried managerial practices despite the demanding roles and prospect of receiving higher incomes for doing the same work elsewhere (KHHi5; JKSi1; SBKSi3). These common barriers to sustainable management,¹³⁸ were overcome by the social bonds between the staff and community and were co-dependent on the project approaches augmenting them (Woolcock 1998). The active utilisation of these, enhancing cross-stakeholder interlinkages, interactions and agencies (Doz and Hamel 1998; Scholz and Lubell 1998), echoes descriptions of the effectiveness of approaches mobilising group norms and bonds as “constraining preferences” to assure and enhance certain actions (White and Runge 1995; Rao and Walton 2004).

Social ties, trust, skills and confidence promoted by social engagement through everyday practices thus signify contingent means to mitigate conventional barriers (Seyfang et al. 2014)¹³⁹, whilst still providing sufficient institutionalization for effective governance, problem resolution, capacity building and ensuring obligations (Roberts and Bradley 1991; Farazmand 2004). Although the development of social ties were constructive and largely positive in the case studies, the highly contingent nature of this is stressed. Social ties and structures are seldom equally constructed or impacting, cooperatives are rarely fully and inclusively cooperative, and there are different degrees and positions of knowing, participation and gain in all groups and ‘communities’ (Arnstein 1969; Cleaver 1999).

Consultation with local, district and national NGOs indicated, however, that external input can support this process and ensure committees do not reflect entrenched inequalities, elite capture or “political influence” (JKSi3; SBKSi7; SBKSi8). In Sisuwa-Bala, for instance, AEPC’s community mobiliser and EcoHimal “were important for developing community understandings of the foremost importance of electing according to capabilities (SBHHi9). The third prime method the project approach enabled effective management through utilising situational aspects was developing pre-existing capabilities through daily practice. Elected members of the communities, for instance, performed maintenance across the case studies. The local selection process supported the appointment of the most capable community

¹³⁸ (See also, Morris & Hough 1997: 2; Frank 2004; Cleaver 2005; Tencati & Zsolnai 2009).

¹³⁹ E.g.s include contracting weaknesses and cumbersome, unenforceable or absent legislated regulations and means to enforce them (Gray & Wood 1991; Hartman et al. 1999; Armanios 2012).

members. The capabilities were then actively developed through preliminary formal training and ongoing “experience and learning” (JHHi2; JKSi3) “over the years of doing it” (SBKSi3; SBKSi4). This capacity building was considered vital by all the stakeholders for the management, presenting ‘learning by doing’/‘using’ via long-term practice performance as formative for enhancing project management (Arrow 1962; Lundvall et al. 1988). This means of learning is discussed further in the following chapter in relation to its enhancement through teleoaffectivities but was actively boosted by the approach to support the project by a fourth method: inter-committee working.

In all the case studies, inter-committee working, through community members having roles in multiple committees, amalgamated the individual and collective capabilities of the committees and members through improving practice coordination and learning. The dovetailing of committee practitioners in Sisuwa-Bala, such as certain members in education committees, electricity management communities and financial service committees, for example, occurred “to help the micro-hydro project and helped overcome resource and coordination constraints” (SBHHi15). It succeeded and simultaneously abated issues of low commitment and disruptive interests related to overlapping roles because all committees shared an overarching intentionality of community development (SBKSi1; KKS7; KHHi1, cf. Prahalad and Hammond 2002). Consequently, considering possible group membership overlaps supported by shared goals and responsibilities indicates a means to enhance existing resources for sustainable development (Ili1; Gustafson and Fagerberg 2004; Mansauri and Rao 2004). This may be especially valuable in areas where conventional resources are limited (Wiggins and Shields 1995; Senkul et al. 2002).

The final point to make in this section is that although in the above ways the projects actively aligned with and developed prior aspects of the communities’ practices, there was a notable example where a key feature of the social context was overlooked that signifies a missed opportunity to enhance the project management. It also provides wider insights. Throughout the communities, there were electricity management practitioners ‘outside’ the official mechanisms (Young 1991). They performed energy-access supporting practices through their informal social networks that compensated for deficiencies in the established modality. This included providing services more quickly and cheaply than official staff, such as household wiring and repairs, and completing valuable tasks insufficiently provided through the official channels, such as household-level capacity building for self-maintenance (SBHHi3; SBHHi17; KHSi3). A recipient of these services exemplifies their value and mechanism further:

Our SHS doesn't work for 15 days on average per year but this could be more as 16-18 times a year it stops working but my uncle fixes it. Others in the ward have these problems and he fixes it for them because we all know each other. He also teaches us how to use and manage it better, especially his friends and family (SBHHi18).

The performance and effectiveness of these practices reveal the value of pre-existing capabilities, informal structures and intimate bonds and that practices may emerge through these that are unanticipated yet influential (White et al. 1976: 769-772; Lave 1995). Firstly, the unofficial practitioners conducted valuable practices for the energy project that emerged informally within common routines, showing the value of allowing management strategies to be adapted through mundane ways of 'making do' (Lévi-Strauss 1966b: 17; Brown and Duguid 1991: 47). The community members also illustrate that this improvising 'muddling through' is catalysed by pre-established social bonds (Lindblom 1959), reinforcing valuable practices through routine kinship networks, amicability and moralities embedded via mutual "exchange and commensality" (Appadurai 1988: 24).

The examples indicate that social relations, meanings, feelings (friendship, trust, neighbourliness) and practices are contextually co-produced in a relationship that may bridge development gaps by reinforcing certain forms of behaviour and exchange (Davenport 1996; Stenson and Watt 1999; Thomas and Twyman 2004). Such co-evolution reinforces the value of ongoing collective inclusion, evaluation and project modification (Folke et al. 2005; Jentoft 2005). By actively facilitating this, consisting in each case study of at least two "local men who acquired the skills by working in the same field before" (KHHi9), local aptitudes and innovations may hence be more fully harnessed to improve development projects (Douthwaite et al. 2002; Lever 2005). This may be aided by supporting and integrating informal practitioners and unexpected actors within management strategies (Mort 1989: 166) and maintaining inter-actor activities to ensure lessons are shared, whilst fostering capacity building of marginalised groups in and for these activities to nurture equal lesson sharing, participation and outcomes (Murphy and Bendell 1997; Leach et al. 1999; Lasker et al. 2001).

Moreover, the oversight of these practitioners affirms the value of early and ongoing monitoring to ascertain influencing phenomena, actors, resources and alternative delivery pathways (Borzell and Risse 2005; Bailey 2005). Similarly, the inability of many householders to manage their energy systems, underscores the common dysfunctionality of rural energy

systems and the need to overcome specific capability constraints to remedy this (Huanyun et al. 2013; Yaungket and Tezuka 2013).

Utilising the social bonds, resources and self-sustaining effects of pre-established routines and supporting already capable and predisposed community members indicates an effective method for achieving this (Valente 2012; Percy-Smith and Burns 2013). The last two subsections thus illustrate how elements, processes and structures of practices constitute highly specific, embedded and presupposed contexts for interventions that can be actively aligned with, and promoted by, the project approach to enhance its management and outcomes. By turning to Khimti specifically, we now explore to what extent these findings extend to much larger-scale projects.

6.3.3. Co-management of medium to large-scale energy projects

The Khimti case provides an excellent comparison with the other cases to explore to what extent the above insights hold for interventions involving especially unequal actors. The 11-village electricity project is managed by the private limited community cooperative, KREC, via a community shareholder model that constitutes the first such model in Nepal that maintained significant rural energy access in a context characterised by energy management failures and limited development outcomes (Fulwood et al. 2000; Sovacool 2012). This subsection illustrates how this was achieved and could be further improved primarily through the following four key mechanisms:

- 1) Interactive capacity building in cooperative groups;
- 2) Capacity building is socio-technical;
- 3) Ongoing social interaction in these groups to maintain practice developments;
- 4) Community “buy-in and end-use mind-set” essential: Income-generating electricity practices key.

These four points interdepend and so will be discussed collectively. KREC's management commenced from 2010 after 2 years of HPL iteratively increasing levels of community management responsibility, training and organisational structures (Ili1; KKS3; KKS5)¹⁴⁰. These efforts were focused on KREC. The other community electricity groups are ward-level groups. HPL's long-term, iterative capacity building method through the cooperative KREC was fundamental to the community management (KKS3; KKS5). As committee members explain:

Although most of us in the committee have prior electrical or managerial experience, HPL's training and making the committee and facilities allowed us to manage the project (KKS3).

We are still learning things for the management but the main requirement for the long-term management is not technical, it's what the community does (KKS7).

The committee and HPL staff highlighted that the prime management dependency on what the community does relates to the income KREC receives from the community for maintenance and reinvestment requirements to sustain the energy access. This income is via electricity consumption tariffs from the 7860 households and a nominal fee for becoming a shareholder of KREC. The income needs to be raised to enhance the management viability and the principal requirement for this is for the tariff rate to be raised above its current minimal amount (40% of national-grid price). Although the community could afford this, social meanings, sentiments and practices opposed paying higher rates and using more electricity.

These included underestimations of the costs required to provide and sustain energy access, interpretations that HPL was a wealthy company so they should provide free electricity and notions and feelings of natural resource ownership and hence a right to free electricity produced from them (KHH3; KHH7). This 'right' substantiates interpretations of justice as embedded in practices (Rawls 1999: 112). Other important and related dimensions included a high demand for electricity yet limited "buy-in and end-use mind-set", community engagement with the project, "collective feeling of ownership", misperceiving electricity's potential and minimal income generating electricity practices (Ili1; KHH1; KHH11).

¹⁴⁰ While some external support remains for the villages, HPL now "largely plays only a mentoring role, only giving support when requested and when KREC cannot do it themselves" (KHH4; Ili1).

The result was user-side high electricity wastage, non-conformity to recommended practices and only partially perceiving they had a role and potential share in the success of the project and that it belonged to them. Examples included using inefficient appliances at peak load times, namely electrical heaters, not using the electricity substantially for income generation practices, which would boost electricity consumptions, expenditures and benefits and not collectively attending project meetings. Social meanings alloyed with feelings appeared to undergird these outcomes. It allies with others revealing the importance of these being consistent between stakeholders for effective partnerships, collective action and community projects (Falk and Kilpatrick 2000; Rao 2003; Montgomery et al. 2009). Zooming across the three case studies highlights the influence of the project approach and actors involved on the degree of collective meanings, feelings, practices and development outcomes.

In Jaidi and Sisuwa-Bala, for instance, a small cohort had low expectations of the community project and thought other actors should provide electricity without their input, resulting in them refusing to contribute, not receiving electricity and the community-wide delay of energy access and benefits (SBKSi3; SBHHi8). Interpretations of capabilities, feelings of justice and expectations of free provision signify the effect of such social dimensions on limiting investment and support and the value of actively aligning these for all actors (Rosenberg 1974: 534-5; White 1996). In Khimti, however, HPL anticipated that their contrasting identity¹⁴¹ would engender “unrealistic” local social expectations that would hinder the project unless “managed” (Ili1). It consequently designed an approach focused on ongoing inclusive dialogue and activities aligned with valued community groups, languages, settings and leaders (Ili1; KKSii2; cf. Burr 2013). This aimed to transform community expectations to “feeling ownership, responsibility and capable” (Ili1). The negligible local management issues common in Nepal and elsewhere, such as resistance and theft, suggests some success achieving this and interpretations as collectively and experientially conditioned (Battachayra 2006; Adhikari and Godley 2010; Yadoo and Cruickshank 2010).

Yet practices, feelings and meanings associated with the energy projects for the respective societies and sub-communities within them were not fully conducive to supporting the projects and their potential development impacts. It suggest that mediating these is a

¹⁴¹ Corporate, international, high budget. The anticipation resulted from HPL’s and NORAD’s prior experience in similar contexts and evaluation of the socio-economic and political context of the region and local needs, understandings and power relationships (Ili1; KKSii3).

differential and long-term process (Ostrom and Gardner 1993; Blom et al. 2010)¹⁴². The community's emphasis on the size of HPL indicates that this may be compounded when these are particularly engrained and contrasting, such as positionality and notions of justice (Plough and Olafson 1994; Conway 2012). In discussing KREC's financial management, HPL's Nepal director illustrates these points and the importance of common meanings for collective action further:

They don't yet believe they can really gain from this. The householders would rather have free energy than to see wider development through the cooperative. It's not in their mind-set to think their cooperative could develop more micro-hydropower, funds and so many good things for the whole community, but they really can. Instead, they expect outside support (Ili15).

The dimensions highlighted here, including social beliefs, notions of independence, self-sufficiency, saving and reinvestment are commonly highlighted in the community development and energy access literatures as significant for collective projects and action (Ostrom and Janssen 2004; UNDP 2012). The majority of the institutional stakeholders in Nepal accentuated the importance of these for energy access management. This substantiates that expectations of free energy may preclude community interest in doing so *if* they misperceive its relative advantages and that such expectations may translate to the payment, upkeep or payment-in-kind of modern services in general (Mosse 1997a; Katz and Sara 1997). Such meanings, however, deter private investment and hence energy provision (Ili9; Ili17; Ili20; Sovacool 2001), yet may rather reflect structurally unequal "capacities to aspire" rather than low demand and need for certain services and development outcomes (Appadurai 2004).

Social meanings, action and structures thus appear interrelated and significant to project management. This commands further attention. In the rice cooker non-appropriation case discussed in Chapter 5, meanings of 'free' energy were constructed and embedded through daily perceptions, narratives, roles and embodied experiences of fuel and labour abundance and exclusive costs. In the case Mr Larsen refers to, however, the meanings are not all constructed and reinforced through directly experienced, habitually enacted practices as community-led development had negligible common precedent for the communities. The general expectation of long-term external-support in the Khimti project and limited sense of ownership and supporting actions thus indicates the contextual specificity, politics and

¹⁴² Links back to value of interlinking actors through participation from the onset of projects. This is widely emphasised in development and sustainability literatures (e.g. Farington & Bebbington 1993; Johnson & Osbourne 2003; Berkes 2004; Hindmarsh & Mathews 2008; Santiago & Roxas 2012).

communicability of meanings and the need for all actors to be able to mediate and meld the forms and outcomes of meanings within their daily lives (Wenger 1998: 2000; Agrawal 2001).

Exploring the 'mind-set' as prefigured by social practices that influence future actions indicates further causes (Heidegger 1985: 217). The communities consist primarily of subsistence farmers with biographies uncondusive to the registers of meaning and actions demanded of them to manage substantial funds, income streams, investment options, stakeholders and budgets, inter alia. Their experiences of other development services being provided, both in the community and elsewhere they know, with no community requirements and many of their community development cooperatives folding after 2-3 years accentuate this (KHHi5; KKS9). The communities' practices, therefore, the context for the translation of any form of knowing to practical intelligibility and action, render the communities unable to operationalise the "business mentality" demanded without additional, practice-specific capacity building (Habermas 1991a; Wenger 1998: 289).

Contrary to adopting sustainability-enhancing practices, therefore, routine structures developed over time may lock communities into particular meanings and actions, such as "asking for external donations instead of self-managing and paying only a minimum for electricity" (KS1; Meinig 1979a: 44). Such embedding shows the challenges of change are systemic and augmented in societies where the requirements are not norms (Coleman 1990; Agrawal and Gibson 1999). It similarly underlines the importance of long-term strategies considering systemic dynamics and norms for sustained and wider impacts that may contend with aspects that are considerably shared and coupled with others (Higgins and Lockie 2002).

Mr Larsen suggests that these include conventions of planning and development, highlighting that "the communities don't really think ahead to help themselves" and "these social aspects are the biggest challenges of working with communities" (KS1). This is consistent with others indicating the relationship between systems of meaning and action as among the most prevalent challenges of large-scale community projects (Cialdini 1993; Fischer 2006). The case thus presents the requisite of not simply aligning meanings between actors for improving participation inputs and management outcomes (Chotthong and Aksornkoe 2006), but also ensuring actors can mobilise, "interweave" and negotiate these within their own routines of practice (Wenger 1998: 2002) and domains of power (Mosse 2001: 388).

Scrutinising the dimensions of social practices may thus indicate overlooked constraints to recommended behaviours, such as in cooperatives, and avenues for supporting them

(Ranganathan 1992; Balint and Mashinya 2006). The case studies signify this further through a deeper exploration of the challenges they encountered that influence the cost, impact and scalability of projects. We now discuss these through two interrelated barriers encountered in all case studies and limited in the literatures: dealing with third parties and the demands of practices.

6.4. Collective management trade-offs?

6.4.1. The pragmatics of trade: negotiating practice gaps & inequalities

The case studies demonstrate sustainable management challenges as systemic. These included high transaction and repair costs (Kayizzi-Mugerwa 1998; Maxwell and Riddell 1998). Consistent with Khwaja (2001) and Kapour et al. (2009), key causes were trading capabilities. In Sisuwa-Bala, these included coordinating an assortment of sub-contractors for the multiple requirements of the construction and maintenance of the project (KKS_i4; Pokharel 2013a). In Jaidi, crucial problems resulted from receiving and accepting lower quality components than ordered for want of knowing about the quality of components and that supplier misdemeanors could be challenged. Chhisti's EMC chairperson articulates this:

The committee were inexperienced. It affected equipment and installation, including household wiring, switches and transmission poles (JKS_i8).

Practice requirements may thus be especially constrained for novel practices and actors (Putzel 1997; Petty 2003). Similarly, established actors will have already acquired the requisite capabilities and thus be systemically advantaged (Sen 1997; Ribot 1998). In Jaidi and Sisuwa-Bala, the result was frequent electricity shortages and complaints of inaccurate tariffs due to faulty meter boxes (JHH_i14; SBHH_i5). The lower quality components undermined community needs and required replacement at a greater frequency and cumulative cost than higher quality counterparts (JKS_i5; SBKS_i6). The inexperience thus translates to positionality-related (in)capabilities, consumer-producer disconnects and power relations that extend development limitations (Bebbington 1996; Lyon 2000; Raz et al. 2002) and disadvantage rural communities (Morris 1997: 2; Ika 2009). Considerations for mediating these are highlighted by a SHS provider serving Sisuwa-Bala's district:

Solar companies should hire locals for technicians but it is challenging to find or replace capable persons in remote communities. Another challenge is overcoming their lack of professionalism, such as keeping their business agreements. They accept the job and take payment and training but then they sometimes don't work. If we took it to the police they would take too long and too much expense. We trained 9 technicians but only 5 continued working, costing me 15,000 NPR (SBKSi18b).

This represents that the necessary skilled labour, meanings, supply chains and regulatory frameworks are often limiting factors for enhancing services, especially for the private sector (Zerriffi 2011b; Nygaard 2013). The SHS provider thus emphasises the importance of systemic support to overcome this (Diallo and Thuillier 2004; Ika et al. 2012). As Potter and Brough (2004: 339) attest, this widely influences development failures and necessitates developing multi-level capacities and constitutive practices to overcome investor perceptions of inordinate risk and bureaucracy, and supporting the dynamism required of sustainability interventions (Sadeh et al. 2006; Schillebeckx et al. 2012; Zwikael et al. 2014).

Overcoming this requires actors in the 'practice system' mutually mobilising the processual and structural assets and interactions required to engender the requisite transformation and use of resources (Wenger 1998: 138). As the solar home system (SHS) supplier and others argue, this includes government regularly monitoring and enforcing 'Codes of Practice' to bind technicians and suppliers to common frames of action (Martineau et al. 2002; Dovlo 2003). They also advise for development organisations to facilitate this institutionalising and for this to include citizen groups (Ili8; Ili23; Chaurey et al. 2012) and "state guarantees" (Ili3). Sustainability thus occurs within a multilevel architecture requiring coordinated practices to renegotiate the context for community and investor confidence, competencies and action (Zuzhang 2014: 214; Williams et al. 2015). This coordination enhances performance and project optimisation (Mainali and Savailia 2013), yet, as the "inexperience" highlights, develops over time (Hoffman 1959; Longoria 2005). Effective management, therefore, is necessarily a collective, long-term task (Gladwin et al. 1995; Poteete and Ostrom 2004).

The disadvantaged communities and community groups in this environment, substantiate however, that the context, elements and practices are unequal. An inequality structured in terms of the social groups position to the elements, relations and routines of practice. This 'situatedness of interaction', as Giddens (1984: 332) helps us realise, is a product of actions in concrete situations that are available for participants for their own recognition and use. Revising disadvantages to this thus requires interventions to be equitably legible, performable

and negotiable across social orders and their properties of institutionalisation (Wenger et al. 2002; Mantere 2005), and through ways that account for performances and their dimensions and practitioners not being fully deliberate (Kelley 1990; Brown and Duguid 1991: 47).

To this end, as Yi (2002: 115) also finds, social organisations and workings in the case studies appeared to mediate these through their conducts and relations. This enhanced inclusive, tangible and symbolic ties and outcomes, including of participation, consumption, management and benefits. It affirms the value of social contracts, emotional bonds, experiential innovation and collective learning, and mediating these interdependencies to reveal and reform development constraints and inequalities (Hosking and Fineman 1990; Gidwani and Reddy 2011: 1640). Inclusive activities and structures may thus augment the coordinated resources, interactions and results required for sustainable development (Schmidt et al. 2013; Urpelainen 2014; Nasirov et al. 2015).

Management, therefore, requires interactions that may strain the experiences and capacities of local actors (Olsson et al. 2004). These “pragmatics of trade” (Sahlins 1981: 45) and “economics of practice” (Bourdieu 1977: 177-8 183) highlight interdependencies wherein situated capabilities marginalise certain groups and practices and require interconnecting to facilitate alternative courses of action¹⁴³. By examining the management difficulties of both the community committees and SHS providers, we further see that these interdependencies are simultaneously social (e.g. “professionalism”, inexperience, regulation awareness) and physical (meters, poles, remoteness). Effective management is hence social-technically dependent through the specificity of practices. Energy access and management success are thus provisional outcomes of how differential practices and practice relations are negotiated.

Indeed, the case studies illustrated that the community groups became increasingly competent in negotiating the exchange constraints and managing the project (JKSi3; 8; SBKSi4). This included knowledge of the market, supplier and regulatory environment (Hartman et al. 1999; Selsky and Parker 2005). Examples included the EMCs in Jaidi lobbying with the NEA to improve their transformers and maintain their obligations and Sisuwa-Bala’s EMC enhancing contractor and product tendering and selection capabilities due to greater (JKSi2; SBKSi3). These developed through task and context-specific experience (JKSi1; JKSi3; SBKSi3; SBKSi4), signifying that capacity building can enable communities to manage and up-scale development projects even to the extent of managing corporate and statecraft,

¹⁴³ Further highlighted by the disconnects in the case studies occurring despite inter-actor collaboration being hallmarks of their related policies & institutions (AEPC 2012; Ei14; Ei22).

mobilising resources and reducing transaction costs (Fleck 1981: 92; Carlsson and Berkes 2005). Experiential, iterative learning, therefore, recast the “line of action” through co-evolved capabilities, meanings, institutions and so forth in ongoing social practices (Geertz 1973: 448; Hascher 2010). This underscores the need for long-term, multi-level approach monitoring and co-evolution in practice to support effective participation and development¹⁴⁴.

Capacity building to accelerate this equalising effect could hence reduce the structured imbalances that hamper sustainable development (Bebbington 1999; Leach et al. 2012). The community training required, therefore, signifies a demand that represents a ‘trade-off’ between initial resource-input and overall development output (Ika et al. 2010; Rondinelli 2013: 7). The analysis suggests the value of practice-based capacity building to augment sustainable development and account for the unequal and uncertain (Thomsett 2002: 175; Rees 2013). The observed inconsistency in effective consumption and management practices relating to pre-existing capacities highlights this (Arrow 1974; Leach et al. 1999), suggesting co-evolved goals, pathways and reward systems reflecting the multiplicities of conventions and change (Letcher et al. 2007; Murni et al. 2010)¹⁴⁵.

6.4.2. The constraints of time: Practice temporalities & demands

The previous chapter signified the importance of considering temporal dimensions in the costs, modification and constraints of practices. The community management cases indicated this further. Examples include the relative effectiveness of the informal maintenance practices and the communities’ preference for them partly because they are “faster” (7.3.1); the official regulations for local energy suppliers taking “too long”; HPL’s gradual capacity building approach and the increasing capabilities of the committees. In emerging as a consistent factor throughout the management modalities and impacts, indicated as significant for social life and sustainability in social constructivist scholarship yet neglected in management discourse and praxis, it is now pertinent to consider what constituted this temporal importance and what further implications it may suggest for enhancing sustainable development pathways¹⁴⁶.

¹⁴⁴ (Davidson 1989: 17; Scott 1993; Lasker et al. 2001; Van Huijstee et al. 2007; Glasbergen 2007b).

¹⁴⁵ Stressed further by Cohen & Levinthal (1990), McGrath (1991), Venkatraman & Venkatraman (1995), Diallo & Thuller (2004), Stirling et al. (2007), Baumgärtner & Quaas (2009), & Ika et al. (2012).

¹⁴⁶ For an extensive oversight of the importance of the temporal domain for society and daily life see Shove et al. (2009). Critiques of the neglect of time in development project management include Ohmae (1989), Crawford & Bryce (2003), Ingirige & Sexton (2006) and Barnes & Browne (2011).

A common management complaint attributed by the community and technicians to limiting the energy access was “repairs take too long” (JHHi5; SBHHi9; KHHi1) and “we don’t have enough time to make repairs more quickly” (JKSi4; SBKSi4). This was explained in Chapter 5 as a product of intersecting practices competing with practitioners’ resources, including time, to conduct additional practices or modify them. The recruitment to meetings attests this further:

It would be better for the project if more people participated but most of the community cannot spare the time from farming for meetings (KKSii4).

Time is thus a limiting factor of practices, contributing to show how actors, functions and capabilities are multiply conditioned (Breedveld 1998; Cass et al. 2005). The notion of a timeframe within which practices (e.g. electricity repairs) should be conducted, however, suggests normative framings collectively transmute and modify interpreted needs, demands and ‘oughtness’ of practices and subsequent conduct (Lefebvre 1991; Schatzki 2002). All stakeholders, for instance, came to increasingly deem electricity and hence rapid repairs as “vital” (JHHi1; SBHHi3), requiring “better time management” (JKSi3), “more advanced training” (SBKSi3) and “more labourers” (JHHi7). As the nascent uptake of electric mills displacing slower alternatives and rising consensus that low quality component-induced faults “were a waste of time” that needed to be addressed further attest, the emergent electricity practices thus both reconfigured the communities’ spatial-temporal norms and were constrained by them (Shove et al. 2009: 39).

Looking at this from the technicians’ routine patterns suggests further insights into the effect of time. The informal technicians expressed that “doing these things is easy because we fit it into our normal day as we do other tasks” (JKSi10; SBKSi4), while in all the case studies the official technicians were multiply tasked and felt “overworked” and “stressed” because they had “not enough time” to complete them (JKSi4; SBKSi3). Indeed, the dispersed, multiple and relatively recent nature of the official technicians duties rendered them less temporally and spatially coordinated with their other daily practices as compared with the informal workers. Moreover, the unpredictable spatio-temporal requirements of some of their duties, such as responding to transmission faults throughout the entire project area¹⁴⁷ limited the ability of the practitioners to coordinate their practices. This inability limited the effectiveness yet also conflicted with the coordination of pre-existing practices that have their own spatio-temporal rhythms, such as daily meals (Southerton et al. 2000; Allen 2011).

¹⁴⁷ A 2 day to 4-5 day walk in Jaidi and Sisuwa-Bala, respectively.

This meant the technicians either had to ensure they were at home at two specific times per day, enhancing their daily travelling times and limiting their maintenance work, or forego a definitive cultural practice and the wider wellbeing and functions it produces. By contrast, the informal technician's practices related to pre-existing temporal and spatial arrangements embedded within the cultural fabric due to their social nature (Cash and Moser 2000; Clark et al. 2000). This enabled them to be conducted within the patterns of daily life in concert, rather than in tension, with fulfilling other valued functions, such as eating, socialising, maintaining familial ties and moral economies (Ricoeur 1992: 207; Lund and Gronow 2014). Indeed, the social association of such functions with specific temporal slots reaffirms the extent to which individuals have limited discretion to innovate and manage differently.

The practical value of this is threefold. Firstly, it suggests that aligning new practices with existing routines of ordered practices may support innovation adoption, effectiveness and maintenance (Elias et al. 2003; Elzen et al. 2004). Secondly, it signifies the converse may have the opposite effect and jeopardize the fulfilment of valued functions. Thirdly, it indicates that coalescing necessary management functions with valued social functions, such as maintaining relations, may make their emergence, completion and effects more "easy", manageable and inclusive (Tencati and Zsolnai 2012). Interventions should thus consider time as an essential and limited ingredient for sustainable development whose continuous structuration, negotiation and redefinition is situated and manifest in contextualised social action and inaction (Suchman 1993; Adam 1998: 11). This is reinforced by a peripheral householder indicating that the contextualisation includes the interweaving of collective temporalities and sensibilities in the (non)performance of electricity practices:

In winter the water is very high and breaks the canal. It stops electricity for 60-65 days per year and makes us scared to use it (SBHHi9).

Constraints and conventions thus co-evolve in the situated interrelation of activities that predicate and may mitigate consumption, managerial and sustainability limitations. This was further manifest in the requirements for timely repairs, which included monitoring, ordering, stockpiling, quality checking and implementation in conjunction with existing demands and additional tasks (JKSi1; KKS4; SBKSi3). The requirement for the official technicians to do all these thus compromised their performances and perceived "quality" (SBHHi4; SBHHi7; JHHi1). Yet the perceptions and requirements also relate to location within a wider socio-technical

context (Walsh 1977: 41). As the above participant signifies, this may include high fluvial discharges, electricity blackouts, fear, non-use, inexperience and narratives of floods that enculture fear of natural calamities (SBHHi9)¹⁴⁸.

Specific socio-physical contexts and one's location in it thus impact on practices, temporal demands and interventions, highlighting the unequal distribution of resources, the specificity of management requisites and their diverse interdependencies (Adger et al. 2005; Valenete 2012). The example also underscores the requisite of ensuring all persons within a project can use a service or gain from a development intervention provided and circumventing the false economy of lower initial cost components and evaluating uptake through short-term measures of income or purchase rather outcome distributions over time, space and project phases (Pachauri and Spreng 2011; Yadoo 2012; Khandker et al. 2012).

Assessing how diverse groups, dimensions and inter-practice routines schedule, synchronise and delimit practices and practitioners may thus support interventions surmounting participation and management barriers (Smith 2000; Ika et al. 2012). The contrast between the informal and formal technicians suggests this would be further augmented by projects integrating a range of actors through multiple practices (Gonzi et al. 1995; Morris 1998). Indeed, for routine tasks and systems, such as household services and consumption practices, it may be especially valuable to include citizens as necessary management actors and equip them to do this effectively (Sen 1982; 1999c; Berkes and Ross 2013). Householders and technicians, for instance, commonly demanded greater capacity building for householders to manage their electricity throughout the case studies. It would reduce the fear-induced non-use and frequency of household-level faults that constituted a key component of the time-squeeze that encumbered the official technicians (JHHi3; SBHHi5; KHHi14).

Undermining time and the intersectionality of practices, however, are common causes of intervention failure (Gasper 2000; Southerton 2003). The log frame is archetypal of this, providing a 'snapshot' from one positionality, project phase and moment (Gasper 1997). Conversely, the thesis signifies social practices as a means to frame social temporalities in conjunction with the interactor bonds and activities necessary for the required legitimacy,

¹⁴⁸ Social interpretations, emotions & affects of floods & landslides were embedded & reproduced in Sisuwa-Bala through common stories, metaphor, religion & rituals (cf. Meinig 1999). It reflects the common disconnects between expected & encountered dimensions of innovations & its affect of limiting use (Bower 2004: 13-15; Reimann et al. 2008), which is, ironically, the prime process for rectifying the disconnect (Westbrook & Oliver 1991; Bendapudi & Leone 2003; Meuter et al. 2005).

trust and uptake for development efforts (Brinkerhoff 2002; Conrad et al. 2005)¹⁴⁹. The managerial interdependencies illustrated in this chapter depicts these as inherently co-constitutive (cf. Shove et al. 2009: 37, 47), supporting management scholarship that highlights the significance of interrelated social routines, temporal-spatialities, cultures, institutions and capabilities (Gittell and Vidall 1988; Ayas and Zeniuk 2001; Armitage et al. 2009; Berkes 2009).

The centrality of practice temporalities and practitioner time as critical to acting is also reminiscent of Park et al.'s (2012) consideration of time as constitutive of "practical capacity" and Baland and Platteau (2007) and Aldrich's (1972: 15) emphasis of 'personnel' time as core resources and constraints for sustainability interventions and routines. Others develop this further in showing the importance of time to how routines, knowledge, spaces and institutions develop, embed and interrelate (Silverstone 1994; Ika et al. 2012) and thus the uptake and effects of innovations (Hayak 1945; Nonaka and Toyama 2003). Participants' advice for enhancing sustainable development-orientated energy access reaffirms this (KHHi1; KKS4; Ili22). Jaidi's EMC chairperson recommends for instance:

Starting local energy access, income generation and financial service projects at the same time to help link and coordinate them as the activities are vital and support each other (JKSi3).

For the experienced chairperson, therefore, the interconnectedness of certain services is instrumental for enabling sustainable development where these services are absent and the temporal domain is key for engendering this. This recommendation of service complementarity and coupling for enhancing sustainable development is consistent with others (JKSi8; Ili4; Poulton et al. 2010; See also 2.6), yet more specifically highlights the contingent interdependencies required by underscoring the bundling and temporalities of specific services.

Energy access, income generation and financial services, for example, are the most essential interlinked trio for *enabling* capabilities to surmounting the prevalent barriers to sustainable energy access and development by mitigating electricity waste, limited management reinvestment and sustainability and low uptake of welfare enhancing practices (Chaurey et al. 2004; Hiremath et al. 2007; Cook 2011). Yet the informants substantiate a critical dimension for this understated in the current access narrative: these services are only *enabling* factors

¹⁴⁹ Also Heap (2000), Moran (2001), Vangen & Huxham (2003), & Hirsch & Meyer (2005).

for enhancing sustainable development: wider capabilities to *use* them for bolstering livelihoods and wellbeing are also essential (JKSi7; SBHHi8; Ili16).

Moreover, the recommended practice bundling and temporal consideration allies with commands for contextualised, interlinked and systemically reflective considerations of needs, capacity building and energy access pathways (Elkington and Hartigan 2013; Tenenbaum 2014). The importance and practical implications of this can be developed further by considering the interdependencies of practices in explaining a pervasive example of access challenges observed throughout the case studies: limited SHS management. SHS require certain user practices, maintenance and occasional component replacement to sustain effective electricity generation (Ili11; Ili29).

The case studies indicate that part of the reason SHS were often¹⁵⁰ dysfunctional was that although necessary institutional support was provided, basic practice requirements and constraints were not addressed, rendering the support ineffectual. An exemplar of this is the training provided for householders to maintain their SHS. Although guidance is relayed to the consumer by the seller during the approximately 45 minutes for the average rural purchaser to conduct the necessary form-filling and some advice is given when the mechanic installs the system *if* they are requested, the principal 'training' is through an informational poster, user manual and repair pamphlet (JHHi5; SBKSi18b; SBHHi14).

These are provided to the purchaser upon purchase and whilst legible - written in simple Nepali, simplifying concepts, and clear illustrations - and recommends the routine performance of multiple maintenance tasks, the information focuses on technical components¹⁵¹, their replacement and fault avoidance techniques. Considerations of repair practices and wider dimensions of doing, such as the necessary integration within socio-technical routines, for instance, are absent (Schatzki 2001: 104-105). Examples of this from the repair pamphlet include:

Problems with solar system. Change solar system.

Problem in controller. Change controller. (Dhaulagiri TLC 2013).

¹⁵⁰ Approximately 30% of the SHS were dysfunctional and a further 10% functioning sub-optimally (JKSi3; SBHHi14; SBKSi5).

¹⁵¹ E.g. switches, bulbs, fuses, fittings, wiring, charging indicator, controller, battery, junction box.

Examples from the user manual include those in Tabel 6.1.

Table 6.1. Recommended SHS user maintenance practices

Activity	Daily	Monthly	3 monthly
Clean bulbs.		✓	
Check charging indicator in the controller during battery charging.	✓		
Only use appliances when needed.	✓		
Check water level in battery and increase level if low.			✓
Clean panels with a soft & clean cloth & warm water.		✓	
Check screw and bolt of stand.			✓
Check wire fittings in switch to ensure they are not loose.			✓

Source: Translated from Nepali from AEPC (2013).

The habitual requirement of practices is thus nationally recognised by those advising certain management requirements, but how these interconnect, are communally enabled and relate to various other capabilities and constraints to perform them in conjunction with established practice schedules are neglected. From the first example, for instance, no indication of the know-how and know-where to “change the controller” and implications of this, such as temporal, financial and social costs, is provided in any of the documents or information provided. Indeed, the householders were unaware of these and where to safely replace and dispose of certain components, especially batteries (JHHi7; SBHHi15; SBKSi16).

Discerning simply the time and financial costs, however, requires a 2-6 day walk to the district capital at the expense of considerably localised daily livelihood practices (JHHi7; SBHHi15; SBKSi16). No helpline or interpersonal information was provided¹⁵² to enable householders to receive this and additional valuable information without going to the district capital to ask a

¹⁵² This standardised, inanimate ‘information deficit’ approach is reminiscent of the critiqued development model (Zander and Kogut 1995; Hutchins 1995; Marteau et al. 1998).

SHS provider. The result was householders seldom replacing dysfunctional SHS components and subsequent reduced rural energy access, despite a national policy to reimburse the replacement of SHS components (SBHHi11; SBHHi12; AEPC 2012).

The institutional and social action disconnect this illustrates is a common constraint to energy access and management (Pahl-Wostl et al. 2008; Wang et al. 2011). The requisites of the novel practices thus mismatched users' prefigured constraints and the diverse and situated interdependencies of these (Bulkeley and Mol 2003). Finally, the utility of the information for the users was dependent on conditions often limiting, including means to read, conduct the intended practices and embody their required meanings and skills¹⁵³.

Maintenance constraints may thus manifest locally yet are institutionally orchestrated (Montgomery et al. 2009), reinforcing the need for systemic support that match the specificities of practices and constraints of all social groups (Rose 1998; Franceys and Weitz 2003). Doing so may bolster transforming policies into 'meaningful information' and equitable action (cf. Bateson 1972: 489; Luhmann 1986: 103). The chapter thus demonstrates the imperative of considering practices in concert with their variously interconnected and contextualised requirements. Household, commuting and workplace practices, for instance, demonstrate highly socially sequenced co-dependencies whereby a change in one requires reordering or compromising other practices and elements of practice.

This encompasses material, organisational and teleoaffective considerations, such as the route, schedule and conforming to workplace cleanliness conventions or not (see 3.5), yet vary socially, temporally and spatially in the degrees to which they are possible and necessary (Watson 2012). Practices requiring tight sequencing to be optimal, such as medical practices being embedded in, and co-constituted by, the spatial configurations of hospitals to facilitate the effective provision of emergency aid, further signify the temporal significance and interlocking of certain practices (Shove et al. 2012: 86).

¹⁵³ All members of the case studies spoke Nepali, although this was not the preferred language for all groups & Nepali illiteracy rates for the population aged 5 years or over are 28-28.6% for the three case studies (NPC 2014a-c). The consumer information approach was thus not fully inclusive, yet not exclusionary to the degree Mansuri & Rao (2004) precaution with elites often being the only ones in rural societies able to read & hence directly gain the benefits of information provision. It is also pertinent to note that information delivery, as with any resource or service, does not equate to power to act differently.

The temporal-spatial interconnection of practices, therefore, are significant to the performance and coordination of practices and means through which they may be enhanced or induced. Indeed, the analysis suggests the temporal domain is a key component in the normalisation process that supports the uptake of innovations/interventions (Leibenstein 1976; Torchia et al. 2011). This process subsumes a routine's socio-technical requirements into the subconscious realm of everyday social life, thereby presupposing its continuance (Bloor 2001; Schatzki 2001: 104-105). Such co-dependencies signify that the patterning of daily routines does not just transform habits into practices (Turner 2001: 120), it constitutes the wider configurations they require (Foucault 1979: 138).

Consequently, as further developed in the following chapter, it is generally analytically and practically constructive to consider these dimensions as inseparable (Shove et al. 2012: 86). Secondly, only in interventions conforming to or remaking these interdependencies, requiring collective practitioners and their interdependent shared practices, time-spaces, rules, conventions, tacit knowledge, meanings, feelings and materialities, can required practices be socialised, widely appropriated, institutionalised and reproduced (Dreyfus 1991; Collins 2001). Failing to do so overlooks dimensions of daily life whose co-constitution may render them 'essential' to the society in which they are embedded and hence oppose change (Kingham et al. 2001)¹⁵⁴. Similarly, as indicated by the emergence of practices related to the electricity and their demanded management practices, the increased embedding of practices within the practice-landscape renders their routines increasingly 'essential' (Wittgenstein 1958: 242).

This expands solutions to the current high-level of disrepair and disuse of the SHS and limited participation in other advised managerial practices to collective efforts, structural revisions and exchange between multiple actors in ongoing practice (Appadurai 1986: 24; Desai and Imrie 1988). This closes the analysis of this chapter. The arguments discussed and implications will be now summarised before moving to the penultimate chapter.

¹⁵⁴ 'Essential' in terms of what new consumer expectations demand, as Grunert (2005) articulates, & that outcomes are a function of what systematised capabilities presuppose (Kleine, 2010: 679), made in collective routines that structure every dimension of their realities (cf. de Certeau 1988; Dematteis 1988; Banister 1994; 1999; Weick 1997) & delimit choice (Wagner 1976; Beck 2010; Giddens 2010). Compare also Strauss & Quinn (1977) and Schmookler (1993), reinforcing multiple interrelations - consumers, moral, political economies - that account for the situated practices of social reality.

6.5. Summary & implications

In considering energy access management, this chapter evaluated a pervasive caveat to sustainable development interventions. The analysis affirms communities can manage challenging services, partly co-create the conditions for their development, and better couple actors, impacts and response¹⁵⁵. For this, processes, components and structures allied with those normalised within a community's everyday life appear essential (Pinkerton 2011; Reckerton et al. 2011). These manifest through and are intrinsic to patterns of social routines that co-produce opportunities and constraints for sustainable development. These include the integration of diverse actors, inter-group collectivity and responsiveness to dynamics essential for managing the complexities and augmenting the outcomes of sustainable development (Morss et., al. 1975: 329; Keen et al. 2005; Rondinelli 2013: 183). The relative effectiveness of energy access management across the case studies presents realising these opportunities through ongoing, negotiated and social-driven interactions between all actors (Cohendet and Llerena 1997; Schön 2000), verifying the value and prospect of integrating all stakeholders for sustainable development via socio-technical practices (Zimmerman et al. 2005; Folke 2006).

The chapter analysis present three core and interrelated ways of supporting this: utilising and building communities' pre-established forms and structures of social interaction; utilising and building upon pre-existing skills, meanings, feelings and bonds; co-evolving these through activities sensitive to their differentials within and between groups. Complimentary social practices were instrumental for this and carry key implications that will now be summarised.

Firstly, certain practice bundles encompassing practice-specific demands, feelings and purposes within normativised social contexts catalysed coordinated collective working, increased capabilities and self-sufficiency. Examples of greatest managerial effectiveness occurred where managerial practices became embedded in the social routines of the communities in which they were situated and systemically interlinked these with district, national and international suppliers, policies and markets. This required ongoing collective action and dialogue was most effective and inclusive when aligned with social temporal-spatial rhythms, meanings, emotions, relationships, mutual commensality and ways of communicating (Varughese 2000; Inkpen and Currall 2004). Examples included the emergence of community mills, the informal technicians, democratic elections, and interpersonal and

¹⁵⁵ Paralleled findings by (Raymond 1999; Baldwin & Clark 2006; Backstrand 2006; Petersen 2008).

mobile phone-based monitoring, group meetings, accountability and reporting that reinforced modes and elements of practice (Gregory and Hicks 1999; Roberts 2002)¹⁵⁶.

The effectiveness of these for enhancing electricity management and outcomes via aligning with pre-existing and recently 'domesticated' conventions, signifies their importance for the coping and management of daily life and change and development approaches engineering and utilising socio-technical conventions and relations through social practices (Geels 2004: 902; Ager and Strang 2008: 178). It illustrates that these may include both relatively established methods for a community, such as group meetings, and also improvised methods building upon established norms, such as support through social relations and mobile phone-based practices (Diani 2000; 2013; Heeks 2002)¹⁵⁷. This reinforces that research must include the socially entrenched and emergent to enhance understandings, processes and outcomes of participation, innovation and sustainability (Bäckstrand 2003; Bonney et al. 2009)¹⁵⁸.

Alignment with the specificities of communities' conventions thus catalyses the effectiveness of approaches because prefigured routinised 'webs of capabilities' support their necessary integration within everyday life, actions and structures (Narus and Anderson 1996; Jasanoff 2004: 3). Within these contextual systems, however, the chapter also showed that management approaches may extend existing structural inequalities and constraints in practice even if considered in policy¹⁵⁹ unless rectified collectively in all their project stages through ongoing social performances (Anderson 1983; Abramson 1992). These overcome managerial and development weaknesses related to multi-level interaction barriers entrenched in differential means to enact the requirements for effective practices in conjunction with the demands they constitute.

¹⁵⁶ The co-evolution & importance of practice interdependencies, & hence pre-established dimensions, is further signified in communities familiar with co-working being more effective at participatory design & management practices boosting SD (Kopytoff 1986; Isham & Kahkonen 2002: 186) & why traditional groups, consumption & methods relate to social meanings, emotions & temporalities & are often more effective than modern alternatives (McCracken 1986; Croll & Parkin 1992; McMeekin & Southerton 2007).

¹⁵⁷ Remittance flows exemplifies this. They increased from 10 to 17% between 2001 and 2008 in Nepal and globally equated to \$325 billion in 2011, up to 25% of which was used for household energy purchases (Kramer et al. 2009; Mainali & Silveria 2011; World Bank 2011). Research into the prospect of interlinking remittance flows with modern energy service payment, learning, innovating, working & banking practices may thus be pertinent (Papademetriou 1985: 212; De Hass 2005; 2010).

¹⁵⁸ Recent methodological developments underscore this. Examples include those of living labs, action research & 'citizen science', whereby relational, amateur & professional are interlinked via utilising societal measuring, interacting and testing practices (Silvertown 2009; Newman et al. 2012). This mobilises society as agents of research & development through how they interact & live with, use & modify technologies & the built environment (Coleman & Collins 2006; Voytenko 2016).

¹⁵⁹ Such as communities dealing with market actors (6.4.1). Another example was one exemplified also in Chapter four, namely female representation and active participation in EMC meetings. See box 4.1.

Examples include insufficient time for technicians to conduct their tasks 'on time', the inability of some practitioners to use electricity due to experience-related fear and the limited social contributions in Khimti which jeopardised the financial health and thereby sustainability and impacts of the project. Such examples depict that the consumption, management and effects of electricity are interlinked. Within this, management was achieved through multiple social practices inseparable from wider practices and functions in the communities, such as household maintenance, saving, maintaining relations and co-working. Energy access and management thus occurs in constant relation with other practices and their requirements. This situates management as part of the practices of daily life wherein citizens are necessary actors within a system of practices.

This expands the access and management narrative from technological objectivity, substitution and determinism to the particular embodied experiences and capabilities of diverse social cohorts and their co-constitution via interlocking practices (Barnes 2001; Bovaird 2007; Pahl-Wostl et al. 2007). This advances the implications from the previous chapter that practices occur in constant relation with other practices (Watson 2012: 5) whose relationships may be variously complimentary and adversarial (Pinch 1986; Erkut et al. 2008). Consequently, considering the practice communities encompassing the various forms of both electricity use and non-use may more effectively support sustainable development.

This chapter demonstrates this as a reflexive, ongoing exercise to embrace emergent and neglected complexities (Gasper 2002: 453). Through the energy access and management practices, for instance, pre-existing relations were strengthened and new groups, labour-saving, income generation, market access and financial service capabilities emerged, bolstering the projects, other practices and remoulding those demanded, available and the notion and prospect of time, participation and development. Through the interconnection of multiple practices, therefore, the communities' production-supply systems became increasingly multi-level and interlinked, supporting the continuance of the new practices and related energy access (McFarlane 2009; Watson 2013: 162). The findings thus show how practices co-constitute the contexts upon which they co-depend, suggesting focusing on the practices constituting the interlinkages as the primary agents for effective services (Law and Urry 2004: 390-391; Urry 2007).

The social practices, therefore, are supported by the interpersonal bonds and bidirectional exchange they reinforce (cf. Habermas 1979: 3; Stark and Bainbridge 1980). These are augmented through ongoing communal work in and between everyday institutions and activity (Levitt and March 1988; Attewell 1992). This is further underscored by Bishnu-je, KREC's general manager, in his advice that the best way to improve the project is through enhancing active, collective responsibility, input and participation through "promoting better community practices within the existing cooperative groups (KKS3; Narayan 1993). In emphasising the importance of open dialogue, active participation, a referent structure and dedicated work, Bishnu-je supports that social practices and their structures co-construct the ingredients for continued and additional practices¹⁶⁰. For sustainable development, it predicates that the social, institutional and symbolic structures and interactions could be utilised to enrol, develop and retain competent practitioners (Nagendra et al. 2005; Walker 2011), even when other dimensions are limited, such as staff salaries and standards (cf. Johnson 1990; Hargreaves and Fink 2012).

Needs and capabilities, as demand, identities, consumption and difference (Appadurai 1986: 28-30), thus interdepend and co-evolve over the course of provisional practices and their co-constitutive elements and structures (Warde 1994; Spaargaren 2003; 2011). Social relationships appeared integral to these generative processes, resources and bonds, reinforcing the importance of social capital for sustainable development yet indicating that these are ongoing products of systemically situated practices. Capabilities, conventions and outcomes thus co-depend across various nested scales and institutions co-constituted by social practices (Ostrom 1990; Hanna et al. 2012). A relationship of routines that organises daily life yet presents the context for agency, development and sustainability as variously contested (Bohm et al. 2006: 3)¹⁶¹.

Within this system, practices jostle for practitioners, time and other resources requiring multi-level practice coordination via both informal and formal mechanisms (Benson 1975: 4; cf. Wade 1987). These may be interlinked by intersecting routines and their reciprocal codes of scheduling, morality, feeling and purpose that appeared collectively intrinsic for generating and maintaining competent managerial and energy access practices over common barriers of

¹⁶⁰ His points echo others, such as Cheadle et al. (1997); Pretty & Sandbrook (1991) & Uphoff (2004). Moreover, Bishnu, highly mobile, educated, previously an engineer in Kathmandu & now the main overseer for KREC for 8 years & born & bred in Khimti, like his family, who own & operate a local grain mill, is a hub of key local, regional & national practices & hence particularly well positioned to advise.

¹⁶¹ Other manifestations of this is the dichotomies between energy production, poverty (Nussbaumer et al. 2012), demand management & consumption (Strengers 2011; Wallenborn & Wilhite 2014).

malpractice, non-use, waste, low reinvestment, low capacities, and high exchange and contracting costs (Sovacool 2001; Muriithi and Crawford 2003). This supported apprehending the unfolding constraints and requirements of managing interventions and reaffirmed social meanings and emotions as part of this and how people routinely interpret, cope and consume (Wilk 2002; Geiger 2009). As the informal practitioners underscore, allowing new and unexpected forms of these to emerge and integrate within development pathways may further enable supportive innovations and functions to emerge in concert with the multiplicities of everyday life (Westley and Vredenburg 1997: 394; Ainley and Rainbard 2014).

Through such interdependencies, the practice coordination required for effective management revealed in this chapter signified that time also becomes a contextualised part of the coordination requirements and mechanisms. Overlooking this in the managerial approach resulted in constraints for certain practitioners that hindered effective performance in relation to the society's temporal demands. This presents objective time as a finite resource for practitioners to perform practices whose embedding in social routines renders time ordered and ordering, gaining qualities associated with the performance and guidelines of certain practices and places (Lefebvre 2004; Southerton et al. 2004). Intersubjective time and the (necessary) coordination of practices thus becomes part of those guidelines configured and constrained by the routinised performance of integrated practices. Practices thus institutionalise normative temporalities that constitute requirements for practices and practitioners (e.g. lunchtime, work time and 'family time') (cf. Southerton 2000: 53).

Approaching management through a practice-lens thus reinforces the pluralities of effective intervention actualised and maintained only when collectively performed (Wenger and Snyder 2000: 143). The importance of this maintenance and development was illustrated further through the social learning emphasised by the participants as essential for the increasing effectiveness of the electricity. This social learning appeared fundamental for the communities to forge links, capabilities and act at the local-level and respond to their micro-dynamics, but also to enable this at the institutional-level where their positionalities were limiting and mediated through learning in social practices (Handy 1990; Mezirow 2000). The importance of such coordinated participation, learning, adaptation, and addressing power relations, although marginalised by dominant approaches, is emphasised in recent policy and managerial recommendations and theoretical debates (Gherardi and Nicolini 2002a; Pahl-Wostl 2002a)¹⁶².

¹⁶² Namely, Total Quality Management approaches (Porter & Rayner 1992). As discussed in Chapter 2, PLA & other participatory approaches also embrace the precepts of social learning, adaptation & management. See also Appendix I.

Critically, the analysis presents these processes as socio-technical, performative processes and outcomes (Mumford 2006; Bardi and Eckhardt 2012; Seyfang et al. 2014).

The chapter findings thus illustrates various interlocked routines complicit in everyday life and requiring realignment for alternative pathways and impacts (Warde 2013: 25; cf. Geels and Schot 2007: 399). The findings reflect the importance of human factors in technology management, the interdependence of stakeholders' and how these are (re)arranged and (re)negotiated (Nathan and Mitroff 1991; Jaspersen et al. 2005). Social groups and practices appeared assets for this when allied with the systemic fabric in which they must embed and are co-constitutive. These mediated the projects into effective forms that alerts us to how changes are prefigured and propagated by their embedding in systems they (re)structure¹⁶³. Demanded 'local' project management (Armanios 2012; Fabricius et al. 2013: 278), must hence consider the diverse actors and practices that condition them (May and Finch 2009; Kemp 2010). The 'application context' of interventions and management is thus a systemic environment requiring paralleled coordination, learning and adjustments (Geels 2004: 902).

Sustainable energy access may hence be better conceptualised as products of multiply engrained templates for being and acting in the world whose social, symbolic and material co-dependencies "generates the conditions for its own expansion" (Urry 2004: 27). This explains why common factors reinforce widespread constraints to sustainable development and change and thus offers a comprehensive account of such challenges from which to frame solutions (Geels and Kemp 2007; Bergek et al. 2008). Practices and their components, therefore, unlike economic commodities, align and accumulate with social use and decay with disuse (Hirschman 1984). Electricity and any approach aspect thus requires operationalising in social practices, undergoing (re)interpretation in practices and practice-contexts that continually (re)defines the approach and its effects (Bourdieu 1984: 72; Shove 2010: 1278).

The socially constructed, differential nature of actor positionalities, practices and repertoires of elements and relations of practice in these contexts are instructive. They help identify barriers to equitable and effective participation and what drives certain behaviours, consumption patterns and impacts over others. As Seyfang et al.'s (2013) socio-technical approach to analysing consumption and community energy reaffirms, this includes the variable yet routinised nature of social meanings, needs, conventions and capabilities that

¹⁶³ The value of 'doing' development in social groups and their diverse settings & routines not detached from their wider systemic influences is also highlighted by Nohria & Eccles (1992), de la Mothe & Paquet (1994), Gilchrist (2000: 272), Parton & O'Byrne (2000), Portes (2000) and Mulmi (2009).

present communities as key actors in sustainability transitions yet also requiring formalised forms of institutional and regulatory support (Seyfang and Haxeltine 2012). Secondly, it also guides us to the joined-up levels of interactions this requires and must mediate and why inter-actor reflexivity, learning, and production-use-management are advantageous for development and best achieved in social routines (Calantone 2002; Senge 1990: 419).

Consequently, this chapter shows that rural communities are willing and can manage their development through approaches supporting these processes and overcoming diverse interaction constraints. Although this contradicts overarching narratives, notable energy stakeholders in Nepal and empirical studies increasingly recognise it (Taylor 2000; Woolcock and Narayan 2000)¹⁶⁴. Through social practices, this chapter provides insights into how the willingness and management capabilities come to be, evolve, impact and include normative meanings and emotionality (Cundill and Rodela 2012; c.f. Soubhi et al. 2010). Such attributes are hence culturally and routinely mediated. The formative role of practice communities for this, if supported, may uniquely achieve the socio-technical interlinkages, realignments, transformations and learning required to overcome development challenges.

This recommendation has precedence (Mayer & Argyres 2004; McMeekin & Southerton 2004; Pandey 2015). Isham and Kahkonen (1999), for instance, reveals that groups accustomed to working together made subsequent collective action easier and more effective, while Woolcock (1999) accredits the rural microfinance success in Bangladesh to norms of familiarity and trust between the community and branch managers due to shared routines. Similarly, Moris and Thim (1990: 430-431) ascribe irrigation management success in Africa to informal, culturally embedded interaction networks while Walker et al. (2007; 2010) finds community practices, bonds, groups and meanings boost the resilience of energy projects in the UK. Yet such mechanisms also lead to inaction and unequitable action if they are not linked to macro-social structures (Norman and Shallice 1986; Naess et al. 2005: 130)¹⁶⁵.

The sum is for interventions to consider context, positionality, timing, phasing, contracting, learning and their co-constructed systems of perceiving, feeling and doing (Becker 1997; Hadorn et al. 2006; Cote and Nightingale 2012). This signifies social practice approaches for supporting this diversity whilst mitigating barriers the range of actors and pathways to

¹⁶⁴ Including KKS15; Ili1; Ili11; AEPC (2012), & HPL (2015). Also Desmet et al. (2000), & Liming (2009).

¹⁶⁵ Insights further emphasising this & the value of multi-level socio-technical interlinkages & learning are the ineffectiveness of participatory processes where their links are neglected, esp. where they include contrary codes of interaction & control (Tosun 2000; Yuksel et al. 2005; Li 2006) & familial networks planting the normatively preferred means for order & effects (Charles 1995).

learning and innovation required for sustainable development (Folke et al. 2002; Andersen et al. 2006)¹⁶⁶. This shows development pathways as normatively prefigured and remoulded in diverse ways, often subsuming structures and processes counterposing the principles of sustainable development and demanding reflexively inclusive, multi-level and routine-orientated pathways (Esman and Uphoff 1982: 82; Yohe 2014: 472).

Demonstrating this through energy access management thus substantiates the need for aligning notions of development, interventions and impact with embracing plurality, “the big picture... and long-term benefits” (Shenhar 1997: 13). It illustrates the importance of interlinked processes, policies, project phases and producer-user-managers for this (Nayak and Berkes 2008; Rich 2011), and social practices as mechanisms to co-evolve these. The chapter thus concludes the value of balancing the “instrumental” affordances assigned to technology in development efforts (Feenberg 1991: 5) via supporting cojoined approaches intersecting dimensions and domains through the activities that mediate them (Gronow and Warde 2001). This allies with other studies to compel analysis to zoom into the level of the (non)-users and to zoom out to the array of practices and structures to which they relate.

The chapter then signifies utilising communities of practitioners based on their potentially pre-existing skills, meanings, material cultures and informal, moral, reciprocal and sentimental ties via their discursive and non-discursive ways of interacting (Hodgson 1999: 170; Eraut 2004). Through ongoing interactions in practices, these tackled practice barriers and engendered self-propagating effects that upscale sustainable development. These outcomes reinforce the value of social capitals, economies and society-led innovation for sustainable development and points to the pluralities of communities and consumers through their everyday practices for boosting these (Gittell and Vidal 1998; Callaghan and Cotton 2008).

Yet the analysis cautions that the common systems of meanings, feelings, skills and interactions underpinning these practices and communities often subsume inequalities and barriers to change (Pred 1982: 8; Habermas 1991b). Unchallenged, development and community-based efforts are limited (Bradshaw 2003; Thoms 2008). Through mobilising social practices as input, mediator and output of these, barriers can be surmounted by facilitating co-evolving learning, innovation and management, interconnecting actors across ‘circuits of reproduction’ and change to reconfigure their sociomaterial interactions and environments

¹⁶⁶ Consolidated by ‘user communities’ signified by shared practices & ethics enhancing wellbeing & sustainability via alternative ways of working, resource use, control, value, emotion & knowledge sharing, including for energy provision, management & use (Lutzenhiser 1993; Gerger & Gullberg 1997; Khang & Moe 2008; Seyfang & Haxeltine 2012; Seyfang et al. 2012; Parkhill 2015; Magnani & Osti 2016).

(Wenger and Snyder 2002; Welford 2013: 41). For energy projects and sustainable development, such (re)configurations gain invaluablely from utilising pre-existing interpersonal relations, elements and procedures to facilitate this in concert with embracing diverse and situated capabilities, opportunities and neglected ways of improvising and 'muddling through'.

Social practices thus manifests as providing a dual focus on the micro and meta-processual context in which interventions are situated, co-constructed, affect and effect (Hand and Shove 2004: 245; 252). They represent the multidimensional nature and social location of effective management enhanced by specific forms of collective working, interacting and ordering signified by these locations and their constitutive social practices (Clever 2002; Adhikari 2005; Stringer et al. 2006). Supporting such practices to interconnect energy, financial, enterprise, market, governance, appliance and training services may be especially valuable, fostering the continuous co-productions required to augment resources, bridge gaps and manage the dynamics of projects, social life and sustainability (Huxham and Vangen 2000: 307). In the context of complex and long-term sustainable development challenges, such implications may be considerable (Seyfang 2006; Leach et al. 2010a).

6.6. Conclusion

Effective management marks an overarching barrier for development and a necessary focus for enhancing energy access pathways following evaluations of energy use. Refocusing 'access' from provision to use and management presents the relationship of energy services for sustainable development to a wider 'system of practices' cutting across domains and sectors. This reframing locates the shaping of material interventions and their provisional 'installation', consumption and impacts through and within contingent social routines. The embedding and emergence of these routines, their interrelationships and the integration of (energy) innovations within them, constructs and mediates the impacts and management of projects and services. This reframing was instructive in and of itself, showing that the translation of policies and technologies to material outcomes always involves the conventions of respective societies and the situated capacities and arrays of interlinked processes these entail. The more fully these are understood and reflected in development projects, the greater they function and impact.

Analysing these conventions further with specific reference to how they implicate on the management of daily life and any intervention supports this required understanding and reflection. It shines a brighter light into what these functions and impacts will be, how to improve them, and that they are social as well as material. This chapter provides examples of this to conclude that the social involvement required must also extend into the neglected domain of project management. Reconfigured through the doings and relations of practices, this domain becomes subject to the affective, structured and embodied aspects of social conventions. They shape the experience of innovations and their translation to everyday impacts and forms of management and improvement, presenting new, co-produced and co-evolving ways of enhancing development efforts and their ongoing performance and results.

This chapter presents established and evolving social aptitudes, meanings, feelings and relations in social routines augment this and can be actively mobilised and negotiated to further engender and enhance development capabilities and outcomes. The findings suggest that doing so may be integral to enhancing the equitability and extent of these attributes and outcomes. This occurred through multi-dimensional processes of learning, coordinating, exchanging and restructuring in everyday social practices that included informal and unanticipated forms. These mediated energy projects and outcomes and command multi-level policy foci iteratively zooming-in and out to examine the nuances of mundane social interaction, requirements, capabilities and outcomes, and the larger scales over which they are embedded and reinforced. A social practice approach appears a compellingly useful aid for this.

CHAPTER 7

Emotionality & the sensibilities of sustainability

7.1. Introduction

Emotions arose throughout the research as notable aspects of energy practices and impacts. Emotions, however, are principally eschewed in development approaches and research. This chapter argues that revising this reveals constitutive components of daily life, capacities and sustainable development. Through empirical analysis of forms of consumption, appropriation and resistance allows, the chapter demonstrates the importance of emotions for considerable barriers to development. It also allows moving from considering the orchestrating processes and structures for development projects in the previous chapters to more fully analysing dimensions that underpin them. This analytical progression showcases the qualitative value of starting analysis into such topics at the level of social practices (e.g. energy use), considering this in relation to a system of practices (management), and evaluating across these practices and structures to explore crucial common avenues for sustainability transitions.

Doing so suggests distinctive ways of considering needs, capabilities, coordination and differencing embedded in the sites, processes and structures of social life containing specific emotionalities that render alternative avenues for development. This consolidates calls for refocusing on the affective, relational and normativised components of collective action, wellbeing and development (Mabry 2001: 323; Larsen et al. 2004). A social practice theory is demonstrated as a suitable framework to aid such refocusing and further attentiveness to the pluralities of social phenomena for sustainable development. It offers new ways of working, innovating, capacity building and development that illustrate the potential of community-driven approaches that align with the dynamism and contingencies of everyday life.

The discussion proceeds as follows. 7.2 situates the related discourses, before illustrating the role emotionality plays in two key cases. The former, 7.3, revisits the cooking case to present how a focus on the emotionality of practices furthers insight into tradition, risk and 'taste' for conserving consumption patterns. The latter case, 7.4, considers the upshot of emotionality on how interventions are experienced and primary barriers to energy access and sustainable development; financing and resistance; are surmounted and engendered, respectively. The chapter concludes with associated implications for enhancing pathways to development.

7.2. Emotions in social & development theory and practice

Emotions emanated throughout the primary research as central to the experience and evolution of electricity and development. Yet this challenges conventional development paradigms (LeVine 1973: 229; Tschakert and Dietrich 2010), posing a central question: what are the implications of emotions for socio-technical change and sustainable development?

Seminal social theorists have considered emotions viz-à-viz social conduct, materiality, learning and development (Kluckhohn 1954; Dewey 1984; Deleuze and Guattari 1988). Despite indicating emotions' importance and the need to revise its marginalisation in social and development discourse, policy and applications¹⁶⁷, it is eclipsed by the privileging of rational behaviour, design upholding reason/emotion dichotomies (Tomkins 1981: 306; Levy 1984: 214). Secondly, where emotional influences have been considered in policy, it is largely from imperialist readings of individualistic paradigms (Peters and Marshall 2002)¹⁶⁸. Such analytical reductionism, privileging technology and "self", is buttressed by the difficulty in explaining emotionality, especially with the quantitative, linear and time-constrained methodologies of conventionalised assessments (Sturdy 2003; Hickey-Moody 2013). This, however, presupposes pathways, outcomes and alternatives (Green et al. 2003: 1; Mercer 2004).

As indicated by insights emotions have yielded into the constitution of the social-physical world (Pile 2010), this occurs at the expense of development approach refinement (Mohan and Stokke 2000). Insights pertain to social action, bonds and events (Carver et al. 2000; Payton et al. 2005), cityscapes and infrastructures of capitalism, time and mobility (Thrift 2004; 2008), bodies and place (Southerton and Tomlinson 2005; Urry 2005) and their making and organisation (Bourdieu 1984: 69; Featherstone et al. 2001). Significant contributions from these scholarships include the social construction and structuration of emotions and their effect on wellbeing, trust, cultural stability, product development, uptake, civic action, capacity and change. These present emotions as culturally-specific, arranged and mediated acquirements related to shared histories and experiences (Shweder and LeVine 1984; Solomon 1984: 251) purposefully steerable through social activities (Crane 1992: 153-154) and

¹⁶⁷ Accentuated by, inter alia, Dewey (1894, 1995), Frijda et al. (1989), Mumby & Putnam (1992), Kleinman & Copp (1993), Fineman (2000a), Adger (2003), Sheller (2004), & Turner & Stets (2005).

¹⁶⁸ The dominant James-Lange 'theory of emotions', for instance, explains emotions as mental effects of bodily experiences; a subjectivity instituted in the favoured yet problematic Attitude, Behaviour, Choice policy paradigm (Bond et al. 1992; Grunert & Juhl 1995; Shove 2010; Schwartz 2013).

essential for effective and routinised services, skills, conducts and learning (Markus and Kitayama 2001: 122; Warhurst et al. 2004). Emotions thus influence the 'security' (Maslow 1971), 'normality' and 'suitability' (Gross and Muñoz 1995) required to function in daily life (Taylor 1989; Picard and Klein 2002). Increasingly recognised in progressive schools of thought aiming to put the 'human' back into development and embraced in 'nudge' economics and the term 'emotional needs' (Thaler 2000; Khaneman 2003), emotions form core strands in the DNA of social activity and domains for development (Lederach 2005; Lyubomirsky et al. 2005).

Understanding this further may thus distinctly aid sustainability and social change efforts (Markus and Kitayama 2010; LeBaron 2002) and abate the failure of interventions from the techno-rationalist mould (Guy and Shove 2000; Cotton 2013). This is reinforced by articulations of emotionality-material connections as constituting part of the constellation of the lived experience wherein emotionality and related action is systematically interrelated with heterogeneous actors to the extent of being inscribed within them and hence somewhat technologically produced (Akrich 1992; Latour 2005). Indeed, although countered by social constructivists accounts of agency and change (Elias 1997; Urry 2012), this concept informs novel approaches to product, architectural and policy design aiming to enhance functionality and social conduct through emotional inscription (Demirbilek and Sener 2003; Mohr et al. 2011).

A social practice account reconciles these divergences by reclaiming agency and emotionality as co-constructed outcomes of social routines. For Giddens, Bourdieu and Reckwitz, for instance, there is a deep "affective involvement in the routines of daily life" (Giddens 1984: 125) through which thoughts and feelings interdependently emerge (Bourdieu 2001: 38) co-constituted and marshalled by social practices and their interconnected "states of emotion" (Reckwitz 2002: 242). Like Schatzki (1996: 89), they position emotions as a form of collective expertise pertaining to "a certain way of wanting and feeling": the motivations, dispositions and intentionality essential to, and implicated, in every practice (Reckwitz 2002: 254).

Consequently, "every practice contains a certain practice-specific emotionality", practices are the sites emotions are defined and expressed, and emotionalities are 'socio-technical' (Cowan 1987: 105–106; Reckwitz 2002: 254). In explaining social anxiety, for instance, Pain and Smith (2008: 12) explain fear as a continually defined, "increasingly ingrained material practice". This dual operationalisation and impact of emotions in practice has notable implications in terms of agency and effects, including on the co-production and plurality of knowledge, consumption and change throughout the social and material environment, requiring amplified attention both in research and development (Pred 1984: 294; Jackson and Everts 2010; Pain et al. 2011).

From social practice perspectives, therefore, emotions are not dismissible, personal and fixed, but rather integral, collective, dynamic co-creations of an established order (de Certeau 1984: 34; Bourdieu 1996: 4)¹⁶⁹ and requiring participatory approaches to engage with and revise it (Pain et al. 2011). This relationship and the critical geographies and sociologies it commands is accentuated by Bourdieu's (2001: 38-39) placement of emotions as critical aspects of 'strategies' and 'habitus': situated response to, and conduct within, 'systems of dispositions' that co-constitute the socio-technical structuration, agency and 'emotional capital' of societies (Bourdieu and Wacquant 1992: 128). This interlinkage of emotions to context, purpose and performance is further articulated by Schatzki's (2010: 80) 'teleoaffectivity' concept, vital to the performance and interconnection of practices and underlined by the "omnipresence of affectivity" (3.3; Schatzki 1997: 302). Despite this, practice-theory applications have generally sidelined emotionality to focus on other dimensions of practice in theoretical and empirical endeavours¹⁷⁰.

Supporting these Heideggerian accounts, however, others are notable for their inclusion of emotionality as agent-outcome of the social (Dreyfus 1991; Massey 2002; Turner 2007). Elias (1971), for instance, emphasises unreflexive action as a product of understandings and moods/emotions, while Taylor (1985) explicates social reality as mechanisms and structures of language, intentions and feelings composed and encountered in practices. Sociologies of repression, learning and conditioning, inter alia, similarly afford a formative role to emotions for interactions and thus primordial to social life, (in)justice and organisation (Hochschild 1979; Scheff 1988; Cataldi 1993)¹⁷¹.

The sum is emotionality as player, product and frame of social activity evoked by collective action and its socio-technical interdependencies (Turner and Stets 2005: 36). Hochschild's (1979) 'emotion norms', explaining emotions as subject to social control via 'feeling norms' and 'expression rules', typifies this. As all norms, they provide adaptive functions and cues for social conduct that vary spatio-temporally and socio-culturally (Ekman 1992; Thoits 2004: 362). Willis' (1990) 'feeling structures', Reddy's (2001) 'emotional regimes' and Reckwitz's (2012) 'affective structures' buttressing forms of 'common culture' guiding collective conduct

¹⁶⁹ Indeed, Bourdieu's 'Le sens pratique' or 'the logic of practice' (1990), emphasises emotionality in the constitution of social action with 'Sens' entailing faculty of sensation & feeling (Nicolini 2012: 57).

¹⁷⁰ Exceptions are increasing & include Reckwitz (2012), Wetherell 2013; Hodgets (2016).

¹⁷¹ Extensions of Durkheim's (2014) "collective effervescence" notion - that shared emotions spur action & parallel emotions in others - embodies this, depicting emotions "across situations as the crucial item in the micro-linkages that concatenates into macro patterns" (Collins 2004: 105).

reinforce this¹⁷². The crux, although reinforcing the practice theorists' emphasis that everyday life, agency and impacts are simultaneously processual, discursive and structured, is that emotionality may be "fundamental" (Lutz 1985: 5; Shweder 1984: 45).

Empirical expositions of everyday life appear the most insightful lens for understanding emotionality for development pathways further. Stearns and Stearns (1986) portrayal of the emotional transformations concomitant with changing work and family practices during the industrial revolution, for instance, chimes with others revealing the importance of emotions in post-industrial work and management strategies (Ashforth and Humphrey 1995; Lively 2000). Such scholarship presents the control of social space and conduct via emotional standards orchestrated through normativised 'emotional labour' and responses (DeNora 2000: 9). Such social regulation, for instance, was formative in modifying practices of working and living to align with shifting conditions and demands of industrialisation (Halford 2008: 14). These demands, through mass conformity, came to signify an order signifying an 'emotion culture' deliberately reinforced by factory layouts undermining individuality in promotion of 'areas of competence', control and productivity (Gordon 1989; Lanzara and Patriotta 2007).

Emotionality thus appears part of the co-constitutive relationship between social practices and their settings. The continued effect of emotional regulation despite change in originating contexts accentuates this (Latham 2012: 86). These effects now internationally define standards in the 'appropriateness' of emotional conduct beyond the workplace in both urban and rural settings (Thoits 2004), indicating the expansive affects of emotions if situated in socio-technical interactions and environments. The nub is that emotional codes play a role in collective order and action and may be actively manipulated for desired (though normative) ends, including enhancing development pathways and impacts (Saltonstall 1993; Hobson 2002; Kals and Maes 2002; Jackson 2005; Lutz 2011).

The trajectories of practices, however, are not fully controllable and effects, even significant ones related to sustainability and social action, may be incidental (Massey 2005: 9, 95; Shove and Walker 2010). Nonetheless, increasing examples show some role of emotionality in domains as encompassing as discourse, identities, socialising, working, schooling, provisioning, consuming, governing and repurposing (Holbrook and Hirschman 1982; Jackson

¹⁷² As does Goffman's (1956) 'interaction order' & Heise's (2007) 'expressive order': agency requiring collective 'emotion work' that legitimises & enhances the emotionality, narratives & conducts (also Schutz 1967: 160; Smith 1992), reproducing & retrenching the "feelings" & conducts (Pile 2002: 5).

2015; Halkier 2016)¹⁷³. Indeed, emotionalities' effects may extend to social influence, expectations, roles, trust, place, capabilities and political, economic and environmental decision-making, quality judgments and innovation uptake or resistance (Wilk 1997; Klein 2002: 347; Jones and Jessop 2010). Consequently, emotions also play a role in social class, gender, structure, morality, political economy and avenues for equitable and sustainable development (Thoits 1995; Hutchison 2010; Venkatesh and Morris 2000).

Emotions are hence interrelated to the means and ends of specific social practices that authenticate certain forms of doing, knowing, differencing and change over others (Busemeyer et al. 2002). This counsels quitting individualist readings of emotionality to apprehending its social construction, importance and multidimensionality (Döring 2003; Jensen et al. 2015) through the study of emotionality within the social and its constitutive actions (Illouz et al. 2014: 237-8). This chapter demonstrates the prospect of a practice-ontology to aid this and 'emancipate' emotionality from its relative conceptual and empirical neglect (Tomkins 1981: 306; Escobar 1995: 19). Such empirically-led framework development is further underscored by remaining contentions over the extent to which actions are purpose-orientated and emotionally influenced (Kals and Maes 2002; Stouten et al. 2005).

The following analysis accordingly interrogates the role of emotionality in daily life and development through its influence on energy transitions and outcomes in the case studies. This furthers the research imperatives of reflexively exploring the plurality of factors and their dynamics that influence development approaches (Denzin 1997; Anderson 2009; Woods et al. 2012). I use the term 'emotionality' for its greater resonance with the case study analysis, participants and interdisciplinary clarity over alternatives (Denzin 1985; Barrett 2006). With 'emotionality', I refer to the relational, reflexive contextualisation of feelings that are diverse, multiply embodied and interrelated to lived experiences, bodies, performances and places.

This allies with others arguing for its use over other problematically often synonymously used terms such as 'affect' and 'emotion' that less fully indicate its sociology, duality, phenomenological and often implicit constitution and effects (Cahill 2004; Anderson and Harrison 2006; Scheer 2012).¹⁷⁴ Indeed, 'affect' and 'affectivity' are often vaguely defined and encompasses the visceral, haptic, sensual dimensions of practice as well as moods, desires

¹⁷³ Also Havlena & Holbrook (1986), Meah & Watson (2013), & Burkitt (1997, 2012).

¹⁷⁴ Izard (2006; 2007) & Leys (2011) provides a fuller critique of the terminology, especially 'emotion' & 'affect', respectively, while Dixon (2003) cogently traces the ontological journey between the terms, concluding with 'emotions' & 'emotionality' as more favourable for their greater specificity & coupling with action & structure (Also Denzin 1990; Thien 2005a:452; Manzo 2003).

and sentiments (Bourdieu 1977; Schatzki 1997: 302). Although Chapters 5 and 6 demonstrated that such dimensions become interdependent in the doings and discourses of practice, in espousing 'emotionality' that pertains more specifically to the latter three dimensions (Reckwitz 2002: 254), the discussions of this chapter are more clearly located. We start this by showing how a greater focus on emotionality enhances analytics of the fuelwood problematic.

7.3. Case I: Social change or preservation? Food, tradition, taste, risk.

The minimal influence electricity had on firewood conventions in the case studies, represented the significance of habitualised dimensions and structures in conserving consumption patterns and alluded to emotionality as co-constitutive of this. Chapter 5 presented the fuelwood sourcing and cooking in the communities as interconnected to their socio-technical system of routinised means and ends of which emotionalities were agential parts. Diverse associations of cooking were thus complicit in the practices that interlinked and entrenched them. Such a vantage substantiated the importance of multi-sensory constructions of practices and their diverse significations to sociality and sustainability. This reinforced the importance of considering the embodied, engrained attributes of daily life. As we now see, shifting our focus to emotionalities compliments this further. This section presents this through a focus on the communities' cooking practices and subsequent development pathway implications. As both practitioners and non-practitioners indicate, emotionalities significantly prefigured cooking practices and transitions:

I don't want to use the rice cooker because I've used wood all my life and I'm scared of electric shocks (JHHi4).

We feel like we are doing an important job when cooking. It makes us feel good (SBHHi7).

The excerpts indicate five instrumental points: the interlinking of lives, routines, emotionality and settings to intentions, capabilities and conducts; the collective importance of emotionality within this; the specificity of emotionality-practice relationships; and the breadth of associations that can constitute practices (Costanzo et al 1986; Jackson and Holbrook 1995).

This is emphasised in the collective links between preferences, fears, time of collective commitment to conduct (e.g. lifetime, scared), social value and repetition of feelings linked with the shared dimensions and experience of cooking (e.g. we, important, good), and other structured components emphasized in Chapter 5 (e.g. smoky taste, our tradition). It instantiates that routinised matter (e.g. fuelwood, people, rice cooker) meanings (e.g. identities, intentions, 'tradition'), performances and settings (e.g. intersubjective routines and spaces) interdepend and carry what Reckwitz (2002: 254) terms 'practice-specific emotionality' that shapes conducts, contexts and change (Vaara et al. 2006).

For the case study communities, fuelwood, cooking methods, feelings and meanings thus become co-constructed and located within collective routines whose relationalities and embodiments thereby become socio-technical and multi-spatiotemporal (Howes 2005; Walmsley 2005). The relationality of the subjective "I" and the intersubjective "our tradition", "we feel", "job" and smokiness, for instance, are all contingent, contextualised and, through their co-dependency, multidimensional (Allon and Sofoulis 2006; Castells 2013). Within this relationship, there is an emphasis on feelings to suggest that in certain circumstances, affects may be foremost for practice lock-in and adjustment (Scheff 1990: 295; Fitzgerald et al. 2002). This allies with Giddens (1994: 63) definition of 'tradition' and Barrett's (2006) notion of 'context' as simultaneously moral and emotional constructs of practices providing social bonds that authenticates and safeguards their reproduction.

Yet this relationship is obscured to those complicit in sustaining it (Giddens 1979: 40; 1984: 4). The necessity of the cooks "doing an important job", for instance, despite the acknowledged adverse development impacts, appears validated and anchored by the shared emotionalities that interweaves "the ethical and affective" into "unthought motions" (Bourdieu 1990b: 127-221). This is emphasised as such explanations were commonly the sole ones given for not employing other 'viable' modalities (5.5; Comaroff 1985: 556). Further, referring back to accounts of firewood practices and why motivations to cease them were not enacted (5.5) indicates that differential roles, pains, desires and wellbeing interdepend and situate capacities such that emotionality, identity, power and action become inseparable (Jackson 2005).

Deteriorating eyesight, community-group chairperson abilities, cooking preferences, feelings, experiences, routine contexts and impacts, for instance, were interrelated to the cooking practices and domestic-cultural economy (5.5). Positioned with the above, it presents emotionalities as key to this co-dependency (Jasper 2001; Goodwin et al. 2001; Lipton 2013).

The dominance of conventional cooking may, therefore, be better understood and mediated as practices producing emotional bonds that maintain the practice in accordance with collectively defined identities, rules and guidelines (Hochschild 1979; Bondi 2005). This suggests considering emotionalities as integers of social being, management and practices at least as significant as social identities (Zembylas 2005). Furthermore, it underscores that development assets and agency do not conform to the fixed sites favoured by dominant paradigms (Hoggart 1990; Murdoch and Pratt 1993) and require considering common experiences, capabilities, narratives and emotionalities diverse geographies through their influence on shared temporalities, customs, meanings and ‘togetherness’ (Pinch 2008; Southerton 2009: 62). Thus, the social influences the experience and outcome of emotion and space itself, constructing an enabling, experiential ‘place’ (De Certeau 1998: 108; Taylor 1999).

The intimacy and functionality of discourse in the communities further illustrates this. The quintessential Nepali greeting “Bhat khanne ho?” (have you eaten yet?), for instance, performs a caring, socially bonding function that reproduces the exact form of everyday interactions, distinctions, belonging and hence culture (Bruner 1991; 2004; McCracken 2005: 166). The narratives reproduce its normative dimensions, including temporalities, responsibilities and emotionalities (Scheff 1994: 11). Discourse thus contributes to the specific coordination of everyday life, agency and culture through embodying its rules and activities (Williams 2000: 78). This interplay between specific forms of social discourse, action and context indicates significance for sustainable development, not least for social identity, organisation, action and change (Halfacree 1995; Lacan 1998; Banerjee 2003; Parsons 2013)¹⁷⁵.

This relationship is further unravelled through a social practice theory. We recall that social life, structure and action can be considered as mutually discursive and non-discursive practices interrelated in their everyday routinisation (Chapter 3). The verbal and bodily enactment of consuming rice in the communities, for instance, interdependently expressed and reproduced the definitive practice, its functions, socio-technical configuration and bonds. Meanings and feelings of acceptance, belonging and order, for instance, are inseparable from the social functions of the specific discursive and non-discursive performances of dining (5.5; cf. Taylor 1999; Luckman 2014). As guests, my translator and I were complicit in the reproduction of this system. This may explain the evident displeasure and re-arrangements

¹⁷⁵ Others emphasising this interplay include Halliday’s (2006: 48) notion of “field”, “tenor” & “mode” produced, interlocked & sustained in an interpersonal ‘text’ & Habermas’ dialogical relation of social discourse and action through shared practical, political & moral bonds (Habermas 1987: 303).

associated with missing Dal Bhat and why the community were pleased when we replied in the affirmative about having our rice (Druckman and McDermott 2008)¹⁷⁶.

Emotionalities, moralities and other components and relations of practice are thus intertwined in the 'performative discourse' and actions of social life whose reiteration reproduces "the phenomena that it regulates and constrains" "through the citation of a prior, authoritative set of practices" (Butler 1993: 40). This 'nexus of doings and sayings' (Schatzki 2001: 48) "allied with normativised emotions" and meanings mutually integral to social life (Schatzki 1996: 80, 89; Lash 1994: 149-152) thus frames the significance of emotionalities in the case studies and for sustainable development.

This is compatible with considerations of requisite 'tacit knowledge' being interdependent on craft, passion and competence (Polanyi 1958) and that discourses yield effect only through association with practices and their emotionalities (Arts 2002; May and Thrift 2003). These dimensions are hence simultaneously 'virtual' and physical aspects and relations of power comprising 'a certain economy of discourses' and 'discursive knowledge' (Foucault 1980a: 70; 93; Lash 2002: 141) through their irreducible (re)constitution in social practices (Giddens 1979: 42; Lash and Urry 1993: 30). This renders these characteristics of social agency, everyday life and the lived environment obscured through their very systematisation (Taylor and Leitz 2011; Beetham and Sharpe 2013). This is further articulated by Fineman (1993c: 16), explaining the nature, coordination and mobilisation of interpretations, actions and capabilities through how "cognitions and emotions intertwine" in daily practice.

Dining in the communities further illustrates these components, this normativisation and concealment process, and their importance for development pathways. Firstly, the food practices encompassed multiple practices, institutions and functions¹⁷⁷ co-dependent on their elements, performances and competing practices (cf. DeVault 1991; Woodefield 2000). Multiply embodied and interrelated in this way, the meanings, competencies, materiality, spatio-temporalities and capabilities of practitioners and communities become diversely prefigured such that they are collectively essential to agency and being existent only within this system of social practices (Giddens 1979: 64). Beyond this, the necessary functionalities,

¹⁷⁶ The mother & mother-in-law in Jaidi were displeased with me suggesting starting the day's fieldwork before the dhal bhat custom & wanted to shift the diurnal schedule earlier to coincide with our need to leave earlier so we could eat "properly" in the house with the family as expected (JHHi1). Reinforcing this was the unavailability of dhal bhat outside the prescribed times & spaces, & the effects missing it had on community members' moods & routines (JHHi7; JHHi9; SBHHi2), illustrating the tight interrelations of practices whereby any adjustment has widespread repercussions.

¹⁷⁷ Referring back to 5.5, these included mothering, caring, socialising & maintaining 'family'.

capacities and organisations cease to be, signifying deskilling, loss of control, order and identity (Giddens 1991: 146; Aporta et al. 2005). Routines may thus engulf possibilities, signifying change beyond this as impossible, unsettling and disempowering (Comaroff 1985; Leibniz 1989: 338). This helps explain the unanimous importance the communities ascribed to “tradition” opposing rice cookers and female participants’ impassioned “what else can we do” when discussing firewood practices (JHHi7; SBHHi9; Giddens 1994: 62).

Emotionality, therefore, was irreducible from its combined elements in practice; it harbours social meaning, competency, materiality and ordering implications (Rosaldo 1984: 137; Fineman 1996). Moreover, enveloped and accumulated in social spatio-temporalities, the emotionality and practice of cooking in the communities becomes ‘place-making’ and ‘historising’ (Cassy 1996; Heidegger 1996: 41), reassuring habitualised action and outcomes (Butler 1997; Giddens 1997: 65) and accentuating their social and practical importance (Bourdieu 1977: 78; Jasper 1995). This may help expose the reported attachment to certain elements of cooking, such as the ‘smokiness’ and ‘tradition’: they are complicit in the textured making of the practice, emotionalities and the multitudes of other practices and constructions to which cooking relates (Silverstone 1989; Warde 2013).

Secondly, as practices construct the components and context upon which they co-depend, we can equate practice elements and relations to ‘capitals’, explaining the inability to innovate the food practices as products of positionality-limited means for alternative practices (Bryans and Marvin 2003; Thornton 2004: 2). Capitals distribute, accumulate and expand through the society’s system of situated practices and including emotionality within this, we can better grasp the range of “necessary” dimensions substantiating the “immanent regularities” of the communities’ routines and the durability of the cooking practices (Bourdieu 1919: 112; Anja and Agyeman 2002: 272). Collectively, the capitals signify what Tripsas’ (2009) calls ‘core competencies’, which create “core rigidities” constraining the development of new capabilities, consumption modalities and thus impacts through the system of practices (Bouchikhi and Kimberly 2003)¹⁷⁸. Broadening the recognition of resources and economies in this way is thus consistent with realising the multiplicities of path dependency and alternative development pathways (Dennis and Urry 2009: 64; Hansen 2011; Blewitt 2014: 336).

The innovative electricity and management approaches, for instance, in contrast to rice cookers, were appropriated and sustained because they were consistent with communities’

¹⁷⁸ Reaffirming the importance of process & structure, & its duality & diversity for development pathways (Kogut & Zander 1996; Agarwal 2000; Lundvall 2001; Lee et al. 2009).

organising and communicating routines and their emotionalities, skills and meanings (JHHi4; KHHi10). This complementarity thus mitigated common encounters of diffusion anxiety, resistance and avoidance (Fiedman 2000; Rogers 2010: 3, 303). The contrast with cooking predicates including emotionality and discursive approaches to innovation and development (Thibault 1997: 28, 118). Thirdly, the importance of emotionalities, discourses and performances of practice is consolidated by their implications on time and space and hence the communicability of practices. Rose (2003), for instance, illustrates that engrained in social practices; artefacts evoke routinised emotions of those practices in different settings, producing the 'domestic' in the workplace via family photos just as emotionality, competency and family are embedded in modes of personalisation, reciprocity and care (Campbell 1989; DeVault 1991; Warde 1997). Indeed, such elements may be maintained in practices as diverse as food shopping, holidaying and gift exchange¹⁷⁹, whose emotionality may be an integral part of the practice, its function and maintenance (McMeekin and Southerton 2007; Morgan 2011).

Emotionalities, therefore, have myriad, 'translocal' effects (Fried 2000; Cass and Walker 2009)¹⁸⁰. Existing in practice-specific constellations of routinised bodies, 'tradition', 'community' and so forth, emotionalities become complicit in the structuring and contextualisation of social sites, distinctions and institutions (Giddens 1981: 27; Levy 1984: 216). Emotionalities thus reaffirm the "socio-material systems'" interrelated dimensions and enactments (Chappell et al. 2000: 12) such that the cooking practice and associated emotionalities co-constitute a nuanced yet macro-structured existence spanning genders, villages and rural life (Castells 1977; Scott 1977; Halfacree 1993).

Consequently, the rice cooker, emotionalities, capacities, enactments and effects, transcend the individual, rational and material (Foster 2004; Kleine 2008). They are collective, socio-technical and co-constituting (Giddens 1979: 58; Schatzki 2001: 21). Emotionalities may hence offer further insight into the systems of rules, routines and path-dependencies and their constitutive social practices that distribute, determine and reassure functionality, identities, consumption modalities and power (Foucault 1980a: 38; Holbrook 1986), signifying both 'culture' and future innovations (Giddens 1981: 27; Markus and Kitayama 1991). Thus, emotionalities may provide a further guide for the diverse effects interventions have and how they may be refined (Robeyns 2007; Bijker et al. 2012: 95 244). Consequently, this section closes the cooking analysis by demonstrating, through considering agency viz-à-viz core

¹⁷⁹ See Miller (1997) & Mankekar (2002), Hochschild (1997) & Munn (1977), Mauss (1990), Ruffle (1999), Cheal (2015), respectively, for examples of these.

¹⁸⁰ The 'interscalar' interplay & effects of practices, emotionalities & discourse, is an area of increasing scholarship (cf. Simonsen 2008; Shukla 2009; Burr 2013; 2015; Datta 2016).

routines, risk and marginalised actors, the practice-led emotionality insights for development pathways.

Firstly, analysing the routinely co-created conventions from the positions of the communities highlights the substantive symbolic, emotive and material costs to females digressing from fuelwood conventions and that these, the importance of smoky rice and suppressed rice cooker uptake, were continually buttressed by their habitualised, interrelating performances (Kikidberm 1983; Szerszynski 1996: 104). Emotional responses, therefore, condition consumption, yet rather than produced by the attributes of the product or consuming itself, reflect the social system they cohabit (Murdock and Morrow 1970; Bennett 1990: 200). In this way, as Warde (1996; 1997) also demonstrates, consumption of sources of encultured identity and organization may thus be decoupled from conventional commodification and commercial consumption (Wood and Moreau 2006; Bourdieu 2011: 81, 92). Instead, they are situated through conventions such that technologies and approaches do not configure users and effects (Winner 1980); practices do through 'melding' their everyday tools, requirements and context (Watson 2008: 8). This co-construction includes how culture, community and participation is formed and differential (Fisher 2001; Turnhout et al. 2010) and how 'appropriate' is performed, negotiated and reformed (Ortner 1995: 190-191; Reckwitz 2012: 255).

Accordingly, emotionalities compete with other practice demands to signal 'appropriate' performances and alternatives (Coltrane 2000: 1210). The persistence of gendered domestic practices¹⁸¹ and distress typically experienced in interventions may thus reflect outcomes of meanings, relations and emotionality mutually embedded in their performances and structures (Ferree 1991; Erickson 2005: 340)¹⁸². This parallels Giddens (1984: 125) proposition that the very emotionality of daily life obscures the agency that participants have. Secondly, the centrality of cooking practices in the case studies suggests that practices and elements that are omnipresent, ancient and interrelate with a range of other practices and their structures, elements and projects, may be especially engrained, diffuse and oppositional to change (Fetherstone 1987; Shove et al. 2003; 2007). They also represent factors, processes and domains that hold particular influence over others (Rose 1997; Dooris 2009).

¹⁸¹ Including in Western contexts & when other gendered inequalities have become more equitable, such as income, time, decision-making and ideology (Shelton & John 1996; Spain & Bianchi 1996).

¹⁸² Reinforced by West & Zimmerman (1987), DeVault (1991), Harvey (1998; 2003), Beck & Beck-Gernsheim (1995), Cass (1996), Hajer (2003), Kroska (2003), Erickson (2005), Buijss (2009; 2011).

These 'signifying' or 'focal practices' and elements may thus be especially formative to everyday life and sustainability (6.4; Hebdige 1979: 117; Warde 1997; 2005). This may include indicating prime sites, barriers, activities, structures, moments and junctures where intervention and research may be most effective for certain outcomes and the type of approaches required for this (DeSimone and Popoff 2000; Browne et al. 2000; Seyfang 2006). The thesis thus calls for further practice-orientated research into social phenomena and suggests notable foci include common and resource-intensive routines and forms of demand, financing, control, resistance, (dis)empowerment, belonging and innovation. Exploring how they function and impact over time and space via practice performances, relationships, interactions and teleoaffectivities may be especially valuable (Banchoff 2002; Goodwin et al. 2004).

The fuelwood practices and their emotionalities, for instance, permeated foundational dimensions of everyday life that the entire community had shared since time immemorial: rhythms, rites and landscapes of fuelwood collecting, cooking, smoky food, houses, clothes, the importance of rice, cooking and in language, values, feelings, socialisation and distinction (5.5). Forged in and through such "generations old" dimensions, the social practices, relations and practitioners become collectively normativised yet positioned (Rogers 2010: 26; Gawande et al. 2013: 6). They hence become political, cultural and locked-in to the extent that its contextualised dimensions represents, politicises and configures the relationalities and means of replication (Law and Mol 1995). Considering emotionalities as part of this and co-constituted demands, capabilities and effects may hence expand the analytical gaze to advance how consumers and innovations for certain functions are particularly prefigured.

Indeed, for marginalised groups within this system, reproducing the 'family', roles and 'tradition' maybe foremost sources of economic and emotional support, providing 'subsistence insurance' essential to manage daily realities (Smith 1977; Roos et al. 1998)¹⁸³. In such contexts, therefore, maintaining firewood practices may appear 'essential' (Smith 2004, Kirby et al. 2007). This is reinforced by the interlinking of 'belonging' with feeling safe and uncertainty with discomfort and risk (Goss 1993: 28; Hofstede 2001). The significant confluence of emotions, conventions and agency is also stressed by Beck's (1992a: 87-90) notion of individualisation and Giddens' (1999: 3-4) 'manufactured risk', presenting the erasure of identity, predetermination and certainty induced by development and declining traditional institutions (Beck 1994; 1998; Giddens 1999; 2010). The collective system provided trusted 'fate', which, through patterning performances, precepts and encounters, displaced

¹⁸³ Expounded further in a rural and Global South context by Mead (1934), Moscovici (1984), Costanzo et al (1986), Scott (1995), Jahan (1995), Bhavnani (2003), Abbott et al. (2004), Singh (2006).

emotions and choice to unreflexive routinisations (Giddens 1999: 3; Barbalet 2001: 61). These routinised systems thus render the elements for sustainability “far from being visible or deliberately selected”, especially by those most affected (Shove and Warde 2002: 249).

The effect of ‘liberation’ from traditional pathways, therefore, as Scott argues (2000: 37), means “reflection seeps deep into the most private recesses of our lives on a routine basis; into our every action as colleagues, parents, partners, children”. This echoes the earlier contention that innovations in practice contend with norms as integral to society as family, ‘home’, temporalities and work (5.5.2; Hoggett 2005: 14). Innovations counterposing normalised procedures are thus culturally perceived and felt as non-deterministic ‘risky freedoms’ and undesirable outcomes, ‘disembedding’ clear signposts for welfare, being and belonging (Giddens 1990: 80)¹⁸⁴. The cooking change thus affects power, trust, values and place (Giddens 1991: 146; 1994b)¹⁸⁵, posing social alienation, disorder, reflection (Besier 2003: 31), anxiety and its emotional, embodied (Wilkinson 2001: 15; Jackson 2015: 41) and timespace restructuring (Lash 1993: 16). Emotionality and risk hence contribute to the action-disabling doubt typifying prospective changes to routines (Eraut 2004; Jackson and Everts 2010) and the objective cultural framework whose mediation compounds the daily duties and risk prevention tasked to rural women (Beck 1988: 10; Flitsch 2008).

Expanding the dimensions of agency to include such an embedded system interlinking emotionalities, capabilities, consumption, participation and outcomes, may thus minimise overlooking barriers to sustainable development (Kleinman 2005; Shrivastava 2010). It also illustrates how insights from postmodern concepts, if contextually considered, may broadly enhance development frameworks (Attewell 1991; Hunt 1999: 510). Examples beyond the case studies reinforcing this include effective development innovations relating to being “easy to love” through adaptability to community relations and emotionalities (de Mol and Laet 2000: 252; Donahue 2008; Purrenhage 2010) and innovations in new organisations partly because their novelty precludes substantially engrained co-dependencies and opposing emotionalities (Rosenberg et al. 1986: 258)¹⁸⁶.

¹⁸⁴ See also (Allan et al. 1998; Beck 1992a; Bijker & Law 1992: 3; Kogut & Zander 1996; Lee et al. 2011).

¹⁸⁵ Also Cowan (1983), Bauman (1973; 1988), Jackson (1992; 2005), Giri (2000: 1014), Frewer et al. (2003), Townsend et al. (2004), Oksanen-Särelä & Timonen (2005), Ekberg (2007), Bloch (2008),

¹⁸⁶ Indeed, examples of mainstreamed innovations & resistances show some changes & outcomes partly rely on the collective unknown, minimal negative emotionalities & subsequent institutional, emotional & moral enablers (Margolin 1995; Gaskill 2001; Frewer & Salter 2002). The rise in meat production intensification, consumption & ‘scientification’, especially vis-à-vis technoscience, risk, supply chains, impacts & consumer involvement, exemplifies this (Sjöberg et al. 2000; Jackson 2015). Conversely, for other food practices – consider vegetarianism & veganism – actor context, knowing & emotional & moral framings are formative uptake drivers embedded in the social (Haidt 2003).

The discussion, therefore, indicates the considerable extent to which food practices in rural Nepal¹⁸⁷ express notable teleoaffectivities that influence change, outcomes and order (Goodwin et al. 2001; Eckhardt et al. 2010). These become structured through their very ordinariness such that their elements, emotionalities and economies may extensively influence development (Klouzal 2003: 256; Beckett 2012). Emotionalities are hence substantive components of agency within practices and thereby collective yet encrypted (Silverstone 1994; Schösler et al. 2013). A supposition supported by the presentation of ‘taste’ as conditioned and constrained by customary relations and settings of practice (5.5). Emotionalities, consumption and development are thus complex entities predicated in routinised social performances (Butler 1993; McWhorter 1999). Thus, rather than countering fears, uncertainty and opposition through information or technology campaigns (Hilgartner 1993; Marteau et al. 1998), exploring the ways in which they are systemically made and enacted may be more effective (Frewer and Slater 2002; Pinch 2006: 182; Moloney et al. 2010). Doing so may advance understandings of the importance and structuration of relationships, consumption and choice (Bauman 1991: 276; Lawler 1992; Jackson 2000a: 32), such as those intersecting practices of making and sustaining family, gender, community and culture in Nepal (MacIntyre 1981: 187; cf. Haider 1995; Momsen 2004).

This further account of cooking conservatism thus affirms the inseparability of intelligibility, perceptions, ethics, feelings, risks and positionality in everyday life (Tulloch and Lupton 2003). Showing their collective influence on social agency and structure through social practices advances contentions that these interdependencies can be reconfigured to progress development pathways (Finger 1993; Miller and Edwards 2001; Urry 2006). Expanding such ‘webs of interdependence’ (Shove and Warde 2002: 242), this section advances considerations for sustainable development wherein emotionalities and capabilities are ongoing social constructs presupposing practice lock-in and change (Maniates 2002: 57).

This analysis advances the importance of considering the ‘invisible’, implicit and entrenched and how these construct normative framings that situate both barriers and opportunities for social change, action and sustainable development (Schutz 1967; Baerveldt and Voestermans 2005). It predicates approaching capitals, agency, risk and resistance, and thus interventions and impacts, via contingently routine multiplicities of knowing, feeling, legitimising and exchanging (IPCC 2001; Jackson 2000a: ix; Shove 2010). These signify the diverse, processual

¹⁸⁷ As elsewhere (cf. Douglas & Nicod 1974; Menell 1996; Warde, 2004; Rogers, 2010: 26).

and structuring nature of 'communities', 'practitioners' and 'culture' (Star 1991; Guy 2006: 650) and the necessity of approaching social life and "doing development" through the situated routines that constitute them (Porter and Judd 1999; Hitchcock and Hughes 1993: 28).

The social practice-informed research design and analysis presents an invaluable approach to aid this attentive to diverse socio-technical contexts, dimensions, dynamics and embodiments required (Goodwin and Goodwin 2000; Tulluch and Lupton 2002; Strijbos 2006: 365). Examining collective action and resistance further advances these insights and prospective implications.

7.4. Case II: Feeling collective: Shared elements of practice via discourse, doings & learning

Drivers of the collective action that materialized as essential for energy access and sustainable development were shared meanings, competencies and interactions. Emotionalities were integral to achieving and maintaining these, suggesting inroads for surmounting development challenges. This section further develops this through firstly examining how pervasive development problematics were eschewed and remedied in the communities (7.4.1) and, secondly, how they were encountered and sustained at scales far beyond the local (7.4.2). The two foci, getting electricity and electricity resistance, enhances the thesis by expounding the considerable influence of emotionalities on the minutiae of everyday life and sustainable development.

7.4.1 Getting energy access: Emotionality in financing, remoteness & demand

This subsection provides the opportunity to explore the role emotionalities played in surmounting three predominant energy access barriers representative of broader development challenges: financing, remoteness and demand (Mainali and Silveira 2011; Palit 2013). A considerable internal finance and labour contribution was required in Jaidi and Sisuwa-Bala to supplement the material, transportation and installation cost of providing electricity. Achieving this hinged on significant collective and sustained inputs from recipients, common barriers to development projects (Ili14; Ili26; cf. Ruttan 2006). Chapter 6 explicated that this was achieved through interactive socialisation processes aligned with pre-existing

social conventions, meanings, emotionalities, skills and structures consolidated through repeated group practices. It suggested that constituents of practice, including emotionalities, become irreducible in practice performances. This problematized the dominant neglect of emotionalities and reaffirmed the importance of further understanding the interdependencies of social practice and change (Morgan 2011). We contribute to this further now by developing three additional points that integrate and augment the findings of the previous chapters through collectively considering the barriers of financing, remoteness and demand.

Surmounting these barriers related to the high and collective electricity and approach demand, motivations, responsibilities, respect, pride, prestige, “good feeling” and a “positive sense of togetherness” (JHHi11; SBHHi15; KHHi7). These attributes were practice-specific, textured by emotionalities and crucial to a number of practices. Aligning with this resulted in highly contextualised and coordinated electricity and development-related practices that underlined the effectiveness of the practices and project approach¹⁸⁸. Yet the practices and outcomes were unequal and emotionalities were similarly agential in this. Marginalised groups appropriating electricity-practices, for instance, were constrained by “fear” and “uncertainty” (JHHi8; SBHHi4; KHHi3), while electricity users and managers were boosted by the positive teleoaffectivities. Emotionalities, through practice, thus catalyse, symbolise and reinforce social position, means and ends (Thoits 2004: 361; Nightingale and Ojha 2013).

The second point is that these effects are systemic. Collectively feeling “frustrated” and “neglected” by the state’s electrification efforts, and instead desiring “fair” electricity (SBHHi17; JHHi11), for instance, bolstered the supportive community practices and were augmented by feelings of nationalism, justice and entitlement relating to their perceived abundance, meanings and ownership of electricity-generating fluvial resources (JHHi18; KHHi15; li5). The positioning, construction and context of emotionalities are hence multi-actor, infused with, and influencing, the socio-technical dimensions of the social setting (Calhoun 1993; Probyn 1996). Emotionalities are thus aspects of the duality of structure that are both medium and outcome of social performances (Harding 1991; Smith 1990; Bell 1999).

Practices and spaces are thus imbibed with co-constitutive details whose emotionalities, when actively integrated in the energy practices, became a key part of the empowerment process and emergence and effectiveness of resulting practices (Passyn and Sujana 2006), yet when

¹⁸⁸ See 6.3. The range of participants widely underscored this conclusion. Practices related to community electricity use, management, capacity building, financial saving, education and enterprise schemes.

overlooked, resulted in practice exclusion, short-termism and non-uptake¹⁸⁹. Patterned in social practices, emotionalities were hence involved in both revising some aspects of the communities' socio-technical templates and maintaining others, simultaneously enabling and constraining inclusive sustainable development (Pretty 1995; Stanley and Miikkulainen 2004). Whilst indicated in 6.3.1, focusing on the role of emotionalities in this develops the final core point of this subsection: the impact and revision of normative orders.

Inclusive group structures and performances were integral to the success of the community electricity models. They collectively constructed performance-linked bonds that reinforced the social performances (5.5.2, 6.3; March 1991). This process represents a practice 'community': social groups united by shared practices and/or elements or relations thereof (Wenger 1998). The COP thus mutually co-constituted and co-evolved 'culture', consumption and capacities (Shweder 2003; Markus and Kitayama 2010)¹⁹⁰. As signalled in 6.3, although unequal, this included enhancing resources, inclusivity, services, meanings, conventions and enterprises. The communities thus reproduced and revised normative socio-technical orders, suggesting the prospect, and structural considerations, of practices for engendering sustainable development. Considerations included practice communities overcoming barriers to participation and that practices involve various degrees and forms of participation and non-participation related to the system in which they are located and co-constitutive (Levinas 1981; Chui and Hong 2006). The contingent forms and repertoires of these hence yield insights into the organisation and requisites of (non-)participation, consumption, inequalities and capacities and substantiates 'access' and consumption as the performance of practices¹⁹¹.

This chapter advances this through interrelated accounts of emotionalities, place and performances that furthers the degree to which means and ends are embedded and co-constituted. Thus, while utilising pre-established elements and structures of a society's practices signifies a means to enhance capacities and development through practices, drawing upon the emotionalities of these, such as pride and "good feeling", signals means to further contextualise and boost them (Di Cerbo et al. 2009). This advances notions of capacity and

¹⁸⁹ Examples of these were discussed in chapter 6, including effective group-based management practices, commitment and retention of skilled staff via utilising social bonds, yet less effective, short-term SHS use and managerial practices involving private sector actors, such as the SHS distributor's technicians, where these actor bonds were absent (cf. Connolly 1991: 173; Aminy 2002; Rogers 2010).

¹⁹⁰ Putnam (1993a: 52), focusing on social relations rather than practices, argues a similar co-constitution for structures and distinctions of 'community' and 'culture', while others stress the co-constitution between 'place' and 'culture' through norms being routinely lived and performed (Tilley 1994; Hirsch & Hanlon 1995; Lewis & Weiret 1995; Rapport & Dawson 1998: 4; Bender 1998).

¹⁹¹ Social constructivist accounts of 'consumer culture' and 'consumption communities' support this point further (cf. Jackson 2000b; 2004; Muoiz & O'Guinn 2001; Cova & Cova 2002; 2006; Seyang 2007).

development as multifaceted outcomes of collective action (Kumon 1992; Lawson and Lorenz 1999) supported by reciprocal participation and emotionalities in practice-communities (Stack 1973; Andrew and Lewis 2007; Liberman 2007). The case studies thus substantiate emblematic 'cultural goods', institutions and interactions as means to overcome development constraints and underpinned by feelings (Wilk 1995: 183; Anderson 2003: 141-143)¹⁹².

Considering demand, a prime driver for collective action (Rydin and Pennington 2000; Olson 2009), substantiates this contention further. The electricity-related routines in the case studies were collectively deemed indispensable for a multitude of shared reasons. These included that electrical goods impart prestige and enable innumerable desired livelihood enhancing ends; their current consumption modalities are variously unsatisfactory¹⁹³; other actors will not provide these services soon enough and that what they can collectively provide will be better than individual or external provision (JHHi17; SBHHi3; SBHHi13).

These reasons and the resultant demand were collectively enhanced and structured through common experiences and discourse that engendered, and interlaced with, attributes such as prestige, belonging and associative actions (Edwards 1999). 'Demand', like the other attributes, is hence a socially produced and coordinated composite requiring social communication and confirmation via practices integrated within the social economy and context (cf. Malinowski 1921; Hardin 2015).

A 'habitualized' narrative and practice of the contextualised value, means and feasibility of the energy access approach thus developed and reinforced the encounters, demand and agency of the societies (Richins 1997; Pérez-González 2011: 44). Interconnected to the energy provision practices that continuously signified the relative advantages, necessity and feasibility of the innovative modalities, both the discursive and non-discursive performances experientially interlinked and embodied these constructions (Berger 1979; Mano and Oliver 1993). The constructed repertoires and interactions thus dually encompassed the "full gamut of convention and normality", establishing a common, multiply embedded, practice-specific demand (Belanger and Dubé 1996; Birtchenell 2012: 497). This extensive demand and socialisation was enhanced by the exemplary inclusivity and long-termism of the

¹⁹² These notable implications of pride, trust, social desire & attachments are widely reinforced, including for enhancing services, wellbeing & livelihoods (Hirschman & Holbrook 1982; Schein 1999: 358; Williams 2000; Belk et al. 2003; Chiesura 2004; Simmel 2004: 75-79; Herzfeld 2014).

¹⁹³ As discussed in chapter 5, in addition to wood for primarily cooking, modalities were chiefly kerosene (lighting), provided no electrical power and were collectively, excepting wood, deemed inadequate, unjust, unsafe, insecure and costly (JHHi2; JHHi11; SBHHi9; KHHi9).

communities' interactions viz-à-viz the electricity approach. The approaches, demand and practice elements were hence co-constitutive and collectively involved in overcoming pervasive development barriers of doubt, external dependency, intentionality-performativity dichotomies, financing, remoteness and productive, complimentary end-uses and management, inter alia (Darby 2006; Allcott and Mullainathan 2010).

The discursive, experiential and emotionality realms of social life thus interconnect in social practices to play a constitutive and coordinating role for agency and its contexts utilisable to engender collective action and sustainable development (Guha 1998; Herzfield 2014). The analysis illustrates that these processes and structures gain effect through their circumstantial performances integrating specific socio-technical dimensions of social experience (Gronow and Warde 2001). This aligns with an undercurrent of contemporary scholarship evidencing emotional experience as significant determiners of ongoing social behaviour and support in domains as diverse as marketing, consumption, working and management (Holbrook and Batra 1987; Dube and Menon 2000). They affirm that experiential emotionalities underpin effective practices and practice transitions, such as via enhancing citizenship, collective learning, action, innovation uptake and development gains (Greenberg et al. 2003; Park 2005)¹⁹⁴. Yet the case studies also revealed that emotionalities sustain inequalities (Hook 1998; Adger and Kelly 1999: 257)¹⁹⁵.

Practices thus embody a critical 'prose and poetics' mobilising collective action and inaction (Bauman and Briggs 1990). Indeed, revisiting the industrialisation emotion-conduct regulation and transformation example (7.2) reveals that social narratives, in addition to spaces, were utilised as part of this. Coupling ideologies, feelings, materialities and behaviours, narratives such as "we're all in it together" and "men don't cry", became socialised, masking the differences between the bourgeoisie and proletariat and legitimising the mass appropriation of industrial practices and outcomes (Engels 1968; Simons and Bruder 2012). Practices thus engender and reproduce a collective authenticity sufficient to enable novel and maintained practices, 'commodifying' practice elements, relations and performances (Simmell 2004: 78), yet often being tacit, unclear and rehearsed (Bower 1991; Beck 1992).

¹⁹⁴ Further work highlighting these points include Cannon (1994), Schmitz (1995), Hoggart (2000), Amin (2002), Molyneux (2002), Zorn (2003), Barker (2005), Wolf et al. (2005), Hackney (2006), Steiner (2006: 33, 123), Isaac et al. (2007), Sharma (2007), Clough (2010), Ahmed (2013), Ingold (2013: 48).

¹⁹⁵ Peter Jackson & others (2009: 19) similarly emphasise that contrary collective experiences & feelings, such as of material hyper-availability through (decreasing) price signals & (increasing) product omnipresence may diminish consumer demand & desires & thereby reduce, rather than sustain or enhance, related social practices & consumption (cf. Williams 1977; 2000).

This signifies the importance of emotionalities and discourse in everyday life and transitions (Wilks 1997; Heywood 1994: 100) and analysing the social, symbolic, 'irrational' and routine that underpin interactions and inequalities (Hirschman and Holbrook 1982; Addis and Holbrook 2001). It affirms the value of rectifying their predominant neglect in development paradigms (Adkins 1995; Bosshardt et al. 2013, See also 7.2.) and predicates practice-based pathways for this attentive to their systemic and poly-dimensional processes and embedding (Friedman 1997; Markus & Hamedani 2007; Shove and Walker 2008). The signalled importance and contingencies of these, however, warrants further investigation into the nature and role of emotionality in practice (Berezin 2001; Clough 2010; Reckwitz 2010). We advance this and its significance for development approaches further by now considering intervention resistance.

7.4.2. Resistance & project disruption

Exploring technologies, energy access and development requires exploring resistance. The previous chapters highlighted that resistance was a prominent barrier to these, including in the influence and longevity of social contributions, consumption and management. Indeed, development efforts are routinely marred by resistance¹⁹⁶ and for Hickey and Mohan (2004: 127), resistance to change poses the ultimate barrier for sustainable development. Consequently, critical investigations into the nature of resistance, and most notably from social science perspectives, are required and gradually increasing (e.g. Cotton and Devine-Wright 2011; Sovacool and Ratan 2012). Following the substantive role of emotionalities and discourse in non-innovation, social life, inequalities, exchange and (in)action, however, an interrogation of resistance from a practice-lens embracing these dimensions offers further insights into these, the role of resistance and subsequent means to enhance development pathways. The following empirical analysis contributes to these through making them the focus of this section.

It also takes this opportunity to study these in the context of a significant yet oft forgotten component of core services such as energy, and one often met with notable social resistance at the expense of the service and prospective outcomes as a whole: distribution/transmission (e.g. Cowell 2010; Cotton and Devine-Wright 2011; Devine-Wright and Batel 2013). This section thus aims to remedy the neglect of the substantive empirical issue of service

¹⁹⁶ Highlighted further by Miller (1995), Berkes & Folke (2002), Allison & Hobbs (2004), Brown (2005), Hoffman & Bazerman (2007: 85), Walker et al. (2009), Harich (2010), Yadoo & Cruickshank (2010).

distribution, and the broader imperative of the neglect and 'irrationalisation' of emotions in resistance framings opposing the multidimensional and nuanced complexity, scales and contestations of development (True 2003; Emirbayer and Goldberg 2005)¹⁹⁷.

Resistance takes many guises. Significant forms for consumption and sustainability include rebound effects, commodification objection, complexity expectation and fear and risk avoidance (Hargadon and Douglas 2001; Gerasimov 2003). They reflect the social dynamism and embedding of consumption patterns and resistance (Cala and Smircich 1999; Markvart 2009). The Khimti case exemplifies a substantial form of development resistance that provides the focus for this section: the World Bank commissioned Khimti-Dhalkebar electricity transmission project, prevented since 2003 due to social opposition (KHHi18; Ili19; NEA 2012). Mr Larsen provides the national, international and private sector perspective:

The line will export surplus electricity to India for revenues for Nepal yet there are 7 towers running through one village unfinished because they have not agreed to the compensation the government has offered. So a small village is managing to halt an international transmission project. That's completely unheard of in our world. It's all complete but for those 7 towers so it cannot be used yet and the amount of capital just sitting there is outrageous (Ili1).

The criteria underlying dominant development models – political, technical and economic – in this case would predicate project success (Ili1; Ili19; NEA 2015)¹⁹⁸. The reality reaffirms grounds for scrutinising development pathways and considering alternative factors and perspectives (Lohmann 1988). Residents from three households surrounding one of the sites, for instance, highlight:

We rely on this land for our livelihoods. It's all we have and the electricity will harm our animals and us. The wires make noise that will scare them and make them produce less. We are also very scared about how it will harm our health and land and so we don't want it here....and we don't want to move as this is our ancestors' land where we've always been (SHHi1-3)¹⁹⁹.

¹⁹⁷ Stressed also by Gusfield (1970: 180), McAdam (1982: 16-19), Cohen (1985: 688), Oliver & Winer (1987), Handy (1992), Parry (1994), Young (2000), Wood & Moreau (2006), Lilja et al (2013).

¹⁹⁸ Discussed further by ESSD (2004), The Inspection Panel (2013), World Bank (2015), NEA (2012).

¹⁹⁹ This index signifies one of the villages neighbouring the Khimti case study that I briefly included in the research towards the end of the fieldwork as the importance of electricity development resistance related to the delivery approach emerged. Due to the politically charged nature of the resistance, the village name & interviewees are not disclosed.

Residents thus assign considerable value to their 'local' environment that symbolises a plethora of interdependencies for their collective wellbeing, experience and heritage, including, livelihoods, preferences, emotions and possibilities (Savage and Duncan 1990; Cetina and Preda 2007: 126). They present agency, resistance and development as interrelated and embedded within the socio-technical norms of daily life of which emotionalities are constitutive (Melucci 1989; Young 1990). The sustained community resistance through shared practices, solidarity, fear, forceful narratives and connections to place signify this further, emphasising that collective action is symbolic, shaped through the medium of situated emotions and meanings and thus culturally produced and enriched by their interrelationships (Rosaldo 1984: 150; Shweder 1984: 45).

As Marcus and Fischer (1986: 45) usefully express, this reframing of action through a socio-cultural lens may improve social research and projects and pathways to sustainable development necessarily situated in the social through helping to cut through the "contemporary homogenization of institutional forms of social life". It suggests policies and projects bolstered by supporting this and the alternative and interlinked forms of consumption, production and governance they co-create (Rose 1995; Crang et al. 2003), inclusive of their specific communities, norms and forms of resistance, emotionality and material environments that "fundamentally" structure them (Lutz 1985: 5; Goodman 2009)²⁰⁰.

The above excerpt, for instance, advancing the insights of Chapters 5 and 6, indicates that the community's environment is enlivened with ways of feeling, valuing and being that intertwine and embed within the situated forms of social practice (Bryant 2000; Jackson 2015: 46-47). These embodiments and their interdependencies, including "land", "livelihoods", "ancestors", elucidate a regularised, 'deeply-layered' script encompassing expansive spatio-temporalities upon which the group "rely" (Carroll 2000: 48). This 'historized' interdependency thus encultures and territorialises routines (Heidegger 1996: 41), reassuring action and outcomes that consequently may appear to have no life outside those circumstances (Giddens 1997: 65; Hegel 1998). Emotionalities are thus complicit in interpreting, acting and responding, predicating distinctive ways of considering land, needs, competencies and displacement (Casey 1996; Routledge 1999). Bourdieu's (1977:78)²⁰¹ 'habitus' indicates a framing for this to emphasise the rich, agential setting that resistance articulates and defends. Displaced householders and a local teacher substantiate this further:

²⁰⁰ Also Zurcher (1982); Mummendey et al. (1999); van Zomeren et al. (2004); & Thomas & McGarty (2009).

²⁰¹ Described in chapter 3, section 3.4.

They didn't consult us or explain anything so we don't know enough about what impact the project will have on us and so we are frustrated at being ignored and very worried and upset (SHHi3).

We can't trust what they say when they build without telling us anything. And they will make lots of money from this so we should be considered and compensated (SKSi1).

Their emphasis is on relational dimensions of everyday life wherein required elements and modes of practice for normativised agency are signified and situated (Rafaeli and Sutton 1991; Burkitt 1997). Requisites highlighted reinforce the significance of contextualised emotionality, meanings, trust and risks related to social positionality that underpins the subjectivity of needs and the prospect and experience of change (Koch 1995: 320; Becker 2005). Similarly, the reduction of this complex to 'us' versus 'them' depicts the co-construction of identities and difference whose routinisation anchors a collective rudimentary to wellbeing conventionally undermined in interventions (Kelly and Kelly 1991; Klein 2002; Thien 2005b), reaffirming the role of distinctions and practices for alternatives to those currently institutionalised (Said 1989: xxviii; Yuval Davis 2010).

Let us unpick this. Firstly, the participants predominantly express their resistance through articulations of collective emotions. This reflects the communities' emphasis on "taste" viz-à-viz cooking conservation, suggesting emotionalities, like senses, may be foremost means communities experience, convey and reproduce routines and understand, and resist, change (Smith 1977; Lohmeen 1998). Secondly, the respondents relate their resistance to their relatively low inclusion, participation and commonalities with the developers and perceived gains in relation to their specific social conventions (SHHi1-8). Their underlining of consultation, consideration and "us" instantiates this (Goldman 1988; Braun 2000). Resistance thus appears engendered by contradicting normativised or "naturalized" framings of order and power co-constructed by practices and counter-practices (Schiappa 1989: 51; Bauman and Briggs 1990) and mitigated by engendering interactor and pathway symmetries through social inclusivity, interaction and bonds (Ili5, Ili8; Abrahamsen 2004; Barnett and Duvall 2004).

Yet the case advances this further by indicating that these should include social knowledges, dialogues and relationships attentive to actor emotionalities and expressive of social culture, experience and order (Borthwick 2000)²⁰². Knowledge, experience and positionality thus appear causally related and co-constituting agency, order and action (Foucault 1980b;

²⁰² Reinforced further by Merleau-Ponty (1962), Lohmeen (1998), Herbert-Cheshire & Higgins (2004).

Schwartz and Sharpe 2010). Conflating this case with the rice cooker and management analysis, however, signifies emotionalities as significant in this relationship and hence agents of space, power and change (Ash 2014: 4)²⁰³. This is reinforced by insights that emotionalities underscore the vulnerable contributing to their own subjugation and 'place' (Foucault 2000; Turner and Stets 2005), and thus symbolic capital, in its interwoven ethical and affective ties (Bourdieu 1994: 185; Fineman 2006b). Collins' (2001) location of agential emotionality in 'social attention space' and 'practical wisdom'; a situated mastery of the specific surroundings that enables effective functioning within everyday life, entailing and producing emotionality constitutive of that community; also indicates emotionalities' relational location and agency (Dunne 1993: 10; Schwartz and Sharpe 2006)²⁰⁴.

The analysis thus casts experiential emotionalities as formative to agency and change yet unequal, multidimensional and provisional (Kamoch and Mueller 1998). This further conditions approach requirements, suggesting intertwining emotionalities, social needs and capabilities in sustainable development pathways (Hoppers 2001; Jalan and Ravallion 2003). Returning to the empirical material emphasises a third insight that integrates these points: normalised practices. As a local shopkeeper explains:

Normally our village government officer discusses things with us but this didn't happen for the transmission development and so we feel very neglected (SKSi2).

The participant hence underwrites the importance of normativised interactions for wellbeing (Toynbee 2007; Barry et al. 2008). Routinised agents, relations and forms of exchange ("our officer") thus signify socially 'personalised' and positioned systems for governance and development (Bourdieu 1977: 78; McAllister 1989: 347) that signify particular histories, geographies, coping strategies, emotionalities and means to eschew resistance (Amin 2004: 33, 42; Jones and Macleod 2004: 448). Following the previous chapter, approaching the relationship as systems of practice embeds the above pluralities whose co-construction and agents includes contextualised spatio-temporalities and discourses of everyday routines (cf. Southerton 2006). As Mr Larsen emphasises, however, like the elements of practice, the spatio-temporalities of practices are reinforced and reinvented through practice narratives

²⁰³ Also see Fine & Fields (2008), Battilana & D'Aunno (2009), cf. Thrift (2004), Duff (2010: 885).

²⁰⁴ See Wagenaar and Cook (2003) for an extended exposition of 'practical wisdom'.

that harbour notable implications for the communicability, coordination and dynamism of practice and hence resistance:

It's much harder today because of this talked-up teaching of communism and rural inequality instilling an attitude that this is our land and you cannot do anything unless we are heavily compensated. They have been trained to a school of thought that is completely devastating for development (Ili1).

Discourse thus has substantive effects on collective meanings, actions and interventions over space and time (Patton 1995; Fiol 2002). The anti-hegemonic discourse carrying teleoaffectivities of “our land” and justice, for example, was a relatively recent construct in the communities instigated in the last two decades by the Maoist infraction to enhance political disenfranchisement to increase support for their alternative (Forester 1988; Nightingale 2011). It depicts the discursive construction and ‘interscalar contestation’ of development contingencies that gain effect via mobilising social practices and their places (Jasper 1997; Amin 2002: 386). Moreover, the quote predicates, through the lasting impact on the acceptance and enforceability of projects throughout Nepal, that although practices may have ceased, their symbolic legacy can have expansive, emotive, politicised and material effect (cf. Jackson 2002; Herzfeld 2004)²⁰⁵.

The narratives, experiences and performances of the transmission development thus juxtaposed the incumbent social setting and constituting social processes and resistance. As Toke et al., (2008) and Knudsen et al.’s (2015) empirical studies also note, this is compounded by the differential materialisation of the risks (local, public, partially conspicuous for civil society) and gains (private, monopolised and largely concealed from society) of centralised distribution of any service. Social practices at all scales, therefore, both produce and countervail power (Foucault 1977; Cooren and Taylor 1997), providing the legitimation that constitute and conserve ‘appropriate’ norms and hence co-construct ‘acceptable’ feelings, conducts and interventions (Whittington 2010: 112). Order and norms are, therefore, usefully understood as attributes of social practices (Giddens 1984: 4, 30; Shove 2004: 74). We can thus understand the participants’ resistance, “normally” and “neglected” as embodiments of

²⁰⁵ The example thus substantiates the practical effect and co-dependencies of the ontological distinctions between *practice-as-entity* and *practice-as-performance* (see 3.2). Practices held in collective narratives and elements of practice may have enduring social and material effect. The continued effect on consumer practices, competencies, meanings and material culture of practices and elements (such as thrift) of repairing and recycling developed in historically constrained times are further testimony to this (Humphrey 1995; Gerasimov 2003; Jackson 2004).

their practices whose very systematisation obscures their pluralities (5.5; Heidegger 1996: 43; Crouch 1992).

The community practices and counter-narrative's collective multiplicities and effects, overlooked by the transmission project, reify this. They subsumed the government office, its convivial discussions, officer who farms, knows, speaks, feels and lives like them, free chai and chapattis following long meetings textured by pride and belonging; all colloquial, routinised and intimate. This performative setting provides the community's essential "structured space of possibilities" (Weick 1979; Postone et al. 1993: 4), a common socio-technical encountering that configures and inscribes its components, determining requirements, impacts and future happenings through a necessary 'order of co-existence' (Leibniz 1989: 338). Thus, the localised practices may signify "vital" conduits for change in the locale (Cohen 1999: 219)²⁰⁶.

The absolute particularity of this dialectic co-constitutes the distinctive means of substance and identities of social groups (Massey 1999: 18; Escobar 2001a: 146). This confers 'obligatory' conditions whose making, exercise and reproduction entails the ongoing contestation and affirmation of difference (Camilleri 1996; 1999; Shove 2004: 77)²⁰⁷. As such, social life is always political and contingent (Mouffe 1993, Laclau 1996), giving a multi-dynamic account of positionality, agency and intervention pre-requisites typically missed (Rip 2006; Shove and Walker 2007: 4). Thus the specific templates of rural life in Nepal renders certain narratives, emotionalities, performances and governmentalities powerful and 'non-indigenised'²⁰⁸ development approaches differentially experienced, non-operational and resisted (Redclift and Sage 1994; Gronow 2009: 130). India's Narmada opposition further exemplifies this (Appendix X).

The analysis thus demonstrates the importance of contextualised narratives and routines for development. This related to their influence on forms of production, consumption, interpretation, resources, contestation, innovation and reproduction fundamental to social

²⁰⁶ Analogous to 'taste', 'tradition', the 'domestic' and social groups and bonds embedding cooking and management practices (Chapters 5 and 6), illustrating the diversity and significance of pre-existing practices and their co-constituting sites, institutions and power structures of interactions (cf. Connerton 1989; Anderson 1990; Foucault 2000: 208-9; Giddens 2012; Creswell 2013: 20).

²⁰⁷ These related points are widely reinforced (cf. Mackay 1997: 1-2; Thrift 2004: 59; Massey 2005: 9).

²⁰⁸ The (re)configuring of anything with and through the normative templates and processes of a society's everyday life. The term signifies social reinvention and appropriation of the innovation that the thesis demonstrated is essential for functioning provisions and change in everyday life (Appaduari 1999; Carrier and Luetchford 2012). The indigenisation process is referred to as 'localisation', 'hybridisation', 'domestication' and 'acculturation' (cf. Hooper 2000; Cherrier, 2009).

order, agency and sustainable development (Fujikura 2001; Lachapelle and Smith 2004)²⁰⁹. It evidences the value of evaluating and utilising these through researching and developing the contextualised performance and non-performance of social practices (Long and Long 1992; Schatzki 2002: xii). We now integrate the insights of this chapter into conceptual and pragmatic implications for development pathways.

7.5. Summary & implications.

This chapter contributed to the rising acknowledgement of the need to include emotions in framings of everyday life and development. Building on findings of the previous chapters, this was advanced through empirically-informed arguments exemplifying emotionalities as core components and binding agents to social structures and processes integral for overcoming energy access and sustainable development barriers and illuminating the diverse constraints and capacities instrumental for this. Key capacities included social bonds reinforcing certain routines and outcomes enabling effective collective working, augmenting collective and ongoing demand, learning, commitment to tasks and financial and physical contributions. Key needs and constraints related to the embedding of routinised performances, meanings, skills and feelings of everyday life contradicting electricity practices. These interdependencies rendered certain social groups disempowered to change their focal routines through using electricity and fearing the implications of such a change due to the degree of risk, change and uncertainty it signified countering their entrenched competencies, customs, identity and emotional assurance reinforced by the incumbent practice and its relation to others practices.

The chapter then showed how these interdependencies were variously context-specific and included rules of time, space and discourse. These specificities of practices reinforced their exact form and reproduction, signifying overlooked and co-constituted contingencies of social agency, structuring, needs, collaboration, conservation, change and impacts for development (Giddens 1981: 91; Pearson 2004: 8). It substantiates the need for research and development efforts to attend to these through how discursive and non-discursive routines interlink actors, actions, context and effects (Law and Urry 2004: 396; Cameron and Hicks 2014). These

²⁰⁹ Highlighted further by Fine (1995). Reinforced by resistance to interventions varying according to contexts, such as generally being less where centralised and large-scale governance and development practices are commonplace, epitomised by China's mass rural electrification and resettlements, is often rapid and extensive (Rosenberg & Birdzell 1986; Parent & Prescott 1994; Zang & Kumar 2011).

comprise prefigured asymmetries and opportunities to overcome them through informal, tacit and teleoaffective means. These underscore the “sensuous” and interlinked nature of social phenomena (Law 2004b: 22; Amin and Roberts 2008) and advance demanded ‘participatory’ approaches that put the ‘human’ back into development (Cloke and Johnston 2005: 3; Bhavnani et al. 2003b). The reinforcing relationships also signify self-sustaining development outcomes if embedded in practices, reaffirming evaluating the nuanced interdependencies of provision, consumption and exchange (Harvey et al. 2001; Fine 2002; Urry et al. 2003).

Demonstrating this through a social practice analytic revealing the construction and role of emotionalities, resistance, identities and norms within systems of routines, enhances the prospect of such evaluations (Crouch 2001; Doorling 2009). It affords the necessary heightened sensitivity for apprehending the spectrum of the lived experience, expertise and difference (Diamond 1996: 5; Jackson 1996: 19) and predicates including the representational, relational and non-rational for sustainable development (Kaufman 2000; Escobar 2001a; Burr 2013). The thesis thus substantiates the extensive, underutilised currency of practice approaches (Schatzki 2002: xii; 2012). Their dynamics, interdependencies and contestations commands further research in these areas and their multiscale structures and effects (Rose 1996a: 330–331; Shove et al. 2012: 117). Focal practices, practice emotionalities, communities and systems, signify especially compelling avenues for this surpassing the parochialism of standard policy and the anti-technological stance of dominant sociologies (Pieterse 2001: 111; Shove et al. 2012: 116). The ensuing subsections summarise this and means to support it further.

7.5.1. Practice conservation, innovation or resistance? Time, place & (dis)order.

Routinised emotions both opposed and enabled change. Emotions, resistance and power are hence inseparable (Routledge 1996). Considering them collectively as components and products of social practices revealed and accounted for their systemic interdependencies and context-specific social construction and location influential to any level through their practice’s interdependence with any number of other social practices (Lewis and Potter 2011; Schatzki 2011). These interdependencies signifies the value of considering emotions synonymous with the resources, processes, structures and constraints of daily life and the term ‘emotionality’ to better support this. Residing in social practices, therefore, emotionalities and resistance become, like specific technologies, skills and meanings, integral to the fabric and positionalities of social life (Jackson and Everts 2010; cf. Monteiro 1998: 250; Latour 2003). Exploring the specific interdependencies of practices also presented their

contingent duality such that they co-constitute normative structures influential for both opposing and supporting development enhancing routines. These included configurations of 'culture', 'community' (class, milieu, subculture, kinship) and 'tradition' and their integrative economies of roles, discourse and performances (Giddens 1979: 2000; Sewell 1992: 13).

Intervening in this complex without aligning with it thus makes the prospect of change a disempowering and destabilising one, including practices that maintain inequalities (Pahl-Wostl et al. 2008)²¹⁰. Emotionalities and resistance are an articulation and defence of these (Fisher 1995: 424; Escobar 2001a: 140) and thus complicit in the recursive production-consumption legitimisation fundamental to forms of culture, interactions and development (Jasper 1998: 421; Jackson 2004). These systems encompass diverse norms, capabilities and differencing whose emotionalities are hence generative, distinguishing and (dis)unifying (Clough and Halley 2007), able to increasingly enrol, develop and manage elements and practitioners over timespace through their consumption and consequent embedding (Gergen 1992: 3-6; Amin 2004: 35). This signifies routinised conservation and revision, respectively, in practice communities and mobilising emotionalities for this (Lave 1998: 152)²¹¹.

The chapter then demonstrated that the normativised interdependencies include co-constitutive time and space (Wilkinson 2001: 17). As such, practices, in addition to power, capacities and functions, can also be considered the agent of 'place', 'mobility' and 'time' (Escobar 2001b; Watson 2013)²¹². Practices thus carry a specific 'placefulness' (Castells 1996: 412; Giddens 1990: 21)²¹³. The 'timespace' concept encapsulates this: a shared domain constructed via the intersectionality of routines necessary for the interactive socialisation and sedimentation of the diverse practices of social life (Tilley 1994: 15; Schatzki 2012: 20)²¹⁴.

²¹⁰ This problematic relationship for development is further stressed by others, including Ogilvy (1986: 87), Cannon (1994), Gill (2002; 2007), Gill & Pratt (2008), Banks & Milestone (2011: 76-7).

²¹¹ Substantiated also by Rose (1999), Reiche et al. (2000), Chaurey et al. (2004), & Bovaird (2007).

²¹² The following works, from various angles, also substantiate this contention (Rapport & Dawson 1998; Knights & Willmott 1989; Lee & Brown 1994; Basso 1996; Bourdieu 1996: 11; Harvey 1999; Massey 1999; 2004; Jackson 2004; Jonas & Pincetl 2006; Maslow 2015: 145; Spinney et al. 2015: 327).

²¹³ Even 'global' or seemingly 'placeless' practices have their sites of interaction and sedimentation (cf. Merleau-Ponty 1962: 42; Scott: 1992: 34; Dupuis & Goodman 2005; Latour 2009: 142; Schatzki 2010: 63-64). The internet exemplifies, co-constructed by communities of emplaced users, technicians, embodied meanings, skills, emotions, data storage units, and so forth.

²¹⁴ As time is objectified and made functional through structured tasks (Shove et al. 2009), similarly compatible concepts with practices as 'timespace' yet more explicit of the role of activities in the co-constitution of time and space and duality of structure is 'timescapes' (cf. Adam 2000: 135) and 'taskscapes' (Ingold 1993; cf. Tischner & Charter 2001).

These interdependencies emphasise the politics and ordering of agency and interventions whereby 'place' and emotionalities are simultaneously relational, productive and divisive insofar as the interrelated practices that construct and are prefigured by them pattern the possible elements and routines of social groups (Yuval-Davis 2006). Substantiating this throughout the thesis and more broadly in this chapter adds to related areas of scholarship influential for development transitions, such as 'equity', 'vulnerability', 'justice' and their normative and routine construction whose processes defines and legitimises their structured form and reproduction (Walker and Day 2012). This contribution is a contribution to notions and interdependencies gaining increasing concern in the context of energy and sustainable development (e.g. Orellana 2005; Hall et al. 2013: 415; Knudson et al. 2015). Indeed, seeing their relation across domains through their mobilisation in social processes, i.e. procedural as well as distributive, allies with the thesis reframing of 'access' as circumstantial, structured and heterogeneous use and management rather than predominately material provision.

Further, the chapter consolidates the thesis that social capabilities, participation and position relates to sets of practices representative of the community that share them (Ingold 1993; Bourdieu 1996: 10). This relationality guides "all situations of action" (Schatzki 1987: 119), and thereby resistance, through the habitualised ensemble that distinguishes and enables it (Clarke et al. 2004a; Jackson et al. 2006). This ensemble co-evolves via discursive and non-discursive routines that hence become properties of the order (Scott 1992: 34; Gibson-Graham 2011). Thus the distinctions of temporalities, emotionalities, places and practices become non-distinct. Yet they also become political and multiply embedded (Jackson 1999a; Holloway 2003), condensing "both imagination and material reality" within an 'anthropological space' (Haraway 1991: 150; de Certeau 1984).

The contrasts between the community electricity management, consumption practices and transmission resistance related to interdependencies of practices, signify that approaches that utilise these interdependencies reflexive to the ongoing social construction and plurality of needs, coordination and capabilities may better support all social groups effectively participating, using, shaping, benefiting and sustaining interventions in practice (Barker 1993; Tepper 1995). Doing so appeared to enhance intervention effects, signifying using the exemplified effective community methods. Thus, pre-established community leaders, meanings, emotionalities, materialities and skills brought together, shaped and normativised

in specific shared narratives, performances and timespaces of interaction, may signify compelling means for augmenting development efforts (Westwood and Linstead 2001)²¹⁵.

Showing this reaffirms the substantiations of Chapters 5 and 6 that diverse elements become agential, interrelated and embedding by virtue of their citation in practices. It also reaffirms that emotionalities can play a formative part in this, interconnecting diverse actors for substantive ends (Wenger 2002; Desmarais et al. 2014). These include meshing constructed obligations, justice appraisals and behavioural motivations, coordination and capabilities, enhancing livelihoods, participation, services, management and consumption (7.4.1), multiscale collaboration, learning and sustainable actions (7.4.1)²¹⁶ and change resistance (7.3, 7.4.2). Interconnecting emotionalities, performances, sites and structures of practice thus refines approaches to place, agency, capacity building and development through their co-constitutive specificities that collectively engender action and impact (Goodwin and Pfaff 2001: 283)²¹⁷.

Emotionalities broaden the repertoire of interpersonal networks, rules, and spatialities of interaction through which development pathways gain legitimacy, actualisation and needs-responsiveness (Carmen 2000; Nussbaum 2000). Where not collectively engendered, interventions were socially experienced as unfeasible within their systems of being, feeling and acting, undermining situated certainty, identities, and power and hence extensively resisted (Fineman and Sturdy 1999; Adger et al. 2005)²¹⁸. Interventions thus need to horizontally and vertically interconnect these to augment practices over the multitudes of co-dependencies and “social risks” they may signify (Silverstone 1989: 81; Strengers 2012).

This signifies effective interventions as performing diverse relations ‘always in the making’ through and in social action (cf. Callon and Law 1995: 485) interweaving production-consumption systems and their translocal “forms of connectivity and coordination” (Cetina 2005: 214). The relations, therefore, are important, but it is the social practices that constitute

²¹⁵ Also Putnam 1997; van Staveren 2001; Randeria 2003; Miller 2008: 15-18; Ingold 2013).

²¹⁶ Further notable examples illustrated by (Montada 1993; Kals et al. 1996; Montada & Kals 1995; Kaplan & Kaplan 1989; Kaider et al. 1999; Schahn 1996; Knapp & Clark 2001; Conrad & Hilchey 2011).

²¹⁷ These interconnections, further problematizing dominant binaries, are highlighted by terms such as ‘emotional spaces’, ‘moral emotions’, ‘global communities’ (Fischer 1995; Rose 1999; Gruszczynska, 2009; Herzog & Golden 2009) and ‘imagined communities/spaces’ (Anderson 1983; Harvey 1989).

²¹⁸ This is a widely professed contention (cf. Tushman & Romanelli 1985; Comaroff 1985: 556; Mumby & Putnam 1992; Massey 1995; Hartley and Choi 1996; Kogut & Zander 1996; Weick and Quinn 1999; Goldman 2001: 201; Pólos et al. 2002; Bouchikhi & Kimberly 2003; Hsu & Hannan 2005; McRobbie 2007: 723; Luckman 2015: 122-125). The groups and forms of practice signify and legitimise these interdependencies (cf. Swan et al. 1999; Hildreth et al. 2000; Storck & Hill 2000).

them and the patterns of continuity and change. Emotional bonds were agential in this, bolstering development enhancing practices and outcomes across scales and domains. This influence, and the opposite role certain teleoaffectivities played in the conservation of cooking related practices and social orders, consolidates commands to evaluate the emotionality through which systems are made and mediated (Solow 1992; Matless 1997).

The findings thus also supports considerations of emotional attachments as sustaining 'common culture' defined through iterative 'consumer culture' (Jackson 1999b), yet that their teleoaffective and relational identities often mask notable geographies of difference reproduced by their teleoaffective, structured routines. The thesis also comes to highlight, therefore, economic, institutional, innovation, diffusion and cultural framings as incomplete without affective dimensions (Gereffi 2002; Jackson et al. 2009)²¹⁹. India's and Africa's luminary SIMPA and Z/M-pesa underscores this, providing banking services to remote populations enabled by bonds of consumer-client trust and fairness within co-evolved practices of electricity consumption, management and payment (Donoghue and de Klerk 2009)²²⁰. The various examples, therefore, signify the systemic and socio-technical construction of development and resistance that interventions must encompass.

The requirements of social practices thus unpicks the distress encountered in conventional interventions (Bujis et al. 2012: 213); means to coordinate and integrate development interventions; and the limited explanations from the communities for their routines and oppositions and the implications embodied in their key terms of 'tradition' and 'taste'. Interventions thus 'translate', "transform" or resist through social processes (cf. Latour 1990: 116; Swan and Clark 1992: 114) whose emotionalities and structures appear 'essential' to daily life, the lived environment and their enhancement (Steerling 2001). This politicisation and moralisation of agency and space aligns with increasing considerations of emotionalities and ethics as components of governance, difference and change (Paquet 1999; Fassin 2005) and defining cultural geography disciplines (Matless 1997; Busch 2000; Creswell 2005). Yet through the specificities of practices, the chapter contends that these social processes are co-dependent and 'lodged' by multidimensional performances (Schatzki 1996: 80; Allen and Cochrane 2010: 1079). Interventions must hence support the diversity of conditional actors, relationalities and practices for extensive uptake, functionality and equitable impacts

²¹⁹ For expounded accounts of this, see (Ehn 1988; Willis 1990; Lee 1993; Lury 1996; Kozinets 1999; Rip 2005; Silva 2005). Durkheim's (2014) notion of 'collective consciousness' follows a similar logic.

²²⁰ This accounted for differential needs & constraints, such as rural illiteracy and retailer needs via verbal training and developing supportive regulation, respectively. A thorough sociotechnical assessment of the project milieu informed this specific approach (Hughes & Lonie 2007; Mas & Radcliffe 2010).

(Klemmer et al. 2006)²²¹. The analysis substantiates that evaluating emotionalities, identities and time-space logics of practice communities may particularly support this²²².

Demonstrating this evidences how risk, routines and participation are shaped and thereby enhance (in)equalities and (non)development (Gutierrez 1995; Speer et al. 2001), through becoming imbued with schemes of morality, convention and feeling through their co-constitutive social practices (Schatzki 2012: 20). These permitted the specific people, elements and practices 'belonging' in certain settings, preventing certain developments yet presupposing the competent informal technicians, community groups, interactions, learning and loyal staff (Lave 1988: 171; Morgan 2007: 1248). These dichotomies illustrate that through the structured distribution and performance of practices, the resources, organisation and revision of capacities and outcomes vary and require sensitive development approaches (Hine 2000: 28; Carroll 2001), mutually attending to socio-technical structure, positionality and process (Ahmed 2004: 118; Clarke et al. 2004: 95)²²³.

Such contrasts substantiate the importance of practice systems viz-à-viz development and considering routines focal to communities' daily life and marginalised attributes (Hech and Simone 1994: 138: 71; Escobar 2001a: 164-166). The insights developed from exploring taste, tradition, management and emotionality in social practice, therefore, reveals the "kaleidoscope" of development considerations (Crouch and Toogood 1999) embedded in the shared rules, spaces and performances of practices (Warde 1996; van De Donk et al. 2004; Yedoi 2010). The co-constitutive relationships emphasised in this chapter substantiate that these specificities encompass gender, knowledge, language, commodities and 'cultural cartographies' (Weiner 1991: 32; Bourdieu 2003). Practices and interventions therein thus signify diverse 'place-making, people-making processes' (Gupta and Ferguson 1997: 233).

The cases show, however, that this occludes inequalities compromising sustainable development, including fear, agency, risks and outcomes, maintained in dominant framings of 'development', 'sustainability', 'nature' and 'rural' (Bourdieu 1977: 78; Hetherington 1998). Consequently, the 'invisible power', 'narrative identities' and 'material sensuality' (Gramsci 1997; Crouch 2001: 68) of social systems become "hidden" and reproduced in interdependent

²²¹ Reified by (Wenger 1998: 2; Basco 2007; Purcell 2009; Hildreth & Bailey 2014; Perry et al. 2015).

²²² Also Desmet et al. (2000), Bondi (2005), Ignatieff & Gutmann (2003: 168), Jordan & Troth (2002).

²²³ Group-distinctive food (Fischler 1998; Pottier, 2014; Deimling & Ray 2014), transportation practices (Williams 2008; Watson 2013; Petty 2014) and 'risk cultures' underscores this further (Beck 1992b: 36).

practice arrays (Schatzki 2002: 78; 2009: 40)²²⁴. This “disguises” agency and the significance of (non)performativity (Miyazaki 2000: 43). Use and resistance thus simultaneously signify dominant and alternative development pathways (Radcliffe 2006).

The communities’ adapting to manage, live with and scale-up the electricity and benefits through innovative co-working, co-management, microenterprise, fixing and learning, however, demonstrate social practices for the responsiveness required for sustainable development (Massey 1999: 18). These modalities signify emotionality and morality aligned community-based projects for boosting resources, sustainability, employment and welfare (Evans and Yen 2006)²²⁵. Indeed, such approaches may be more cost and quality-effective than alternatives and significant for equitable development in both rural and urban contexts (Ennis-McMillan 2001; Sultana 2011), signalling “officialising” practice communities, informal innovations and emotionalities in development frameworks (Bourdieu 1977: 40)²²⁶.

A Hindi concept is illustrative of these conclusions. ‘Jugaad’: purpose-driven adaptations following a systemic reverence for frugal improvisation (Radjou et al. 2012; Chaturvedi 2015). Examples, such as informal street entrepreneurship, mobile phone practices and disaster-relief shelters using novel mixtures of locally available materials and techniques (Singh et al. 2012; Rai 2015), show that these practices often occupy the temporalities and ‘spaces in-between’ ‘official’ schemas of development (Montada and Schneider 1989; Leach et al. 2002). Yet they may be essential for sustainability (Lohmann 1998: 1-2; Ellerman 2001: 3). Nepal’s innovative inter-village practices following its 2015 earthquake and insufficient state relief is another case in point (Gough 2015; Sheppard and Landry 2015).

Supporting this ‘melding’ for sustainable development is widely reinforced. This includes the effectiveness of inclusive user design, ‘emotional learning’, community projects, changing standards in food, retail, finance and electricity systems, resurgent practices of repair, rationing, ‘making do’, repurposing and upcycling (Carr and Gibson 2009; Lewis 2015)²²⁷, and

²²⁴ This notion of components & mechanics occluded by virtue of their systemisation has emerged as significant for the empirical analysis throughout Chapters 5, 6 & 7. For further substantiation of this see Giroux & Taylor (2002), Baker (2006a: 325), Schatzki (2010: 83), Maller & Strengers (2013).

²²⁵ This advances previous insights (chapter 2) and is further empirically supported by James & Lahti (2004), Connors & McDonald (2011), Dinkelman (2011), in addition to wider notable examples presently discussed. Similarly, as the cooking and transmission cases signify, united emotionalities and meanings, if countering change, consolidate resistance. Cass & Walker (2009) find analogous factors underpinning renewable energy opposition in the UK (cf. Manzo & Perkins 2006; Devine-Wright 2009).

²²⁶ (See 2.3 & Bauman 1997: 17; Maddock 2002; Berkes 2003; Folke 2006; Tschakert & Dietrich 2010).
²²⁷ Also substantiated by, inter alia, Hogget (2000), Norman (2005:114), Schutte (2005), Hackney (2006), Wilson et al. (2006), Graham & Thrift (2007), Ingram et al. (2008), Watson (2008).

the emergent diversity of 'ethical consumption' (Crane and Matten 2003; Carrigan et al. 2004). Examples of innovations engendering sustained change when socially attached to social emotions, routines and 'affective experiences' accentuates this further (Littlebyke 2008; Mehta and Movik 2011)²²⁸. They highlight alternative constructions of gender, empowerment and economics over dominant, often precarious and exploitive scripts (Dawkins 2010: 261), that negate interdependent ways of consuming and feeling (Morgan et al. 2006: 166). Redefining work, 'expert' and participation (Cambell 2005; Watson and Shove 2008; Ratto et al. 2014), they offer alternative means for capacity building, management and sustainability (Folke et al. 2002; Goss 2008; Massey and Rustin 2014)²²⁹.

Consumption, resistance and development thus interdepend and cannot be understood as a single dimension, event, or timespace (Deleuze and Guattari 1988: xiii, 33, 249; Ricoeur 1992), but rather 'necessary' yet dynamic social practices (Chouinad 2009: 110). Decentring analysis in this way more fully resolves the agency-structure duality than otherwise valuable paradigms, such as 'moral economy' (Ortner 1995; Jackson et al. 2009) and reveals that practices co-produce their diverse settings (Black and Cherrier 2010) co-constitutive of a polycentric 'context of action' (Guy 1994; Shove 1998: 1108)²³⁰. Subsequently, conventional practices may be normatively conserved (Beck 1998; Manner and Schmidt 2006), and non-use/resistance maintains agency and order, especially for focal practices or sets of practices (Bruland 1995; Selwyn 2003)²³¹. Thus users', non-users' and their emotionalities influence innovation development and (non)uptake whose performances may maintain or enhance relationships (Turner 1994: 554)²³². The chapter thus shows substantial value of considering the interdependencies of emotionalities, consumption and resistance within social practices for enhancing development pathways. Summarising the role of discourse accentuates this.

228 This concurs with an empirical study into multiple-use water systems I conducted for an INGO, revealing emotional drivers & outcomes, especially anxiety & its alleviation, underpin innovation appropriation (cf. Herbert 1972: 632; Kar & Pasteur 2005; Pantzar 2010). Reinforced by juxtapositions between effective 'carrot' campaigns mobilising emotionalities & less effective 'stick' policies for sustainability (Steg & Vlek 2009), from household (Pallak et al. 1980; Darby, 2006; Schultz et al. 2007) to transport carbon reduction (Taylor 2007; Cairns et al. 2008; Miller & Prentice 2013).

²²⁹ See also (Cook & Crang 1996; Mahon & Wartick 2003; Devine-Wright 2005; Pelling & High 2005; Siltaoja 2006; Du et al. 2007; & Tanenbaum et al. 2013). They reify critiques of neoliberalism viz-à-viz sustainable development (2.2; Morgan et al. 2006) and 'fair trade' (Banerjee 2003; Jaffee 2014).

²³⁰ This substantiation advances wider debates of 'technophobia', 'anti-development' and 'technological reticence' (Brosnan 1998: 33; Turkle 1998; Haywood 1998; Coppola & Verneau 2014).

²³¹ Further indicating focal practices and aspects thereof as valuable sites for mobilising change (see 5.5, 7.3; and Feenstra (1997), Pelling (2010), McCormick et al. (2016).

²³² Extensive examples of this relationship and co-construction are illustrated further by Stone (1973), Sieber (1974), Gough & Thomas (1994), Gasper (1996), Hajer (1996: 259), Rijal (1999), Miyazaki (2000), Probyn (2000), Askew (2002), Gibson (2002), Schutte (2005), Young (2005) and Kohli (2012).

7.5.2. Emotionality, discourse & practice: Agency elements, drivers & bonds.

The chapter enhanced the previous analysis by highlighting a considerable discursivity in the process, communicability and embedding of practices and development pathways. It signifies the prospect of discursively mobilising emotionalities for augmenting development over time and space. This effect of discourse was circumstantial to the normativities of specific practices being routinely integrated throughout social groups. Discourse influencing collective action thus appeared interrelated to social practices, predicating pathways to utilise discourse reflecting the specificities of practices²³³. The chapter thus further unpicks the dimensions of everyday life, interaction and change and the value and means of rectifying their overlooked discursive and emotional dimensions (Dewsbury 2003; Lorimer 2008; Thrift 2008). This section now summarises three examples of this and ten resulting implications.

Firstly, narratives reinforced the contextualised importance and specificities of cooking in the communities and its subsequent conservation. This included its rules of taste, time, emotionalities, 'family' and socialising that were embedded in the locales yet articulate national-level narratives and relations of practice. These both overcame engrained development limitations and extended others, such as marginalised groups mistrusting, fearing and avoiding using, learning and appropriating (Koch 1995: 320). Discursive practices can hence enhance power and exclusion (Samra-Fredericks 2005; Mantere and Vaara 2008).

Secondly, community-specific discourse subsuming the attributes, links and effects of practices spurred energy and sustainable development enhancing community consumption, participation and management practices. This included the demand, morality, outcomes and requirements of energy access specific to their socio-technical setting. These were actively enhanced through regular interactive discursive methods in the three community approaches uniting the elements and bonds of practice, especially emotionalities, at every spatial level (Fisher 1995: 425; Khagram 2004), illustrating practice-driven 'affective catalysts' for influencing routines and development (Kelley et al. 1990; Bennett 2009: xii, 61).

Thirdly, and collectively, the contingent narratives effected the coordination, components and constraints of other practices and their functions. This included fieldwork scheduling, participant responses, risk and openness, community meetings, 'belonging', 'rights', "our"

²³³ I henceforth refer to such practice-associated forms of 'sayings' in the terms 'discourse' and 'narrative'. So defined, they are components of practices (cf. Schatzki 2010: 72-77).

natural resources and collective (transmission) resistance. These prevalent social dynamics influencing development pathways (Leach 1987; Pauchari 2011) were underscored by private sector discourse of the difficulties of working in rural areas and the communities' stories, feelings and rituals interlinking with practices beyond their locale and upholding the land as goddess and mother of the community (JHHi17; SBHHi16)²³⁴. The discourses hence united various social groups that shared them, implicating enhancing collective action for development through supporting social coordination orientated around shared practices and their discursive and non-discursive forms (Lutzenhiser 1993; Laine and Vaara 2007).

This identifies needs and preferences in terms of specific social emotionalities and histographies symbolising the relationalities that prefigure agency and setting (Giddens 1990: 21). Without innovations developing or aligning with these, the rice cooker and transmission project signified alternative performative, epistemological and ontological systems (Goldman 2001: 201; 2004: 169) with multitudes of disempowerment rather than development (McRobbie 2007: 723; Luckman 2015: 122-125). This affirms the need for interlinked conceptual and practical approaches situated in social contexts, interactions and effects and operationalised and coordinated in everyday life (Hodgson 1999: 111; Law and Urry 2004: 390-391) and social practices as means for this (Gibson-Graham and Roelvink 2009).

Similarly, by reinforcing certain social-cultural aspects of their community and environment, their discourse enhanced their collective juxtaposition to the transmission approach, such as cash compensation, external actors and non-inclusion (Levin 2013). The typology thus eroded interdependencies responsive to the uncertainties of the lived environment (Aitken 1992; Dubash et al. 2002)²³⁵. This signified loss of emotional ties, agency and culture (Harvey 1976; Parenti 2015), engendering collective action to resist disorder, uncertainty and acculturation (Turner 1991: 302)²³⁶. Discourse may thus reinforce the positions, dimensions, bonds and hence actions of both communities and development practitioners in ways that may support or hinder development, depending on the degree to which the development discourses align with the practice templates of the social groups (Fletcher 2001: 43; McGray et al. 2007).

²³⁴ Such as Durga/Kali, the earth of the community (Routledge 1996). These associations of the precedence, spirituality and familiarity of nature were reinforced by narratives and material cultures throughout rural and urban Nepal (Isager & Ivarsson 2002; Darlington 2003; Herzfeld 2014: 35; 55), including blessings, offerings, prayer flag and soukounda (temple lamps) practices.

²³⁵ Consistent with other projects under the dominant development paradigm (cf. Krois 1987; Allen 2000: 20; Jackson & Sleight 2000; Fletcher 2001; Goldman 2004; Orellana 2005).

²³⁶ The Himalayan Chiplo resistance against 'scientific' forestry rules subverting engrained practices of consumption & management reinforces this analysis (Guha 1989; Adams 2003).

Through this alignment, discourse becomes agential, reproducing “the phenomena that it regulates and constrains” (Schatzki 2001: 48). Thus the specificities of emotionalities, meanings, materiality and competencies become routinely experienced in the discursive and non-discursive fabric of daily convention whose intersecting practices embeds their reproduction (Schatzki 1997: 302). The exact elements, processes and structures thereby become normativised, reinforcing and mutually integral to social life (Schatzki 1996: 80, 89). This relationship hence specifies requirements for effective and ‘acceptable’ practice and transitions (Lash and Urry 1993: 30; Mann 2002)²³⁷.

Through this framing, the project support and resistance contrast renders ten notable implications. Firstly, it affirms discourse, moralities and emotionalities as part of the agency-structure process and setting of daily life and its ongoing tensions and (re)negotiations (Ahearne 1996: 185; Fletcher 2001). Secondly, this process united actors over time and space into transpatial practice communities (Foucault 2000: 295, 356), emphasising the significance and structuring role of discourse for conserving or changing practices (Routledge 1996; Guha 2000), reinforced by incorporating emotionalities (Amin 1999; Donais 2009). Thirdly, development discourses that align with the specific practice templates of social groups may be most effective for sustainable development (Butler 1993: 40, 227; Leidner 1993). Fourthly, therefore, it predicates the need to revise the development approach for each intervention in relation to the discursive and non-discursive practice landscape of specific communities. This advocates a continually co-evolving development discourse and praxis to reflect the nature of social life and sustainability rather than myopic approaches eclipsing diversity and dynamism via the ‘mathematization of nature’ (Foucault 1973: 71–77)²³⁸.

Narratives thus mediate action, resistance, contexts and development (Giddens 1979: 73; 1992b: 115). This affirms knowledge, power and capabilities as intertwined, contextualised and simultaneously discursive and non-discursive (Foucault 1980a: 69; Lash et al. 1996: 56) and social structures and dialogue as co-constitutive and enhancing collaboration through adapting and integrating the feelings, demands and intentions of diverse stakeholders (Herbert 1972: 632; White 2009). The cases thus exemplify that the “practical significance of

²³⁷ Stressed notably by Giddens (1979: 42), Kopytoff (1986: 64), Sewell (1992), Lash (1994: 149-152), Hoggart & Miller (2000); Collins (2001); Urry & Sheller (2007), Barnes (2008), Parkhill (2014).

²³⁸ The extension of rationalism and external control embodied in development discourse & evaluations whose ‘scientification’/‘expertification’/‘professionalization’ marginalises forms of actors & knowledge & quantifies values into discrete forms that separate the process & context from their socioecological and socio-cultural practices, contestations & significance. Discussed notably by Epstein (1995; 1996), Escobar (1995), Harvey (1996), Macnaghten & Urry (1998) & Banerjee (2003).

emotions” in practice (Schatzki 1997: 288) includes discourses and further conveys the “multi-level” complexities of social life and change (Hand and Shove 2004: 245, 252)²³⁹.

Nightingale’s (2011) ethnography reveals a comparable conclusion, showing emotionality and discourse as agential to action and resistance by their social interrelations to materiality, power, place and practices (Maturana and Varela 1987; Buijss et al. 2012: 213). The cases thus present discourse as both instrument and effect of power, yet also “a hindrance, a stumbling-block and a starting point for an opposing strategy” (Foucault 1990a: 101). The strategies and effects, however, are often overlooked and buried within the provisional terrains of everyday action that include the frameworks and conducts of development and sustainability (Watts 1993; Shove et al. 2007: 95-97). This included differential takes between the actors on what the managers and communities should accept and do, signifying the significance of what Foucault (1980a: 70; 93) labels the ‘tactical polyvalence of discourse’ (Lash 2002: 141)²⁴⁰.

The actor differentials and systemic interdependencies, therefore, highlight the significance of interlinking diverse actors (Roux 2007; Fabricious et al. 2013: 278), dimensions and practices via ongoing, contextualised socio-technical interactions (Redclift 1994: 17; Cole and Wolf 1999). As the electricity management indicates, this fifth implication could include enhancing sustained, equitable, interactor and needs-orientated project and policy design, collaboration, capacity building and commitments through social practices (Rothwell 1977; Morgan 2011; Shove and Walker 2014)²⁴¹. Showing these as influenced by prefigured practices illustrates the differential means for social groups in the development process (Postone et al. 1993: 4), signifying the sixth implication: mediate the varied limitations of society via utilising their forms of discourse, doing and feeling (Lave 1999: 150; Eyerman 2007: 44). It affirms a socially mediated process of adaptive capacities situated in routine performances (Bandura 1977; Adger and Kelly 1999), and everyday means to action both micro-level changes and systemic transitions (Smith and Sterling 2010; Kleine et al. 2003).

Demonstrating this also reinforces calls for interlinked, multidimensional approaches to communities, consumption, needs and capacity building for research and sustainable development and the prospect of practice-approaches for this (Gilchrist and Taylor 1997;

²³⁹ Also Butler (1993: 40), De Han & Zoomers (2003), Berkes (2007), Pihkala et al. (2007).

²⁴⁰ Roy (2001; 2002), elucidates exemplars of narrative in the subjugation & opposition process via critiquing the development discourse of ‘trade not aid’ authenticating a privatisation of public assets, dismissing objections as ‘emotional’ & excluding the already marginalised (also Goldman 2004; 2006).

²⁴¹ Further substantiated by the effectiveness of cooperative practices for innovation research, investment and transitions (Gabriel & Lang 1995 Walsh et al. 2001; Rabeharisoa & Callon 2002; Callon 2004), as van Vliet (2004), for instance, demonstrates for renewable energy lobbying.

Chanan and West 1999). This reveals how 'access', consumption and development are routinely contested and negotiated (Soja 1996: 67; Clifford 1997: 54). These integrate expanded forms of learning, resources and exchange through their performative interdependencies (Zins et al. 2004; Goleman 2006), agential only collectively and in social practices (Geertz 1973: 401-3; Collins 2001: 43). This was underscored by the third party interaction difficulties resulting from unequal aptitudes and meanings and overcome through iteratively working, thereby forging links and resources underpinned by emotionality and ethical ties supporting certain forms of actions and outcomes (Collins 2012).

Assets, inequalities and development thus abide in socio-technical systems that reflect prevailing routines through being continually lived and renewed, making them embodied and situated yet fluid and vulnerable (Myers 1991: 93; Casey 1996: 33). This signifies practice approaches as means to apprehend and co-evolve, rather than impose, the systemic coordination and adjustments required for sustainable development (Skelcher et al. 1996; Gilchrist 2000). Considerations of emotionality, development and discourse are thus complimentary and mutually allied with concerns of 'process', prefiguration, power and ends (Schlosberg 1995; Patricia 1997: 327), underscoring three final implications. Firstly, these become specific to certain routines, functions and norms of practice, substantiating one of the many tiers of path-dependency exposed in the cooking analysis. Secondly, abilities, moralities and exchange systems are imbued with a necessary emotionality that reinforces them and whose absence limits capabilities and outcomes (Somers 1994: 625; Lindberg et al. 1997).

Thirdly, embedded and mediated in practice, effective capacities and innovations are social, contextualised and malleable to normative ends (Stoler 1995; Cohn 1996). 6.3 and 7.4.1 highlighted this in revealing learning, change and competent performance as ongoing products of experiential interactions enhanced via performance over time in social groups and settings. Thus, effective capacity building for development is situated, systemic and conditional (Gherardi and Nicolini 2002b). This reflexive, embodied and provisional process can thus be usefully framed as 'learning in practice' (Lave and Wenger 1991: 42)²⁴², reinforcing engendering development through social practices (Boekholt and den Hertog 2005; D'Criz et al. 2007). As the building of groups, voluntary action, trust, identities, social contracts and new

²⁴² Reaffirmed further by (Mumtaz, 2000; Mathews 2001; Füssel & Klein 2006; Lundvall, 2010; Hager, 2012; Sayer 2013), accentuating enabling 'learning by doing' in practice communities and practice systems (Brown & Duguid 1991; 2001; Stokey 1998), analogous to 'innovation-in-use' and learning in practice 'networks' and 'settings' (Skelcher et al. 1996; Gilchrist & Taylor 1997; Goodman et al. 1998; Schuler & Namioka 2003). The 'learning economy' concept emphasises this further, integrating the continuous, multi-actor, user-led, experiential and differential nature of production via alliance-based, reflexive co-production in relational networks (Foray & Lundvall 1996; Storper 1996; Bristow 2010).

practices indicated, these include reciprocal forms of exchange achieved by focusing on social dimensions of the societies, such as moral and emotional bonds, conventions, needs and capacities (Habermas 1990; Ostrom and Walker 2003; Gherardi and Nicolini 2002b)²⁴³. The findings also suggest that these may be enhanced through emotive interventions and actors. These may include social organisations (Lovell 1992; Krishna 2003), community mobilisers, affective, place-based practice strategies (Uphoff 1992; Hildreth and Bailey 2014) and promoting emotionality-linked skillsets, practices and publics through commensurate training and validation structures (Stirling et al. 2007; Shove et al. 2012: 75).

The means and ends of practices thus transcend institutional, temporal and spatial borders and illustrate intertwined politics of ethics and emotions (Goldman 1988; Hutchison 2010), economies of meanings, sharing and welfare (Caulfield 1994; Wenger 1999: 202; van Staveren 2001) and emotional/moral geographies (Shapiro 1994; Korf 2007; Jayne et al. 2010). These co-evolved through the inclusive discursive and non-discursive project methods, forging socio-technical interlinkages and practices sufficient to overcome entrenched barriers to sustainable development yet reproducing difference and political economy (Berezin 2001; Weedon 2004). The practices, bonds and their institutions thus augmented normative and sociomaterial 'skills' and capacities for development (Gershuny et al. 1997: 8), presenting emotionalities and relations in practices as agents of interaction and order (Bourdieu 1986: 249). A 'collective capital' whose interdependencies form the capabilities and constraints of different groups (Clifford 1998) and surmounts barriers and purviews of dominant development paradigms, including binaries and self-reinforcing effects (Handley et al. 2006)²⁴⁴.

The analysis thus reveals the the social, teleoaffective, normatively socio-technical and non-elite as essential instruments of development (Jasper 1998: 421; Arts et al. 2012: 11). It advocates development efforts to utilise these through social practices, (non)consumers and their emotional, sensory, moral, political and informal economies for modifying, coordinating and sustaining behaviours and resources. The chapter also elucidates the value of doing this and enhancing sustainable development approaches through considering practice systems (Acre and Long 2000: 28; Pine and Gilmore 2011).

Within these, meanings, competencies, emotionalities and other dimensions of agency, order and difference are constituted, actualised and conditioned (Giddens 1979: 206-7; Schatzki

²⁴³ Reinforced by others showing their instrumentality for initiating sustainable practices and change (Erickson & Kellogg 2002; Emery & Flora 2012; Gutierrez-Montes et al. 2012; Emery et al. 2016: 4).

²⁴⁴ Also Cohen (1999), Law & Hetherington (2000: 38); Lave & Wenger (2002), Schlager & Fusco (2003), Heise (2007), Moulaert et al. (2007), Bristow (2009), Purcell (2009), Eckhardt et al. (2010), (2012).

2001: 21). It reveals overlooked, co-constitutive and differential forms of social embedding, needs, means and ends, requiring approaching society through their (potentially marginalised and unequal) social practices, elements, institutions and relations for sustainable development (Tully 1993; Goldman 2004: 157). Doing so signifies presupposed and 'concealed' constraints, requisites and opportunities for development within multiscale communities, processes and structures (Levitt and Schiller 2004)²⁴⁵. Within this, emotionalities supported the specific coordinated requisites of daily life through intersecting with and co-constituting routinised elements and bonds whose enactments form the sites of social agency, distinction and (un)certainty integral to the lived experience (Smith 1996; Foucault 2000: 337).

The thesis analysis thus signifies practice performances as a "productive process" (Schatzki 2001: 16) offering insight into the interdependencies of social groups and development aligned with the 'traditional securities' of everyday life (7.3; Smith 1977; Dirlik 1998; 2000). Emotionalities in social practice thus further efforts to account for the patterning, possibilities and pluralities of everyday life and sustainability and how affects and 'appropriate' pathways are 'always emergent' and constituted (Blum 1988: 208-298; Thrift 2004: 63; Bristow 2009). It emphasises and expands the diversity and construction of needs, wellbeing, 'othering' and resistance (Akrich 1992: 297; Hinchliffe 1996: 673) and demands broader framings of resources, constraints and development (Escobar 1997; Kothari and Minogue 2002).

Considering these as co-constitutive within discursive and non-discursive templates of social life supports such framings and their agential interconnections (McMeekin and Southerton 2007: 15). This includes the significance, embeddedness and communicability of "teleoaffective structures" for social life and change (Schatzki 1996: 89) that may be actively mobilised and reinforced by socially symbolic or enacted forms and emotionalities (Manzo and Perkins 2006; Jarzabkowski et al. 2007). Indeed, in certain contexts key for sustainable development, such as the 'domestic', uncertain and vulnerable, emotionalities may be particularly instrumental (Gasper 2002; McCormack 2003; Silva 2004). This substantiates remedying the neglect of emotionalities in accounts of society, consumption and development (Everts and Wagner 2012; Phoenix and Brannen 2014). The chapter demonstrates the suitability of a social practice approach for this both in theoretical and practical applications. This is increasingly emphasised in notable scholarship (e.g. Brown and Duguid 2000; Anderson and Smith 2001: 7; Benediktsson 2008: 216; Reckwitz 2016) and for

²⁴⁵ Thus framing capabilities & development in performative, cultural-spatial, integrated forms rather than solely political, economic or physical. The concepts of 'network', 'extralocal' & 'glocal' are archetypal of this transpatial, non-linear interaction & agency (Escobar 2001b; Kuhn 2002; Thrift 2004).

advancing the 'sociotechnical consistency', plurality and reflexivity required for sustainable development (Shove and Warde 2002: 242) rather than blinding it out (Reckwitz 2012: 245).

One way of doing this further could be to assign emotions the same centrality to social practices as materiality, meanings and competencies. This could entail framing emotionality as a fourth, equally practice-specific element of social agency, distinctions and order. This may further illuminate the "omnipresence of affectivity" in everyday life (Schatzki 1997: 302), its emotionalities for engendering and embedding social routines, boundaries and capabilities, and their implications for sustainability pathways (Burkitt 1997; Collins 2001). This suggestion evokes Bourdieu's (1977: 78) citing of emotionality within the capitals, politics, dynamics and positionalities of daily life and burgeoning interest in the role of emotionalities in innovation and development transitions (Wood and Moreau 2006; Goodwin et al. 2009).

Similarly, unpicking emotionalities from both meanings and teleoaffectivities²⁴⁶ in this way highlights its distinctions, mutual constitution and interdependencies with practice elements reliant on their collective, ongoing reproduction in social practices. Terms also aiming to further spotlight emotionalities in social science, namely 'affective citizens' (Fortier 2010), 'affective structures' (Ahmed 2004), 'affective/discursive practices' and 'affective economies' (Scheer 2012; Wetherell 2012; 2013b), are insufficiently explicit on these counts.

The proposed analytical distinction is problematic, however, and thus suggests an initial corrective to the oversight of emotionalities in the study of the social rather than a fundamental ontological claim. The elements and infrastructures of practice, for instance, exist only via continued social practice, yet the objective presence and intersubjective effects of materialities may endure beyond their production and circulation in practice systems (Simonsen 2007; 2008). Emotionalities, competencies and meanings, however, are necessarily embodied within practices, their practitioners and relations (Bourdieu 2000: 233). Secondly, expanding the three-element model compromises the value of its simplification for facilitating widespread policy engagement and departing from the practitioner to their agency and location within the social and wider infrastructures they collectively create and are shaped by. The empirical analysis and heuristic proposal thus supports, and further commands, using social practices to better untangle the emotionalities, dualities and pluralities of consumption, difference and development (Reckwitz 2002: 254; Scheer 2012; Wetherell 2013).

²⁴⁶ Chapter 3 explained that in the two predominant contemporary readings of social practice theory, the Shovian et al. (2012) three-element model & Schatzkian interpretation, emotions are subsumed within meanings & affectivities, respectively.

7.6. Conclusion

This chapter explored the role of emotions in social life, energy access and sustainable development. The focus revealed means to enhance development pathways aligned with apprehending the overlooked plurality and interdependencies of social dynamics and activity, and emotionalities as a constitutive part of this. Case study analysis illuminated emotionalities in discursive and non-discursive practices underpinning and coordinating collective action for both enabling and resisting development interventions. This was achieved through interconnecting specific routinised meanings, competencies and materiality that formed the rhythms and rites of social conduct. Aligning with these catalysed forming, improving, and sustaining practices and capabilities that overcame pervasive development barriers. It presents emotionalities, intertwined with meanings and embedded in social practices, as inherent to means and ends of effective projects and sustainable development, commanding the inclusion of these neglected domains in research and development. This is a core contention of the thesis reinforced throughout the chapters and in burgeoning scholarship.

Interventions neglecting this resulted in social risk, fear and resistance, signifying emotionality and resistance as integral to the resources, interactions and needs of everyday life. Moreover, although assortments of elements and ties effect action, functionality and sustainability (Walgrave and Verhulst 2006), the chapter empirically substantiates that collective symbolic-emotional practice structures may be pivotal (Manzo and Perkins 2006: 340; Wetherell 2013a). Aligning with these through the mundane forms of doing, wellbeing and improvising for specific social groups effectively co-evolves 'appropriate' interventions within the already crowded demands of daily life. This consolidates the thesis, arguing that effective conservation, innovation and sustainable development is socio-technical and co-produced. Indeed, approaches reflecting this are increasingly manifesting their potential (Kaplan and Haenlein 2010; Conrad and Hilchey 2011).

This thesis advances this further by arguing for such approaches to also consider co-constructions of place, positionality and power whose routinised making and exercise entails the ongoing contestation and affirmation of difference. Recognising this signifies means to overcome barriers to equal development involvement and gains through the interdependencies of social agency and (re)production typically missed. It reaffirms the value of social, reciprocal and non-formalised forms of 'doing development' for improved and self-sustaining development practices and outcomes. The chapter suggests the emotionalities of social practices may be a good place to start.

CHAPTER 8

Conclusion

8.1. Introduction

This thesis examined development pathways and how improved ‘energy access’ approaches are paramount for augmenting their sustainability and equitability. It comes at a time of unprecedented recognition of the central role modern energy carriers can play in enhancing sustainable development, considerable financial and political investment to provide these to the quarter of the world’s population without, and the necessity of revised strategies to achieve this. Through extensive secondary and primary research, this thesis finds that such revisions must intertwine innovative conceptual, methodological and practical considerations within frameworks reflexive to the complexities of consumption dynamics and everyday life. Key development, innovation, transition and sociological paradigms collectively yielded notable insights and limitations for supporting this. These were advanced through multimethod qualitative research and a social practice theory analytical approach to reveal distinctive theoretical, methodological and empirical insights for augmenting development pathways.

This chapter pulls these insights together to conclude the thesis. First, the thesis is summarised by distilling the core insights of each chapter into their three central contributions (section 8.2). Conclusions are then drawn on the basis of these findings, rendered into three critical theoretical, methodological and empirical implications (8.3). Although they are presented separately for clarity, their interdependencies, key actors and how a social practice framing contributes to illuminating and operationalising them is crucial. The final section (8.4) then reflects upon the strengths and limitations of the research, how these were encountered and addressed, and what else could be done to further augment the contributions of the research. It consolidates the importance of co-produced, dynamic and interdisciplinary approaches for both research and development to embrace the pluralities of the social and material world and how they meld and morph in everyday practice.

8.2. Towards conclusions: Three central contributions of each chapter

Energy is paramount for everyday life and development. Transitioning from wood and other solid biomass fuels to electricity and clean cooking fuels for the 1.3 and 2.7 billion people without, respectively, is pivotal for this (UNDP 2012a). Despite considerable efforts to achieve this, including through the UNDP's 'energy access for all' agenda and now most major development banks and national governments, pervasive challenges encountered through dominant paradigms undermine the prospect of achieving it for sustainable development. This is where this research starts, providing a critical platform from which to interrogate social challenges and paradigms whose purviews transcend scales and sectors. This is introduced in **Chapter 1**, illuminating the need to address this through the three following ways.

Firstly, through problematizing the dominant 'energy access' and development model. Models have critical ontological and empirical implications and the dominant paradigm has resulted in a privileging of technological deployment and elite voices and actors rather than wider dimensions, impacts and the vulnerable. This **marginalisation of key actors, processes and the nature of 'access' and 'sustainable development'** overlooks the journey between provision, consumption, management, wellbeing and sustainability and their pluralities. This conceals the contingent needs of societies, the dynamics of social life and sustainable development, and how energy access extends innovations into new, intimate and contrasting settings and may differentially function, benefit, transform or be resisted.

This indicates eclipsed opportunities for sustainability pathways. It leads to the second core point of Chapter 1: **the importance of learning across paradigms and experiences** in critical conceptual and empirical work that frames how interventions are affected and effect through how they are situated, appropriated and operationalised in the social. This includes factors outside the conventional energy development gaze, including gender, moralities, relations, power and process. The third key contribution of Chapter 1 follows this insight: the necessity of scrutinising the various positionalities, structures and contexts that influence the process and outcomes of change. All three points suggest the interdependencies at work in the realities of energy access, and that the functions technologies enable must relate to these and the normativised knowledges, feelings, skills and procedures they require.

Chapter 2 then progressed these considerations through an analysis of a range of theoretical frameworks and empirical experiences. The **diversity of frameworks** evaluated and brought into the access debate, together with extracting the limitations and insights they bear for

advancing sustainable development pathways, marks the first key contribution of this chapter. Seventeen frameworks were reviewed, extracting insights from dominant and alternative development approaches (Section 2.2, 2.3, Table 2.1.) and augmenting these through theories of innovation, consumption and social construction (Table 2.2). Insights included the centrality of social bonds, needs, rights, relations, routines, spaces and capabilities that shape the outcomes of technologies and development through the prospects they afford and constrain.

Whilst the frameworks appraised provided partially complimentary readings of these considerations, the analysis found that no single framework sufficiently accounted for all of them, their power, pluralities or provenance. From this critical gap sprang the second substantive contribution of Chapter 2: **adding insights to access approaches through theories of social and technological participation**, co-construction and innovation. This contribution integrated insights from notable frameworks related to diffusion, learning, sociologies of consumption and transition theories. It unpicked the neglected importance of diverse forms of innovations, norms, users, non-users, consumption and 'anti'-consumption for how policy interventions variously materialise and impact in everyday life and situate 'energy access'.

The third core contribution of this chapter was to strengthen and further these insights by assessing the empirical realities of service, technological, organisational and other forms of innovation provision, energy access and sustainable development experiences. Pertinent insights were unpicked from a review encompassing over 100 empirical studies (Table 2.3). It advanced notable insights, including the importance of central mechanisms theorised in the sociologies of consumption and technology literatures - namely social use, meanings, reinvention, structuring and learning through routine activities - as well as their significant nuances, such as situated perceptions, 'knowledge' and 'feelings' required for these and their **embedding in social values, roles, identities and space that interventions risk destabilising**.

These contributions expanded the debate on what sustainability pathways may entail. It signified access as situated in interactions whose multi-dynamics render predetermined metrics of 'affordability', 'compatibility' and 'success' unsuitable and advancing pathways through frameworks that facilitate both realising and mediating these multi-dynamics. **Chapter 3** presented a social practice theory for such a framework. The focused discussion provided **the first case of explicitly setting forth the value of social practice applications for the study and progression of sustainable development**. The advantages of the theory for this included its encompassing of the above insights whilst providing a highly applicable analytical unit that resolves problematic binaries and the privileging of certain actors, knowledges and

methods that offer a partial grasp of matters of agency, choice, structure, context, consumption, change, impacts and sustainability.

The second core contribution of Chapter 3 was outlining the practical implications of this theory for 'access' and development approaches (summarised in Table 3.1). This included the importance of mundane innovations and communities identified and bolstered by routine modes of doings and sayings that constitute orders of consumption, power and positionality, as well as specific means to reify or revise them. Through signifying these means as normatively enacted, structured, discursive and non-discursive and also requiring specific inventories of meanings, skills, emotions and materiality reproduced by the specific routines, a social practice theory was further elucidated as significant for framing energy and development transitions.

The third contribution of the chapter was linking these insights to implications for knowledge production, participation, wellbeing, livelihoods, learning, innovation, organisation and resistance, signalling that these must be mediated through efforts that **co-evolve with communities through their multi-dimensional social routines**. Routines of these sorts constitute 'social practices', providing a unit of analysis that sensitises us to the situated complexities of the above processes and their relation to everyday life. Indeed, although systematised through routines, change and innovation is inherent to the nature of social practices through their dependency on iteration subject to reinterpretation, re-enactment and reordering. Moreover, the occurrence of this within and between practices presented a compelling means to apprehend access requirements and how they expand and mediate over over time and space. Critically, this included the environments and processes wherein sustainable development may occur or be opposed, how stakeholders are interlinked and best approached, and where researching and influencing change may be especially fruitful.

These are the sites and intersections of practices, sensitising researchers, policymakers and developers to the vital interplay and 'situatedness' of their interventions with the normativised elements (meanings, materials, competencies), domains (e.g. household, community, workplace, family, market), sectors (e.g. public, private, voluntary; water, energy, food), functions (e.g. governance, heating, cooking, livelihoods) and projects (e.g. energy and community development) operationalised and mediated via everyday social practices. It is hence changes to any of these that this thesis defines as 'innovation', and to which development efforts may constitute 'interventions'. The crux was the importance of considering the plural, co-dependent and emergent forms of the human and non-human in research and development and doing so through methodologies receptive to these.

Chapter 4 outlined such a methodology. It related well-substantiated and innovative methodological tools with the research requirements and epistemology of knowledge plurality and co-production developed over the previous chapters. The multimethod qualitative approach interlinking multiple sites and actors through discursive and performative methods advanced conventional energy access and development research and signified how a practice theoretic can instrumentally inform empirical research.

The breadth and complementarity of the research methods and their critical appraisal marks the second core contribution of the chapter. Through analysing and participating in everyday practices and discourses, the methodology related energy across its spaces and moments of production, distribution, consumption and management. Methods included semi-structured household (N = 54) and community-level interviews (N = 42), informal discussions (N = 60) and extensive participant observation, practice sharing, field walks and site visits. These were informed and enhanced by 30 institutional-level semi-structured interviews and a case study selection exercise trailing prospective research methods in 10 energy projects. The subsequent empirical findings demonstrates the value of research related to sustainability to be ambitious, participatory and continually communicating between implementation and analysis.

The third key contribution of the research was how this inclusion was achieved. It utilised the presented insights developed through the secondary research to more fully include marginalised and hidden dimensions from all stakeholders and how they are interlinked. The multi-dimensional forms of data, interactions and positionalities considered enabled me to enhance these to co-produce multi-actor and 'community'-based research over the various spatialities and domains their practices signify. It provided essential insight into forms, locales and interdependencies of consumption, innovation and embedding and how sustainable development projects must relate to these, taking 'access' beyond households, technologies and individuals to reveal their critical patterning in the social and built environment.

The distinctive insights these revealed formed Chapters 5, 6 and 7. Their contributions were enhanced by relating the primary data to wider studies and conceptual and pragmatic implications applicable to contexts throughout both the Global North and South. The resulting discussions challenged narratives and approaches of development, energy and access through revealing critically overlooked drivers and components that underpin them. These and their interrelatedness were articulated in three empirical chapters of 5, 6 and 7 through focusing upon the integral thematic domains of energy use, management and support/resistance.

Chapter 5 commenced this journey via an unprecedentedly nuanced illustration of the **highly socially stratified nature of energy 'access'**. This included the amount (number and frequency), type (leisure or productive) and beneficiaries (e.g. individual, family, community) of modern energy carriers consumed over various periods of time (introduced in Table 5.1) related to the structured sociomaterial environments in which they were situated.

The second major contribution of Chapter 5 was zooming from patterns of energy use to a profoundly significant example of non-use: cooking innovations. The analysis provided unique insight into the qualitative details of cooking practices and revealed the **importance of socially constructed meanings, values, senses and emotions** enveloped in certain routines for maintaining social agency and structures and constraining or enabling change. This was shown to include the equitable participation in and gains from sustainable development, arguing for development efforts to consider these and their embedding in normativised performances and moralities for their projects to have greater effect. Key to these were 'traditions', food sharing and 'taste' reproduced in everyday discursive and non-discursive routines and relations.

These findings provided notable contributions. It highlighted the significant affective and embodied nature of consumption and sustainability and the need for related interventions to pay heed to these. The third instrumental contribution was then to propound how to meaningfully do this through relating **agency and resistance to change** to the role of the specific practice and elements it is endowed with **in the making of the society's sociomaterial environment**. Routines of focal significance to this ('focal practices') are especially agential and embedded. Targeting these for development efforts and impacts related to such practices may hence be especially challenging but also especially effective. It also shows that these efforts must support the maintenance of certain aspects of daily practice, such as of 'family', 'culture', value, skill and social bonds, if others, such as resource consumption, are to change.

These insights were fused by exemplifying the profoundly interwoven and constructive nature of certain practices and their socially facilitative and productive role. It makes the critical step of moving from energy and other goods or technologies as the central commodity and need, framing 'access' as provision, to seeing the value and form of energy and development abides in social practices and their related attributes. 'Access', therefore, as practice.

Chapter 6 developed this reframing and logic further by following the practices of energy consumption to the equally essential and marginalised domain of management. The three

central contributions of the chapter are as follows. First, **use and management are highly interconnected**. Their interrelating practices, practitioners and effects interlink domains, functions and components (depicted in Figure 6.2). Social groups were integral to this through their relational and ongoing customs of ordering, interacting and working. Innovations that align with these for each respective society foster the necessary requirement substantiated in the previous chapter of routine and inclusive use. It also signified that it enables augmenting key actors and resources for the sustainability of projects, and that these always relate to wider interrelations subsuming forms of expertise, adaptation, community and collaboration.

The analysis thus zoomed-out from practices to the array of practices to which they relate and the processes they co-constitute. Through key practices within this, the chapter then zoomed-in to key aspects of these. Forming the second core contribution of the chapter, these were **co-dependent meanings and emotions**. These included pride, prestige, demand, trust, justice and community. They were **formative to practices and structures** typically eclipsed yet related to the effective implementation, consumption and management of electricity and sustainable development outcomes. Including coordinated participation, innovations, voluntary working, monitoring, reporting and 'responsible' use, maintenance and payment, predicates including the meanings and emotions in broad areas of research and development.

Thirdly, Chapter 6 revealed ways to do this, making the notable contribution to related literatures and recommendations through showing that such **meanings and emotions are only effective in** their relation to **social routines and orders**. These included skills, identities and moralities that were prefigured yet dynamic through their co-dependency on normativised ways of interacting and ordering, such as cooperative and kin-based management and exchange. Projects that aligned with these benefited from such social codes and capabilities of action and influence. Through their established yet emergent nature, this included the use of both long established and relatively novel working and managing modalities, such as reciprocal support and consumer-manager mobile phone-based assistance, respectively. Through such means, projects and outcomes became highly context-specific, effective and responsive, enhancing social resilience, adaptation and sustainability through multi-dimensional processes of appropriation, learning, and normalisation.

These processes and outcomes are co-constitutive and evolved from the projects' compatibility with situated systems of knowing, valuing and interacting through employing socially operationalised and embedded methods. It demonstrates that social orders inform modes and modifications of conduct and governance that reveal significant resources and

requirements for development, including what sort of innovation or approach is deemed “good” and “easy” to accept or use. Critically, this is a dynamic, more-than-rational process, constructed through the partially hidden, tacit, affective and automatic ways interpretations, technologies, capabilities and actions are routinely influenced.

Co-developing innovations with and through social practices thus signifies relatively simple ways to include and co-evolve the multiplicities required to address complex challenges to sustainable development. It forms new routines and ends without undermining valued social functions, ties and economies. These capitals and coping strategies for ‘risk’, resilience and everyday life affirms enabling societies in development efforts through co-produced pathways via social routines and relations, and that doing so must go beyond society as simply end-users, consumers, beneficiaries, recipients and fully discretionary, but essential actors throughout development endeavours with diverse needs and capabilities that bridge critical gaps for effective innovation, consumption, management and sustainable development. Through ongoing practice, these interconnect vital and often disconnected and neglected actors and institutions indispensable for maximising the prospects of energy for sustainable development and the ability of all communities to play meaningful and equitable roles in this.

The role of **emotions and affectivities** throughout this underscored analysing them further in **Chapter 7**. It provided key contributions to related theories and debates. First, emotions and affects, through their role in social practices and practice systems, are cultural and **integral to practice change and conservation**. These were shown to occur in multiple forms of collective action and inaction, but also affective relations to place, resources and rights.

Second, **emotions and affects act as both key binding agents and properties** of collective processes, structures and outcomes. This further explains the above attachments and forms of development/practice support and resistance. Through sharing these, emotions become key to how identities, groups and demands are made and scaled-up, and thus the dimensions required for conducting a practice and reproducing its community. This included cohesive energy groups and users with substantial emotional and collective assurance, but also nonusers disempowered to adopt new practices due to fear, anxiety and uncertainty. This provides an especially nuanced picture of use/non-use, inclusion/exclusion, implying subsuming emotions and affects in development, working and capacity building approaches.

Third, these are infused and **reproduced in the components, conducts and structures of practice** that are **both discursive and non-discursive**. A routinised co-dependency that

intensifies the interrelated yet also fluid nature of social practices and thereby innovations. The embedding of cooking in mundane discourse and the significant social sentiments and signifiers they conveyed, for instance, related to multiple other valued functions and practices. This co-evolution rendered the components (e.g. emotions and smoky food) and structures (e.g. emotional bonds and discourse) properties of the order of everyday life, interlocking cooking within discursive as well as enacted socio-cultural fabrics. This enabled their importance to be entrenched and conveyed over time and space in either symbolic or enacted forms. A multi-dimensional interlocking that provides further contributions to explanations of these and consumption, social risk, the prevalence of innovation opposition, and how to abate them. The role of emotions and discourse in this also added to explaining the social importance of food, 'taste' and 'tradition', and revising focal practices and structures.

These three core contributions of Chapter 7 come together to attest the diverse specificities of social agency and the contexts in which energy and development is situated in and affected by. Emotionalities, affects, meanings and competencies are all agents in this in practice-specific routine forms that included rules of conduct, time, space and discourse. These ally with Chapters 5 and 6 to underscore the nuanced interdependencies of provision, consumption and exchange. Their co-dependencies articulate a catalogue of self-sustaining mechanisms and outcomes that advance explanations of lock-in effects and how to modify and utilise them for improving sustainable energy and development pathways.

This thesis overview underscores the importance of energy in everyday life and development trajectories and the multitude of insights critiquing these can yield. It speaks of their complexity yet how such complexity can be commonly understood and channelled. It affirms the centrality of the social domain for crosscutting matters of design and development through how the material and non-material is patterned, interwoven and gains effect. The empirical and conceptual work of this study coalesced both distinctive and increasingly emphasised aspects of this. It consolidates three overarching conclusions for orchestrating energy and development pathways into more sustainable, effective and inclusive forms.

8.3. Thesis Conclusions

Three sets of conclusions are drawn on the basis of the research findings. The first is the importance of research and development approaches to use a theoretical framework that grasps the pluralities of knowing, doing and saying that co-constitute social orders and patterns of access and consumption, but also enable improvisation and change. These span interdisciplinary contexts where the challenges and solutions of sustainability and the array of social and material phenomena are situated yet emergent and co-produced, requiring such a framework to be continually evolved and applied on a case-by-case basis through these processes and the unfolding empirical realities. A social practice theory affords such a framework. The second and third conclusions stem from this, articulating that research and development approaches must reflect the contingencies and processes affirmed by the empirical findings and the social practice theory. These three conclusions are now distilled into three instructive points that carry implications for academics, policymakers and implementers.

Conclusion 1: Co-production, plurality & dynamism for theory & praxis.

- **Reframe access, development & sustainability.**

Access, development and sustainability is not static or primarily a matter of material provision. It is processual and sociomaterial through their experience, embedding and operationalisation in social routines and relations. These require and reproduce diverse forms and systems of knowing, interacting and valuing that comprise meanings, feelings, competencies and materials, melding the human and non-human world into co-dependent social norms. This mosaic provides the basis for agency and subsequent actions, forming structures situated in social convention and resisting or transforming any technology, policy or project through these. This co-dependendent plurality, patterning and process consequently renders the means and modes of agency, innovation and sustainability highly contextualised and intersubjective. It also reveals the necessity of utilising these co-dependencies for sustainable development, commanding researching and co-evolving multiple sustainabilities and energy pathways intersecting domains of supply, consumption, management and exchange.

- **Reframe needs, means & ends.**

From the first core reframing, the suite of prefigured and fluid conditions required for energy transitions and sustainability pathways and the multitude of impacts an innovation or intervention may have emerges. Critically, this includes requisites for them to operate, effect and be scaled-up that may reproduce geographies of differencing, non-participation, non-use and unintended consequences unless approaches tap into the normativised co-production process that underpins and modifies it (Schatzki et al. 2001: 3). This framing presents needs, means and ends as similarly diverse, differential and co-produced, reproducing emotional, symbolic and relational factors that constitute social identities, capitals and economies. The sum is 'rules' and resources embodied in mundane conventions sufficient to overcome barriers to equitable development and enhance the multi-dimensional uptake, learning and adaptation required. Methods routinised through reflecting key conventions and unanticipated collective improvisations enable these invaluable processes and resources, predicating improving energy and development pathways via such open-ended methods informed through society-led co-production throughout entire policy and project cycles.

- **Consider & co-evolve social practices.**

A social practice theoretic provides an approach to frame and enable the requirements concluded above. Its co-constitutive elements (meanings, materials, competencies), practices (e.g. cooking, working) and relations (sets of practitioners, other practices, feelings, sociomaterial norms, structures, patterns of consumption and waste) signify the contingencies development efforts are influenced by and must apprehend and adjust, and the sorts of actions that would enable this. Energy and development projects must thus consider the practices that enable and constrain their possible attributes, functioning, revision and impacts.

This is especially advantageous as these practices and factors include significant forms for everyday wellbeing, actions and outcomes beyond the conventional design and development gaze. Integral to these are interdependent social emotionalities, meanings, senses and tacit rules and bonds. Explaining these and their connection to the material world through the social practice concept of teleoaffectivity and teleoaffective structures provides an instructive way to aid understanding their role at all scales and enhance their necessary inclusion in research and praxis. The practice approach further supports this through framing the practices and factors as both discursive and non-discursive and, through structuring conducts, properties in the making and effects of social orders intersecting domains, sectors and spaces.

Modifying consumption behaviours thus occurs through the conduct of everyday practices that are profoundly co-produced and sociomaterial, requiring focusing accountability beyond consumers and limited dimensions, processes and institutions. It commands collaborative solutions enriched by the above factors and all actors complicit in them. A practice ontology thus suggests the ends to which collaboration should focus, the actors necessary for this, and the varying degree to which people can perform such integrative work. Development and collaboration efforts must hence scrutinise the details of the process, positionalities, contexts and components that shape them: this thesis substantiates a social practice approach for this.

Conclusion 2: Research through practices.

- **Take practices as the central unit in the research phenomena, context & process.**

Considering practices as the central analytical unit offers many advantages for sustainability and development research. The thesis demonstrated a number of these to conclude the following chief methodological recommendations. First, prioritise studying mundane phenomena over the exceptional through attentiveness to diverse and emergent actors and their marginalised and dominant forms and framings. Interrogate the effects normative positionalities and structures have on these and variances in needs, capabilities, performances and ends (including for participation within research). Non-performance and their pluralities are as important as performances. Attend to these situational and interactional factors across the scales and domains of the phenomena through zooming-in to the modes and nuances of particular practices and zooming-out from a practice to its broader relations of practice.

Use a structured but flexible and comprehensive research design to facilitate this as informed by the always emergent empirical realities of study. Studying practices and non-practice supports this, providing the advocated dynamic tools of enquiry integrating the pluralities of knowing, being and (non)consumption (Habermas 1973: 11), whilst providing relatively recognisable units and their sociomaterial 'thickness' and co-dependency instrumental to how agency is operationalised and embedded (Merleau-Ponty 1962: 275). Investigate these via

analysing practices as they are performed in situ in diverse ways, interlinking discursive and performative interactions attentive to their tacit, material and affective interdependencies. Methods include participant observation and observation participation of and in practices. Ethnographic case studies are excellent for this, while 'citizen science', living labs and action research-based methods are increasingly being shown as complimentary methods.

Include all groups in these and ensure all can participate. The requirements of practices and interactions specific to each social group and position supports this, as does researching which elements and structures in a locale, organisation or society make particular courses of action more or less possible; and the practices and their key practitioners responsible for this and hence making the elements, structures and outcomes (un)available, customary and organised.

- **Analyse focal practices.**

Appraise the practices focal to these and certain elements, practices and structures. They signify forms of these that may cause the most influence if changed and the consortium of actors and conjoined methods required for mediating these. This may include prime sites, moments, actors and junctures where research and intervention may be most effective. An analysis of cooking practices interlinked with other practices, teleoaffectivities, institutions and 'rules' for social life and sustainability signified this. It reveals cooking as a locus of control and the importance of certain practices and constructs for prevalent phenomena of social and material continuity and resistance, not least for gendered innovations and inequalities.

This included the 'domestic', 'community' and 'place' as inter-scalar and co-constituted spaces entailing social temporalities, teleoaffectivities and material cultures continually configured and contested through interwoven practices. Innovating or conserving certain practices and outcomes thus especially intersect with sociomaterial constructs of roles, caring, family, skills, identities, moralities, power, socialising, ordering and accruing and according value. Certain practices thus play a key role in broader patterns of consumption and social organisation, substantiating Friedman's (1997: 276) call for "examining the practices through which people construct places even as they participate in translocal networks" and effects.

- **Include & co-produce the multiplicities of knowing, feeling, ordering & doing.**

A central contribution of this research was revealing unheeded requirements for social agency and developments. It underscored their dependency on specific normativised forms and assemblages of competencies, materialities, emotionalities and meanings that relate to cumulative effects of routinised, multi-sensory experiences. Researchers must thus consider these and how they influence particular means and ends. These intersect bodies, practices, spaces, institutions and domains in ways that are emergent, structured, figurative, discursive and non-discursive. Gain insight into these and their interrelations through how they are configured in everyday practice. Revealing the significance of combinations of emotionalities and sensory experience for moralities and forms of (non-)consumption, knowledge, support, learning, skill, control and economy underpins this. Their making and manifestation in social practices verifies practice methodologies as compelling means for this whose aspects may appear 'essential' to communities that share and reproduce them.

This importance and reproduction, however, occurs despite negative impacts of a convention because the very mechanics and impacts of practice are occluded by their systematic routinisation in the patterns they co-constitute. Seeing the role of teleoaffectivities and co-production in social practices and practice systems in this thus offers inroads for boosting insight into consumption behaviours and means for change. This includes how these are operationalised and impact and how 'appropriate' forms of these are negotiated and (re)produced (Reckwitz 2012: 255). The conceptual and empirical analysis of this thesis augments this and recent scholarship and commands for diverse fields of science and development to embrace the 'visceral', 'affective' and 'emotional' through social practices.

Conclusion 3: Advance practical approaches to development & sustainability through social practices.

- **Co-produce change in/via ongoing practice & practice communities.**

Interventions are enabled and constrained through practices. The electricity provision, consumption and management emerged and sustained not because people were told what to do, but because they melded within routines interlocking conducts. A central contribution of this thesis is demonstrating this and its practical implications for enhancing energy and

sustainability pathways. The foremost of these are now summarised, providing tools applicable to producers and providers across sectors and development challenges.

First, focus on the performances and interrelations of practices for clarifying the functions and forms required of interventions, their related behaviours and how these may be achieved, adjusted and reproduced (Walker 2013: 185). These are multiple practices, showing practitioners how their technologies, services and effects are continually (re)formed and (re)positioned in and through everyday performances and communities. Second, use pre-established and emergent leaders, modes and sites of interaction to improve this for effective practice and innovation. These included sociomaterial bonds, offices, officers, committees, co-working, communication and co-management. Melding these in iterative practices co-evolved existing and new communities of learners and practitioners with the projects in particular routines, revealing the non-monetary, embedded yet also emergent that may be utilised to co-produce the requirements of innovations and action for enhancing sustainability pathways.

Third, support and utilise mundane and marginalised actors through the character of the processes and implications summarised above. Examples include multi-dimensional, group-based methods routinely shaped by sets of people sharing them. Support the plurality of these through the requirements suggested by their routines and differences, enabling groups to be more meaningfully identified and empowered to co-evolve their own development. Processes revealed to support this include mobilising teleoaffectivities, informal and reciprocal working and exchange, innovation, learning and governance. This is capacity building and development in practice and practice communities, allowing the benefits of development to be augmented, maintained and more inclusively shared. The enhanced role for civil society this demands at every level marks considerable opportunities for society and sustainability without concealing that the core onus for this lies with larger powers of states and markets.

- **Co-evolve production, consumption & exchange in everyday practice.**

The thesis underscores the need for development efforts to work across considerations of production, consumption and exchange. These are interrelated processes incumbent upon actors throughout these rather than separate stages and institutions. Foster forms of these that enhance sustainable development via targeting the practices that interlink and co-constitute these processes and their dimensions and systematisation. Collective processes of co-producing and co-evolving in increasingly inclusive communities evidenced a method for

this. It integrated a range of expertise, support and actors (e.g. societal, companies, NGOs and energy institutions such as AEPC, its technical research and development, community mobilisers and product and company testing and certification schemes) co-evolved via communities of consumers into specific ways integral for the effectiveness of the projects. The shared process and structures thus constitute emergent institutions for more productively, dynamically and equitably connecting actors, projects and domains.

This developed collectively normativised, sociomaterial capacities and procedures over a range of scales and sectors that were instrumental for enhancing sustainable development. Shared projects continually revised through shared conducts and relations thus offers a mechanism to systematically integrate and negotiate the diverse practices, stakeholders and domains necessary for sustainable development at any scale. As HPL's active shareholder approach and the electricity committees throughout the case studies affirm, these can be highly effective if interlinking modes of production, consumption and supply in ongoing practice. Such integrative, cooperative projects subsequently present compelling avenues for further scholarship, intervention, and support. The recent 'Domestic Nexus' approach embodies these precepts, integrating actors and sectors complicit in resource-intensive practices in the residential sector to signify invaluable interlinkages typically eclipsed (Shove et al. 2015).

- **Utilise emotionalities, teleoaffectivities, & focal practices & spaces.**

The role of teleoaffectivities in all the processes and recommendations concluded above require their foregrounding in development approaches. These must employ teleoaffectivities as they specifically pre-exist, impact and emerge in everyday practice and practice communities, including discursive and non-discursive forms of 'demand', 'community', 'justice', 'appropriateness' and 'pride'. These informed which project methods would be readily accepted, used and sustained. The teleoaffective-related methods thereby catalysed social uptake, learning, conducts, coordination and mitigated resistance and disempowerment, enabling the co-evolving nature of invaluable social support, knowledges, bonds and practices for sustainable development (Leach et al. 2010: 85). Emotions and resistance, therefore, rather than a definitive objection to change, support the ways we encounter the world and practical means to operationalise the push for utilising people as diverse actors in the development process through how norms are enacted and embedded.

Finally, consider their teleoaffectivities and focal practices to reassure prospective users of the consequences of innovation uptake and minimise the destabilising potential of interventions and changes. For these recommendations, the thesis signifies three complimentary methods. Implement incremental changes rather than those signifying immediate and substantial transitions; promote narratives socialising the relative value of alternative practices, reducing anxieties and uncertainty, especially for vulnerable groups; and support emotionality-linked skillsets, practices and publics through corresponding training and validation structures. This is especially important for innovations related to spaces and practices in which modes of production, consumption and exchange are particularly intersecting and resource-intensive and where focal practices, structures and elements coalesce. A practice approach makes the crucial contribution of highlighting these. Archetypal of this are households and domestic practices, instrumental across domains of energy, water and food and in the construction of family, morality and wider patterns of convention and governance, continuity and change. These core findings and implications, together with additional associated recommendations and specifying to whom they most relate, are summarised in table 8.1, Appendix XI.

8.4. Thesis strengths & weaknesses: Learning from research

This penultimate section highlights further implications for future research and progress via reflecting on three core strengths and limitations of the research. It underscores the value of continually learning from, refining and conjoining research and development approaches.

Strengths

1. Advancing social practices as an analytical & practical device in new contexts.

The thesis demonstrated how social practice theory is applicable for enhancing sustainable development research and practical endeavours. This application marks the expansion of the theory into new and cross-cutting territories and further developed the theory as a methodological and analytical aid for these and neglected dimensions related to embodiment, interdependencies and emotionalities. Through engaging in the practices influencing the phenomena of study, for instance, I was able to render a uniquely detailed and contextualised picture of the experience of and journey from incumbent energy modalities to meaningful energy projects, performances and sustainable development. This requires participating in the

practices involved in the sites and forms of (energy) use and reproduction and doing so with attentiveness to the relations, dimensions and dynamics of these. These co-depend, demanding researchers to recognise their co-evolving effect in the setting and phenomena of study.

To maximise this and the insights derived, I took time to learn local languages and customs and continually reflected upon these, my research methods and appropriateness of conduct, dress, discourse and setting as signified by the specific interactional and situational contexts and the research encounters and findings. It enhanced participation through emphasising my respect and interest in all persons and their perspectives and practices, sharing verbal and non-verbal communication and knowledge, and providing interactional cues via these and the increasing social confidence, trust and openness. This was invaluable for enhancing insights to marginalised groups and actors as well as hegemonic narratives, practices and structures. This required reflexive interaction, learning and analysis yet enabled iteratively refining subject-object positionality and analytical focus to augment access, forms of data and cumulative insights, including to significant yet marginalised dimensions and actors.

It revealed intimate practices and spaces and practices as a platform to augment analysis into these and sustainability and access pathways through revealing processes and outcomes that underpin them. This provided a rich representation of the multiple and teleoaffective dimensions, processes and geographies of interaction essential for everyday life and how interventions are influenced and impact. I then increased the forms of interaction, data, and context embraced via becoming an increasing part of this through developing shared trust, rapport, emotions and meanings via ongoing practice. This progressively enhanced my framing of these for various matters of social life and development, amplified by increasing my inclusion in everyday events and services, as well as access to elites, privileged expertise and private practices and places. It included being permitted to experience key gendered practices and the range of practices in their settings for all social groups, and taking part in electricity management meetings and practices at all levels. I thus utilised and mediated my positionality as a foreign researcher to gain insight into the gamut of practices and relations that affect access, from inclusive forms to those especially differential.

2. Key conceptual & empirical contributions & how they are interlinked.

Mundane innovations and interventions may have greatest sustainable development impacts. This finding manifesting throughout the extensive research contributes to multiple key domains and processes of development, social science and sustainability. These include production, implementation, consumption, management and governance, presenting effective policies and projects in these areas as rendered so by how they are situated in and actuated by social routines and their normative orders. This marks a key strength of the research for how the processual, ongoing and variously embedded nature of development pathways and their rootedness in social action and norms is problematically marginalised and reductively framed in conventional research and development. It is also invaluable for reframing the accountability, resources, cost-effectiveness, scales and inclusivity of development.

This includes the untapped value of social and socio-technical actors and assets mobilised to enhance sustainability and development outcomes by decentralised approaches challenging structural inequalities in the defining and distribution of these resources, communities and related processes of elite capture, hindered use and unequal gains. This divorces from the preoccupation with material 'fixes' and centralisation and shows how to do this. Moreover, an emphasis on the mundane routines and teleoaffectivities to which sustainability innovations relate reveals that successful fixes are not bounded by closed definitions and sectors, rules, groups or classifications. They co-evolve through routines that are neither exclusively small or large-scale, social or technological. Their profoundly co-constituted and sociomaterial nature and hence that of improved development pathways was further evidenced by the role of emotional bonds in all of these catalysing and conserving certain practices and related systems of daily life and consumption. This exemplification is thus a call and means for continually including the routinely reproduced, hidden and multiply dynamic in development. It also contributed to wider issues for energy and sustainability, including the nature of innovations, the patterns and effects of (non-)use, and their role in gendered practices, spaces and effects. Further contributions related to cultures, meanings, participation, food, embodied skills, their role in needs, capabilities and actions, and advancing research, policy and practice.

3. Negotiated positionality to enhance research.

The co-produced and differential nature of knowledge requires researchers to account for, insofar as possible, the complexities that influence this process and their effect on it. For researching social services, innovations or sustainability, it also requires including all social

groups in the research process and bolstering this through methods that support their varied forms of participation (Kitzinger 1995: 300). This leads to a third requirement: being open to the diverse yet contextualised factors influencing research and transparent to how they were influenced. Research and researchers thus always impart an influence on research outcomes yet can improve these over other methods through highly situated approaches that interlink interpretations, actions, orders and effects. 'Achieving' these requisites signifies a principal strength of the thesis that sets it apart from dominant approaches in related fields.

Chapter two established aspects influencing this that were accordingly developed throughout the thesis, aided by the research approach. Key aspects included supporting all social groups to participate, the affect they and others have on the research, settings and findings, and how this relates to participant-researcher interactions, social positionalities, risk, discursive and non-discursive norms, spaces and other routinised social structures and structured actions. Attentiveness to these was further amplified by continually considering them as composed of materials, meanings, emotions and competencies, and varying in degrees and forms according to embedded and emergent contingencies. This was an ongoing endeavour, enabling me to adjust the research approach to continually support participants, reduce my impact on their interactions and the co-production process, and enhance the extensiveness of the actors, processes, relations and data included. This developed a socially emplaced, sociomaterial and self-reflective approach (Creswell 2013: 20), enhanced through a number of qualitative methods initially developed through pre-doctorate fieldwork experience and training.

The sum is showing practices as integrating substantial and diverse forms of data, 'community' members, wider stakeholders and mediating subject/object distinctions to render my positionality somewhat of an asset. It comprised the multi-sensory and emotive nature of consuming, its relation to patriarchy, morality, identities, place and wider practices and rules, as well as an appreciation of the skilled performances and situated knowledge that forms a community (Giddens 1990: 4). Practice participation thus revealed the ways practices contextualise their constitutive settings and the plurality this entails, increasing the efficacy and accountability of myself as researcher, analyst and component of the data coproduced, entrenched and recent phenomena revealed, and the duality of social life and settings whose constituting practices are themselves materially negotiated. This more fully locates these, dynamism and interventions within their larger institutional context (Shove et al. 2007: 38). supported further by the complimentary interlinking of practices to other qualitative methods. Through this, I continually negotiated the complexities of 'expertise' and 'insider-outsider'

identities. The insights this afforded attests the value of embodying practices related to the context of study through ongoing and situated practice participation, learning and living.

Weaknesses

1. Challenges of interdisciplinary research: negotiating breadth of findings.

A foremost challenge of the research was managing the breadth of findings and themes uncovered and fully exploring these within the resource constraints. Negotiating these tensions is a prevalent challenge to research, especially for studies that seek to more substantially attend to the interdisciplinary and multi-dimensional nature of development and sustainability challenges. Reflecting on the thesis experience indicates three considerations that justify embracing this challenge as well as providing advice to support this.

First, the array of invaluable insights provided into energy development as well as broader topics of consumption, innovations, agency and sustainable development, among others, evidences the value of research that includes the plurality of interdisciplinary and dynamic factors that influence empirical realities. Evidencing this through the study of energy access suggests this is especially important for neglected and limited phenomena and for alternative frameworks to support overcoming these. Second, once a strong representation of this plurality and its process has been exposed, zoom into aspects of this that appear especially agential to this and insufficiently framed in academic, industry or policy discourse and practice. This was the purpose of the selected foci for Chapters 5, 6 and 7, providing an evolving thesis that started with presenting broad yet insightful dynamics and patterns (of energy consumption), and increasingly zoomed into these through focusing on how they are situated, modified and managed in and through social structures and practices.

Third, to ensure the insights from researching new, multidimensional and overlooked foci are most clearly conveyed, prioritise analysing and presenting a very limited number of these within any one project. For research into topics that signify multiple lines of pertinent enquiry and approaches that yield numerous distinctive and valuable insights, this requires tough analytical and editing decisions. This was acutely felt throughout this doctorate. Reflecting on this instilled multiple valuable research lessons. These include those above and the merit of keeping the timeline, resources and most valuable potential contributions of the research

project in close connection to the research aims, methodology, developed themes and arguments. This requires managing a balance between enhancing participant openness and emergent insights and realising when these are sufficiently substantiated and require re-guiding participant responses and providing additional contributions in follow-up research.

2. Further exploring additional findings & related themes.

Related to the challenges of interdisciplinary research, a secondary reflective consideration of the thesis was having to omit discussions further contributing to related topics. Due to considerations of enhancing depth and clarity of arguments within time constraints, for instance, the thesis had to regrettably forego further exploring and presenting findings that emerged that are significant for sustainability and sustainable development insights. Three examples are now briefly highlighted that suggest areas for future research. First, a range of factors emerged as influencing energy access and development. Evaluate which type - emotional, sensory, material, discursive, symbolic - has the greatest effect on social agency, consumption patterns and transitions. This would indicate further requisites to enhance related policies, projects and pathways. The thesis suggests that the requisites will be culturally constituted and formative to the normative fabric it is immersed within, reinforcing the significance of further practice approaches to research and development.

Second, further explore the implications of telecommunication technologies on society, innovation and sustainable development. This could include the prospect of mobile phones, smart meters and alternative consumer demand and supply management, data and payment mechanisms. The thesis suggests considering how these are embedded, mobilised and transformed in discursive and non-discursive routines signifying increasingly multiscale communities influencing the co-evolution and dynamics of development. Such research may also yield invaluable insights into overcoming social resistance to innovations, offer alternative financing, communication, participation and management models, and further underscore embracing collective citizens to augment these and modes of research, economy, and development. Third, consider how these constitute communities of practice with invaluable insights for the functioning of innovations, the immediacy, embedding and scale of interactions, and enhancing learning, competencies, norms and change (Wenger 2010).

3. Fully critiquing narratives: 'community', energy financing & impacts.

The thesis provided insights into neglected voices and actors to reveal distinctive conclusions that transcended dominant narratives, paradigms and gatekeepers. This included the character of demand, resources, needs, access, participation, community and pathways, highlighting the variable, constructed and contested nature of these as they are socially and differentially embedded, performed and revised. This provided alternative framings of valuable actors, processes, structures and implications for development, including their co-constituted and teleoaffective nature that signify enhancing learning, governance and development in communities of practice. Whilst the differential nature of these were underscored throughout the thesis, the analysis could be further improved by more fully utilising the insights to further critique certain related debates. Primary examples are the nature of communities, their cohesiveness, capabilities and resilience, how they are defined and included in development, and how this is more nuanced and problematic in reality than dominant narratives imply.

To enhance the research further, these issues should be further explored through additional methodological techniques that enable further critiquing dominant narratives and forms of data. Specific examples include the very positive views about the energy projects, communities, management and financing that emerged from the research. These narratives were tested and advanced throughout the thesis yet were insufficiently developed, for want of time and space, for the domain of financing. The significance of this factor for development compels further research to scrutinise the energy payment and financial strategies of the three case studies. Methods in addition to those I employed would include document analysis and additional follow-up interviews to go beyond dominant discursive and enacted accounts, enhance access to hard to reach actors, and reduce participant-researcher interaction (reactive) effects. These would include analysis of tariff structures, household and commercial payment records, how this income is paid, saved and managed, by whom, what happens if this is not paid, and their implications on consumption, change, control, power and equality. This would include the impact electricity makes to these, such as quantifying how much wood rice cooker use displaces and how this relates to 'costs' or gains over multiple practices.

Such insights could then be further enriched by linking them to the analysis of business models presented in Chapter 2, and insights developed in Chapters 5 and 6, such as the diverse nature of values, innovations, transitions and impacts. This includes how they are stratified and relate to time and other normatively reproduced social and environmental costs

and resources. It offers further key implications for sustainability, including how innovation use, even highly partial, may signify trajectories to further use, (in)equality and development.

8.5. Final remarks

The thesis presents alternative frameworks for energy access and development situated within the complexities of everyday life at a time of burgeoning interest in these. These co-evolve and effect through their incorporation within social routines. These are discursive, non-discursive and reproduce specific constellations of emotionalities, meanings, competencies and materialities. These support the recursive, structurally facilitated performances that competent practices necessitate (Watson 2013: 157) and reveal the contexts in which policies, citizens and interventions function and impact (Reckwitz 2012: 253). Effective and sustainable innovations within this are thus made and mediated by the diverse requirements and co-dependencies of social routines, requiring multiple stakeholders and practices interlinking eclipsed modes, structures and pluralities of provision, interaction, consumption and management. Augment these via conjoined practice communities, research and projects.

Through widely demonstrating the value of this, the thesis culminates in advocating progressing access and development as an ongoing endeavour through multiple pathways supporting the varying ways groups understand, feel and act in the world. These are enhanced via utilising collective practices, (non)consumers and their sociomaterial structures, signifying invaluable sources of innovation, capacity and sustainability that present the normative and non-elite as essential for development. Improved access and development approaches, rather than simply matters of provision, are thus multidimensional and co-produced through social performances over diverse domains. This requires approaches attentive to the differential nature of the means and ends of performances, 'participatory' approaches, the role and nature of consumers and communities in innovations, and overcoming constraints to these for sustainable development. The study of energy practices and projects in this thesis reveals promising means for this aligned with the practices and pluralities of everyday life.

Appendices

Appendix I

Principal considerations to enhance sustainable development pathways derived from analysis of empirical sustainability innovation & interventions literatures.

Uptake requisite	Essential points	Key Empirical Examples
	<ul style="list-style-type: none"> - Motivations, awareness, perceptions, views, experience, clarity, & attitudes emphasised. - Socially occasioned socio-technical associations modify these & interventions. - No singular position, expert, agent, format or scale. - Avoid theoretical & pragmatic foreclosing. - Management essential for ongoing use. Both must occur for long-term energy access. Interlinked processes. - Value of 'social capital': routinised social rules, relations, symbolism, interactions & forms of exchange & knowing. - Provides assurance, stimulates wider benefits & reduces transaction costs & unintended negative consequences. - Includes trust, ethics & hierarchies. - Fostered in experiential, group-based methods. - Emotions significant within these yet neglected in social life, innovation, transitions & development discourse & praxis. - Ordinary innovations may be more effective for SD yet especially prone to uptake challenges. - Beyond rational-actor, 'technology push', relatively standardised, reductive models. 	<p>Ryan 1948; Polyani 1958b; Littler 1982: 3; Harter, 1982; Chambers & Jiggins 1986; Gray & Hay 1986; Rafaeli & Sutton 1990; Rolfe 1990; Morris & Feldman 1996; World Bank 1998; Conner & Armitage 1998; Lin 1991; Schmookler 1993; Cox 1997a; 1999; Davis 1999; Putnam 1993b; Farazmand 2004; Heckman 2002; Kennedy & dos Santos 1998; Woolcock 1998; Fletcher 2001; Greenhalgh et al 2004; Berkes & Folke 2002; Connelly et al. 2006; Troncoso et al., 2007; 2011; Putnam & Mumby 1993; Routledge 1999; Mog 2004; Hargreaves & Hielscher, 2012; Malla & Timilisia 2014; Bhojavid et al.,2014; Gordon et al., 2007; Baxandall 1972; Schuurman 1993, Clark, 1995; Geertz 1976; Furtado 1987; Groak 1992; Rothwell 1992; Kinnunen 1996; Prahalad & Ramaswamy 2000; Franke & Shah 2003; Bozeman 2000; Grubb & Ferrario, 2006; Bazilian et al., 2010; Hackett & Betz 1981; Goldman 1988; Webersik & Wilson 2009; Wu, 2008; Nicosia & Mayer 1976; Kopytoff 1988; Mokyr 1990; Maynard 1992; Butler 1998; Erickson & Kellogg 2002; Chui & Hong, 2006; Peterson & Langellier 2006; Yang & Chang 2008; Dearing 2009; Bijker et al., 2010; Devine-Wright 2011; Nakicenovic & Grübler 2013; Hausman 1979; Rist et al., 2001; Røpke 2001; 2003; Pike et al. 2007: 1255; Chang et al., 2014; Kees & Feldman 2011; Isenhour 2012; Manuelli & Seshadri 2014; Phoenix & Brannen 2014.</p>
	<ul style="list-style-type: none"> - Participatory, plural & socio-technical approaches appear most effective. E.g.s showing these precepts include Participatory Rural Appraisal (PRA), project-cycle, life-cycle, holistic & various integrative management approaches. - Gender-inclusivity, dynamism, partnerships, decentralisation, localisation, multi-level dialogue, experiences, learning, collaboration, legitimacy & accountability highlighted. - Requires countering multi-level 	<p>Schaap & Nandi 2005; Bouda et al. 2009; Blackie & Sadeque 2010; Baum 1970, 1978; Jansson 1994; Curran 1996; Brinkerhoff & Ingle 1989; Clark et al., 1992; Muriithi & Crawford 2003; Brinkerhoff & Ingle 1989; Rao 2000; Folke et al. 2010; Lele 2013; Herzberg and Wright 2005; Chu et al., 2000; Sen & Nielsen 1996; Kerzner 2013; Bell & Morse 1999; Bond & Hulme 1999; Bhatt & Sachan 2004; Feldman 2007; Loucks et al. 1999; Ong & Collier 2005; Roberts & Bradley 1991; Sullivan et al 2003; Herzberg & Wright 2005; Kaplan 1982; Gray & Hays 1986: 96 Gray 1989; Pasquero 1991; Picciotto & Weaving</p>

	<p>interaction constraints between the various actors. Requires interdisciplinary methods.</p> <ul style="list-style-type: none"> - Include societies in the whole research & development process attentive to power, differences & abilities to routinely participate, negotiate, act & control. - Contentions over these & how to arbitrate discords, dynamics, scope, nature of governance & contingencies, needs & capacities, esp. of marginalised actors & how to support them. 	<p>1994; Sriskandarajah et al. 1991: 4; Warburton 2003; Barth et al. 2007; Lasker et al., 2001; Hermatti 2002; Blowers, 1998, Ottaway, 2001; Andonova & Levy, 2003: 30; Fung & Wright, 2003: 191; Tholke 2003; Cashore et al. 2004; Cooke 2004; Gaventa 2004; Hale & Mauzerall, 2004: 231; Pandey 2006; Reus-Smit, 2007: 159; Dale & Sparks 2008; Nautiyal & Kacchele 2009; Brassett & Tsingou, 2011; Jodah 2011; Bridge et al., 2013; Fernandez et al., 2013; Khavul & Bruton 2013; Pade-Khene 2013; Backstrand & Kayslater 2014.</p>
	<ul style="list-style-type: none"> - User know-how, want & ability to socially use & maintain key. - Sustained, (re)negotiated & ongoing use & management necessary. - Mitigates unintended consequences and project failure. - Supported by contextually embedded use, reinvention, management and supply chains. - Decentralised and participatory approaches support this rather than centralised 'quality control' standardisation. Use and reinvention rather than quality focus. - Consider context of use/management - Importance of ongoing processes in contingent norms. 	<p>Otte 2014; Maijer et al 2014; Hazeltine & Bull 1998; Alazraque-Cherni 2008; Heeks 2008; Bensch et al 2014; Malla & Timilisina 2014; Bhojavid et al., 2014; Pode 2013; Gordon et al., 2007; Morris 1997; Jasperson et al., 2005; Karwowski 2005; Grunert 2005; Ihde 1979; Diphaha & Burton,1993; van Lunde 2003; Tiwari et al., 2008; Gaudi & Hauser 2009; Smith et al., 2014; Conger 2015; Hong & Abe 2015; Singh et al., 1997; Rajendran et al., 2012; Dillman et al., 1983; Black et al., 1985; Van Raaij & Verhallen, 1983; Barr et al., 2005; Arnold et al 2006; Practical Action 2010; Jetter et al., 2012; Rondinelli et al., 1983; Engel & van den Bor 1995; Rondinelli & Nellis 1986; O'Neill et al., 2004; Arnould & Thompson 2005; Hyman 2013; Balis & Hyman 2011; Fulwood et al., 2000; Novogratz 2007; Uzoka, 2013.</p>
	<ul style="list-style-type: none"> - Iterative learning & adaptation. - Group-based, experiential 'social learning' best. - Includes emotional learning & 'mixed' or 'new' institutions that combine actors & sectors. - Signifies 'user communities', integrating producers, commodities and consumers in normative processes and spaces. - Drives adoption process, functions & outcomes. Relates to organisational structure & interactions transcending sectors & scales. - Development as iterative, intersubjective and socio-technical - Cyclic process indicates empowerment-development 'nexus', suggesting 'bottom-up', 'community'-based, demand-driven, coordinated approaches. 	<p>Schon 1983; Pestalozzi: 1894: 3; Keohane 1989; Hopkins & McKeown 1999; Cohen & Piper 2000; Kovan & Dirx 2003; Bazilian et al., 2011a; Mumtaz, 2000; Lundvall 2010; Bhojavid et al., 2014; Matata et al., 2014; Valente & Davis 1999; Leroy 1990; Laurent and Paquet 1998; Feder & Savastano 2006; Bazilian et al., 2011b; Chaskin 2001: 115; Stanley and Miikkulainen 2004; Zuckariasson 2004: 77; Herrington et al. 2002; Wenger 2002; Graham 2005; Norman 2005: 114; Reckwitz 2012: 253; Arthur et al., 2011; Hussey & Pittock 2012; Lai et al., 2013; Petty 1995; Adger 2001b; Lindskog & Tengberg, 1994; Williams 1974; 1976; Palis 2002; Sparovek & De Maria, 2003; Broos 2005; Waldron 1991; 2000; Malhotra & Schuler 2005; Keen & Mahanty 2006; Charlton 2007; Patwardhan et al. 2009; Ringle et al. 2013; Shrestha et al., 2014; Mathews 2001; Manda & Wozniak 2015; Quisumbing et al., 2014; Magnan et al., 2013.</p>
<p>Risk & Uncertainty</p>	<ul style="list-style-type: none"> - Affects all stages of appropriation & participation. - Risk is multidimensional & linked to ambiguity of an innovations outcomes, wellbeing, anxiety & empowerment. - Affected by access to resources, including 	<p>Rigotti et al., 2008; Bryan, 2010; Ross et al., 2010; Engle-Warnick et al., 2011; Kusago & Barham 2001; Vecchiato 2012; Iyer 2007; Aw-Hassan et al., 2008; Akinrinola & Mafimisebi 2010; Petit 2012; Shrestha et al., 2014; Weil 1970; Wills 1972; Khan 1975; Bhalla 1979; Knight et al., 2003; Ghadim et al. 2005;</p>

	<p>markets, wealth, education & power.</p> <ul style="list-style-type: none"> - These are rarely equal and hence risk experiences and effects vary socially. - Subjective levels of ‘acceptable risk’ related to positionality & innovation-specific gains. - Co-constructed by socially combined attributes of the innovation & socio-technical setting. - Role for social, market & state institutions. 	<p>Liu 2007; Douglas & Wildavsky 1983; Feder et al., 1985; Sunding & Zilberman, 2001; Isik & Khanna, 2003; Marra et al., 2003; Foster & Rosenzweig, 2010; Jerneck & Olsson 2013; Barham et al 2014; Morton 2007; Sirrine et al 2010; Gabrielsson et al 2013; Pimmer et al., 2012; Maraseni 2012; Cole et al., 2013; Mengersen et al., 2012; Mubiru et al., 2015; Gwenzi et al., 2015; Sloan & McCorkle 2012; Herath & Jayasuriya 1998; Eato & Kortum 1999; Roy 2001; Schmidt et al., 2013; Walsh et al., 2015.</p>
<p>Affordable</p>	<ul style="list-style-type: none"> - Overestimated payment barriers. Ability & willingness to pay & contribute by payment-in-kind. - Long-term budgeting for all costs: assessments, implementation, capacity building, maintenance & management, replacement, extension & upgrades. - Up-front costs prohibitive without tailored procedures related to social capacities. - Decentralised operation, management & user finance often most sustainable for overcoming financing barrier, boosting user practices, reducing malfeasance & enhancing financial health, reinvestments & project outreach. - This reduces investor & user risk, interest rates & emphasises prospective markets requiring private sector, state & society to expand access to ‘unreachable’ groups. - Consistent with a purchasing power parity within the rural energy & solar lighting market of \$350 & \$36 billion a year, respectively, among “Bottom of the Pyramid” (BoP) consumers. - Directly include communities. - Both established & innovative methods work. e.g.s are prepayment, pay-as-you-go and tariff-based, correctly metered mechanisms, lifeline rates, cross-subsidisation, crowd-funding, cash proxy transfers (e.g. vouchers or smart cards), self-help groups, regularly reviewing pricing structures and modes; enable remote, often nominal instalments via mobile phones, interlink payment with user advice & remittance flows. - These support benefits of providing & maintaining modern energy services to exceed costs & barriers. 	<p>Pachauri & Jiang, 2008; Ekholm, et al. 2010; Pearson et al 2012; Chaudhuri & Pfaff 2003; Bansal et al. 2013, Nepal & Amatya 2006; Brunnschweiler 2010 Mondal et al. 2010; Yunus 1998; Gurung et al., 2012; 2014; Horwitch & Prahalad: 1981: 5; Doyal & Gough 1991; Themistocleous & Wearne, 2000; Ghimire 2008; Flyvberg 1998; 2001; Hammond 2002; Karnani, 2007; Roy 2001; Schmidt et al., 2013; Charsombut & Islam 1992; Burr et al., 2005; Eijkman et al., 2010; Sehjpai et al. 2014; Horst & Hovorka 2008; Bhagavan & Giriappa 1995; Okello et al. 2013; Chitrakar & Shrestha 2010; Tenenbaum et al., 2014; Yadoo & Cruickshank 2012; Mainali & Silveira, 2011; Schroeter & Martin 2008; Ghimire 2008; Gauli & Hauser 2009; Arun & Turner, 2002; Ladd 2015; Bhattacharyya 2014; Zaibraffi et al., 2014; de Gouvello & Maigne 2002; Ellegard et al 2004; Solanki & Mudaliar 2010; Ahlborg & Hammar 2011; Groh et al., 2015: 139; Mapako & Mbewe 2004; ADB 2006; Gan 2006; WRI 2007; ARE 2012; The Sierra Club 2012; Taylor & Bogach 1998; Dunn & Peterson 2000; Gore 2002; Finger-Stichtch & Matthias 2003; Birchall 2004; 2006; Gaventa 2004; Iiskog et al 2005; Monroy & Hernandez 2008: 1928; Gomez & Silveria 2010; Angaza 2012; Tuntivate & Barnes 1995; Pacudan & de Guzman 2002; Bajgain & Shakya, 2005; Rawlings & Rubio 2005; OECD et al., 2010; Diniz et al., 2000; Maluccio & Flores 2005; Rodriguez-Sanchez 2010; Pode 2010; Komatsu et al 2011; Barnes et al 1993; Hashemi et al., 1996; Norburg-Bohn 1999; Ravindranath et al., 2000; Franceys & Weitz 2003; London 2006; Weir & Knight 2004; Sovacool & D’Agostino 2000; World Bank 2003; UNEP 2008; Foel et al 2011; Hoff & Stiglitz 1990; Yaron 1994; Yaron et al., 1997; Fernando 2006; Ballis et al 2009; Dahan et al., 2010; Felsing 2010; Bhattacharya et al., 2012; Guay 2012; Jerneck & Olsson 2014.</p>

<p>Compatible</p>	<ul style="list-style-type: none"> - Innovation/intervention's qualities must be perceived, felt & socialised as consistent with existing values, past experiences & needs of potential adopters. - Maintainable innovations, esp. in remote areas. - Requires contextualising/localising efforts. - Importance of social, multidimensional norms, ties & practices for resources, coordination & capabilities. - Innovations among marginalised social groups & common strata may be most effective for sustainable development. - Align innovation with the socio-political, geophysical, economic, historical setting for 'viability', functionality & reproduction. - Consider both material dimensions (nature, artefacts, physical infrastructures) & social (human bodies, senses, norms, relations, roles, rules etc.) & how they form resources/means, order & ends. - Further understanding this contextualisation process & its dimensions poised to enhance development pathways. - Mutual understandings & goals amongst multiple actors. - Active, collective responsibility, input & participation. - Earlier participation occurs in project the better. - Participatory innovation design, use & extension, user engaged, social, interpersonal. <p>Society-led, 'bottom-up' innovation & development.</p> <ul style="list-style-type: none"> - Adaptability, reinvention, reconfiguration, localisation; co-production valuable & ongoing. - Development challenges are highly spatially & temporally variable. 	<p>Agarwal & Prasad 1997; Buitenhuis et al., 2010; Zelenika & Pearce 2011; Adebayo 2009; Barnes 1998; 2001; 2004; Ramani et al., 2012; Mas & Radcliffe 2010; Tucker 1999; Scheraga et al., 2000; Díaz et al., 2013; Harish et al., 2013; Chang et al., 2014; Manda & Wozniak 2015; Rosenburg 1994, Buitenhuis et al., 2010; Zahnd 2013; Bensch et al 2014; Prajapati & Nakarmi 2014; Moseson et al., 2012; Mattson & Wood 2013; Bhutto et al., 2012; Lahimer et al., 2012; Bijker, 2010; Walker & Cass, 2007; Walker & Shannon 2011; Burns & Flam 1987; Sen 1999; Nassburn 2004; 2006; Geels, 2010; Leach et al., 2010; Gready & Ensor 2005; Cornwall & Nyamu-Musembi 2004; WHO & Unicef 2010; Chambers & Conway 1992; Nussbaum 2000; Carney 2002; Brocklesby and Fischer 2003; Solesbury 2003; Shove et al., 2007; Watson 2008; May et al., 2009a, 2009b; 2011; 2013; May & Finch 2009; Finch et al., 2004; Palis 2006; Nugroho 2011; Campbell & Sallis 2013; Conger 2015; Plappally 2011; Visvanathan 1991; Zeller et al. 1998; Dorward et al., 2004; Kraay 2006; Altenburg & Lundvall 2009; Chang et al., 2014. Buitenhuis et al., 2010; Zelenika & Miller 2012; Ramani et al., 2012; 2013; Rosenberg 1994; de Laet & Mol 2000; Skea et al., 2011; Mobarak et al., 2012; Bhojavid et al., 2013; Bullock et al., 2013; Neupane et al., 2014; Maraseni et al., 2014; Agarwal & Brem 2012; Boithi et al., 2014; Nepal, 2012; Narayan 2012; Díaz et al., 2013; Elbatran et al., 2015; Peejack, 2011:44; Powell et al., 1996; Philips et al., 2000; Lawrence et al., 2002; Taylor, 2007; Gauli & Hauser 2009; Leach et al., 2012; Scoones et al., 2012; Mas & Radcliffe 2010; Prahalad 2009; Karnani, 2007; Agterbosch & Breukers 2008; Chaurey et al., 2012; Hale & Mauzerall 2004; Berkes 1995; Buitenhuis et al., 2010; Zelenika & Pearce 2011; Sharma & Iyer 2012; Sharma 2014; Mas & Radcliffe 2010; Nicholson 1993; Feder & Savastano 2006; Dubeuf et al., 2014; Hefny et al., 1993; Adams & McShane 1992; Panapanaan et al., 2014; Byrnes et al., 2014; Garimella et al., 2015; Moser & Barrett 2006; Ojha & Morin 2001; Dayton-Johnson & Bardhan 2003; Nath et al., 2013; Uddin et al., 2014; Hanna et al 2012; Malerba 2002; Scacchi 2004; Douthwaite, 1999; 2011; Cheng et al., 2004; Mackrell et al., 2009; Grint & Woolgar 2013, Pantzar 2003; Foster & Heeks 2013; Southerton 2014; Brown 2002; Gupta et al., 2008; Leary et al., 2009.</p>
<p>Power & Agency</p>	<ul style="list-style-type: none"> - Resource differentials hinder equal development participation & benefits unless accounted for. Extends to politicisation of management practices & 	<p>Wellin 1954, Sen & Nielsen 1996; Mallet 2012; Subedi & Garforth 1996; Abrahamson 2004; Muggenburg et al. 2012; Sriwannawit & Laestadius 2013; Ojha & Persha 2009; Lister & Nyamugasira</p>

<p>development.</p> <ul style="list-style-type: none"> - Requires detailed appraisal of specific socio-technical milieu. - Socio-cultural factors significant & conditions use, non-use, impacts, perceived suitability & uptake. These effects are thus both symbolic & material. - Factors include competition, contestation, differential (especially gendered) priorities, goals, values, demands & expectations. - User age, gender, land rights & marital status can shape above factors & hence practices, meanings & innovation uptake. - Such dimensions are systematised, socio-technical, multilevel and multi-actor. - Equity in outcomes is often directly linked to these & equity in decision-making & performing. - May require embedding these considerations within trans-scale empowerment mechanisms to promote equal participation & gains that address their structuration & intra-household, end-user dynamics rather than 'elite capture' of resources and exacerbated inequalities. - Systemic methods attentive to dynamism & agency-structure duality. - Interlinkages inc. households, family, work, energy, gender & wellbeing. - Requires new modes of conceptual framing, research, innovation, policy-making, capacity building & economy. May include informal, dynamic forms. 	<p>2003; Trevor & Pinch 1986; Bauer 1995; Brulan 1996; Selwyn 2003; Richards et al., 1999; Davies 1999; Pinch and Bijker 1984; Schoemaker et al 1983; Hoffer 1942; Pederson 1951; Rogers et al. 2001; Malaby 2003; Bijker 2010; Villamor et al., 2014; Phuspa 2011; SEI 2002, Türker & Kaygusuz 1995; Clair et al., 2001; Defries & Pandey 2010; Burns & Flam 1987; May et al., 2009a; 2009b; 2011; May 2006; 2013; May & Finch 2009; Eder et al 2015; Finch et al., 2004; Lente 1997; Jackson 2012; Okello et al. 2014, Stern 2014; Tushman & Romanelli 1985; Rip & Kemp 1998; Geels & Smit 2000; Geels 2000; 2010; Geels & Schot 2007; Turnheim & Geels 2012; Buchholz et al., 2009; Lente 1993; Brauw et al., 2014; Udall, 1993; Karakaya & Sriwannawit 2015; Ulsrud et al., 2015; Brown & Corbera, 2003a; Corbera et al, 2007b; Greig-Gran et al, 2006; McDermott et al, 2012; Lukes 1974; Hammad & Dirar 1982; Calantone 1992; Agarawal 1994; Holmes et al., 2010; Kaiser et al. 1999; Corraliza & Berenguer 2000; Oskamp 2000; Guta 2004; Handa et al., 2009; Keller et al., 2012; Hui 2013; Klevorick et al. 1995: 204; Davenport 1993; Fernandez-Cornejo 1996; Lambert et al., 1998; Cleaver 1999; Lubatkin et al, 1999; Aryeetey & Appiah 1995; Agerman 2003; Verbong & Geels 2007; Bass & Dalal-Clayton 2012; Negro 2012; Jones & Boyd 2011; Dubbink 2003; Goodman 2004; Mandell & Steelman 2003; Southerton et al., 2004; Smith et al., 2005; Druk 2003; Kotler et al., 2006; Von Crough & Von Hippel 2006; Gidley et al., 2009; Hammann et al., 2009; Stirling et al., 2007; Stirling 2008; 2010; Scoones 2009; Folke et al., 2010; Shove & Walker 2007; 2010; Dickinson et al. 2014.</p>
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Appendix II

Preliminary field exercise: case study selection for analysing approaches of providing access to energy in rural areas.

Case: Village, District & Region	Distance from unsealed & sealed road	Distance from District HQ & KTM	R Class ¹	Subsidy category ³	Pop. ²	Ethnicity	Approach type & energy system	Key comments	Energy system output start date
Sisuwa-Bala. Sankhuwa sabha, Eastern Region	20 km, 35 km	35 km, 542 km	1	A	3,190	Rai 23%; Chetri 19.4%; Tamang 10%; Brahmin Hill 6.6%	REDP approach. Nepal's long-refined community-based EA model. MH, 60kW, 600 households.	Active community, community mobiliser & effective tariffing. Project spurred diverse means & ends for SD, e.g. agro-processing. How these developed very insightful.	2007
Lokhim. Solukhumbu, North Eastern Region	30 km, 30 km	30 km, 655 km,	1	B	3,098	Sherpa 65%; Rai 20%; Chhetri, 10%; Limbu 5%	REDP approach MH, 52kW, 450 households.	V good, well-managed example that also shows vulnerability & response to landslides. A key issue for remote EA. Local plans to upgrade system indicates success. Atypically wealthy pop.	2010
Swanra. Janakpur, Central Region	10 km, 15 km	20 km, 154 km	4	C	2,324	Yakav17.5%; Muslim 8.5%; Kewat 6.2%; Teli 5%	REDP approach MH, 60kW, 300 households.	Considered best e.g. of the primary modality in Nepal. CM v active, prime contact. Allows insight into influence of CM in relation to other actors.	2009
Khimti. Dolakha, Central Region	0-7 km, 0-7 km	40 km, 156 km	4	B	15,000	Chetri 33%; Tamang 16%; Brahmin Hill 11%; Thami 8%	Private sector (HPL) model with some INGO support. Excellent model for SD results & offering an alternative market-based approach. MH, 400kW, 3100 households. + 630kW, 4160 households.	Pioneering & innovative model that utilises key underused stakeholders: private sector & communities. Could be a significant model. Offers contrast to majority of EA approaches, primarily state or donor-based. Suggests valuable insights to be gained.	2002
Barpak. Gorkha, Western Region	0-5 km, 45 km	50 km, 176 km	2	C	15,000	Gurungs 55%, Ghale 40%; Rai 15	Private sector model, via local entrepreneur involved in its every aspect & ensured institutional & service	Atypically affluent & ethnically homogenous population for hill & mountain regions in Nepal. Also atypically remote. Non-scalable due	1991

							linkages. These were vital yet little social input & wider gains. MH 50kW, 100 hhs.	to reliance on exceptionally wealthy local individual & population.	
Ghandruk . Kaski, Western Region	5 km, 25 km	55 km, 280 km	3	C	4,748	Gurung 62%; Dalit 22%; Magar 6%; Brahmin 5 %; Chettri 5 %.	ACAP model, unique funding stream: Annapurna Conservation Area (ACA). Community-based, privately funded & implemented model. Support of local NGO. MH, 50kW, 200 households.	This village, has long history of community group development due to being the ACAP Trust, an active, well-financed body. Energy model considered one of best examples in Nepal yet does not represent the limitations of typical remote communities.	1992
Jaidi. Baglung District, Western Nepal	2 km, 45 km	40 km, 300 km	3	C	2,500	Magar 28%; Brahmin22%Chettri 19%; Kami 13%	Community group-driven grid electrification Model. kW tied to National-grid, 400 households.	One of few cases of this model with no road access. Model provides high quality electricity & has high scalability potential.	2011
Chhisti. As above.	11 km, 56 km	51 km, 310 km	3	C	5,236	Magar 28%; Brahmin22%Chettri 19%; Kami 13%.	Community group-driven grid electrification Model. kW tied to National-grid, 200 households.	Close to Jaidi, allows convenient scoping of both to ascertain which the most insightful case study & contrasts & how lessons overlapped between them.	2008
Far Western Region	15 km, 50 km	2-50 km, 800 km	1	A		Magar 6%; Nepali, Kami & Newari 11%; Tharu & Janajati 10% Dalit 23%; Brahmin14%	CRT & ESAP approaches. These are two remaining exemplary approaches (collective, multi-actor, long-term, award winning). Area subject to majority of political unrest, hindering research.	One of only11/75 districts where all VDCs in district are remoteness category A. Many stakeholders stated this area is most challenging & overlooked for EA. Covering this region in addition to others beyond scope of this thesis.	2010, 2005

Source: Derived from multiple sources, including institutional-level interviews, peer reviewed and grey literature. Final case studies highlighted.

¹ Remoteness Index derived from most recent GoN (2011) census.

² GoN's (2011) subsidy policy for renewable energy in rural and remote areas, updated in 2011, differentiates level of subsidy eligible for different VDCs and regions into 3 categories. "Category A" villages are defined as "very remote" in this policy, allocated slightly more subsidy for household & community energy systems than categories B & C, respectively. Only certain VDCs in 23 of the most remote & marginalised districts of the 75 districts of Nepal are entitled to the top two tiers of subsidy, categories A & B.

³ Nepal 2001 census. Latest census for villages.

Appendix III

Household & participant purposeful sampling selection criteria. The variables are widely upheld as substantive selection criteria for enhancing actor & data diversity.

Case study	Hh no.	Caste	Remoteness index	Income metric	Family size	Time spent collecting cooking fuel (hours/day)
	1	H	1	5	3	3
	2	H	1	5	3	3
	3	L	4	5	7	7
	4	H	1	2	3	2
	5	H	3	3	4	3
	6	L	4	5	3	5
	7	L	3	3	2	3
	8	L	4	4	4	5
	9	H	3	3	3	3
	10	L	4	5	1	3
	11	L	4	4	4	5.5
	12	L	5	3	6	6
	13	M	4	3	3	4
	14	H	5	3	5	4.5
	15	H	5	1	2	5
	16	L	5	5	1	3
	17	L	4	4	5	5
	18	M	2	2	5	5
	19	L	1	1	5	5.5
	20	H	3	3	4	4
	1	M	1	1	3	0
	2	M	2	3	1	3
	3	L	2	2	2	4
	4	L	3	5	6	5
	5	M	4	2	4	4
	6	M	3	2	5	4
	7	M	3	3	2	3
	8	M	1	4	4	3.5
	9	M	3	3	3	3
	10	L	4	3	3	5
	11	M	5	3	3	4
	12	L	5	4	6	7
	13	M	5	3	5	4.5
	14	L	5	4	5	6
	15	H	5	1	2	3
	16	H	5	1	2	3
	1	M	1	3	4	2
	2	M	2	5	5	3

3	M	1	1	5	1
4	M	4	2	5	10
5	M	1	4	5	3
6	M	4	1	3	4
7	M	5	4	3	4
8	M	1	4	6	3.5
9	L	3	4	5	5
10	M	4	4	3	3
11	M	4	3	4	3.5
12	M	5	3	4	4.5
13	M	5	4	3	4
14	M	5	3	3	4
15	M	3	4	6	4.5
16	L	3	2	3	4
17	M	5	2	2	2.5
18	L	5	1	5	5

Source: Derived from multimethod qualitative research methods. Participants did not require their data to be anonymised. Household participant index presented in thesis indicates the participants characterised above. Index is first letter of case study, HHi and a number, e.g. (JHHi1), representing household interview 1 in Jaidi.

Sources supporting the use of considering these variables for their effect on development and energy access outcomes include the following (Kaygusuz & Kaygusuz 2002; Kobayashi & Balakrishnan 2003; Brown & Corbera 2003a; Kanagawa & Nakata 2008; Urmee et al. 2009; Cook 2011; & Zerriffi 2011a; Lachapelle et al. 2011; Mahapatra & Dasappa 2012; Lee et al., 2015).

Appendix IV

Guideline of questions for semi-structured institutional-level interviews.

Read & record at start of each interview.

'As I said before in my letter, I plan to record this interview for my own records, to be used in my PhD research thesis. I will keep the recordings safe on my supervisor's secured computer at the university of Sheffield. The recording will be used only by me and deleted after use. Any quotes from you I plan to use in my thesis I will check with you in advance, asking how you would like to be referenced and whether you require anonymity. Are you happy with this?' Clarify response & complete consent form with them.

Q, 1, Tell me about your role in this organization.

Q2, Tell me about your thoughts on what energy access is & providing it to rural areas in Nepal for sustainable development. Who is involved in this? Where did the motivation come from? (e.g. social, political, economic, external demand? Degree of social demand?)

Q3, What do you think energy access should entail?

- **Is there a common understanding of EA across key stakeholders in Nepal? If no i), is this an issue? Solutions for issue? If yes ii) What do you think the common understanding of EA is in Nepal (& at scales above or within Nepal)?**

Q4, What do you think sustainable development should entail?

- **Is there a common understanding of SD across key stakeholders in Nepal? If no i), is this an issue? Solutions for issue? If yes ii) What do you think the common understanding of SD is in Nepal (& at scales above or within Nepal)?**

Q5, From your experience/perspective, what are the factors needed for improving rural energy initiatives & SD? Who should be responsible for this?

Expand on key points from answer, e.g.. governance, types of institutions, innovations quality control, capacity building, regulations, community support, participation, overcoming problems between actors & within projects, key components, processes, structures & actors?

Q6, Have you found ways of achieving/ overcoming these factors that you would recommend?

Q7, Who or what do you think are the key types of people or things that are needed to best enhance EA in rural areas for sustainable development?

What would you advise is the best way to encourage these & enhance their effectiveness for EA & SD?

Q8, How can cooperation & synergies between the key stakeholders, people, programs & policies be improved for the improvement of EA? Are they well coordinated in Nepal for rural EA for SD?

Q9, What ways of financing or payment models do you think are the most successful for enabling increased EA outcomes for SD in remote areas?

Q10, What do you think has been the most successful rural energy initiative to date in Nepal? Why? - How was it achieved? How could it be improved further?

Q11, What would you say are the key dimensions in EA for SD?

- **Is enough attention given to social/political/ecological/economic/technological dimensions in research, policies, training & projects?**

Q12, How could these be improved?

Q13, That's my key question asked. Do you have any other questions, recommendations, or insights for me? (Ask further questions related to the answers in the interview & specific additional ones prepared in relation to nature of participant & emerging themes & subthemes).

- **Could you recommend any other key persons or institutions influential or insightful for EA & SD in Nepal?**

Appendix V

List of institutional-level interviews conducted as part of the thesis.

Interview number	Participant Name	Participant position
1	Raju Laudari	<i>Assistant Director/ Climate and Carbon Manager</i> AEPC
2	Ram Prasad Dhital	Assistant Director, AEPC . Programme Manager, National Rural & Renewable Energy Programme (NRREP).
3	Jeevan Baidya	Rural Micro-grid Project Manager & engineer, Gham Power Nepal Private Limited
4	Bhisma Pandit	Energy Advisor to REDP , plus with GTZ & DANIDA Now freelance consultant.
5	Satish Gauta	National Programme Manager, RERL, AEPC
6	Kushal Gurung	WindPower LTD, Director. Also independent sustainability & energy policy advisor
7	Subarna Kapali	Director, Centre for Rural Technology (CRT/N)
8	Saroj Rai	Senior Renewable Energy Advisor SNV Netherlands Development Organisation. Formerly Executive Director of Nepal's Biogas Sector Partnership
9	Achyut Luitel	Director Practical Action Nepal
10	Nick Jeffries	International Sustainable development innovation consultant . Experience across range of private, third & public sector energy projects.
11	Gokarna Bista	Former energy minister, GoN
12	Brijesh Mainali	Senior Academic , Royal Institute of Technology, Kathmandu, Nepal
13	Nabin Bhugel	Director , Solar Electric Manufacturers' Association Nepal (SEMAN)
14	Rajiv Sharma	Community Rural Electrification Department (CRED), Director, NEA

15	Kjartan Gullbra	HPL Nepal Director
16	Pratik Man Singh Pradhan	Director , Butwal Power Company, LTD
17	Surendra Bhakta Mathema	Nepal Micro Hydro Development Association (NMHDA), President . Former director at Power Tech Nepal Pvt. Ltd.
18	Mr. Dilli Prasad Ghimire	National Association of Community Electricity Users-Nepal, (NACEUN), President .
19	Pushkar Manandhar	Asian Development Bank, Section Manager , sustainable energy.
20	Purna Ranjitkar	Nepal Micro Hydro Development Association (NMHDA), Executive Director .
21	Dr. Prakash Gyawali	Association of District Development Committee of Nepal, (ADDCN) Senior Energy and Environment Consultant .
22	Pradeep Gangol	Executive Manager , Independent Power Producers' Association Nepal (IPPAN)
23	Manu Aryal	Renewable Energy credit program officer, AEPC
24	Bhupendra Shakya	Renewable Energy Expert & mini-grid specialist AEPC
25	Suman Basnet	UNDP senior energy consultant
26	Madhusudhan Adhikari,	National Advisor , Mini grid Component, AEPC
27	Ashish Shrestha	World Bank, Sustainable energy project coordinator
28	Vishwa Bhusan Amatya	Division Manager , Energy for Sustainable development, Practical Action
29	Dinesh Dulal	Country Director , Clean Energy Development Bank
30	Lumin Kumar Shrestha	Director , Centre for Self-help Development Nepal. Involved in Improved Water Mills (electricity) & the Advisory Committee for Centre for Energy Studies at the Institute of Engineering. Kathmandu University.

Interview index presented in thesis via 'Ili' plus a number). Number is anonymised from the above 30 semi-structured interviewees. Ili signifies Institutional-level interviews.

Appendix VI

Example of core questions forming the initial basis for household-level interviews

1. What are your key development needs & wishes & how have these changed over time in your experience? Such as, since energy access, but not explicitly initially.
2. Has the energy project made things better for you and your community? Explain the project please as much as you can (What gave them the idea for doing that particular model. thing, for example, income gen activity?) consider changes in practices, behaviours, feelings, skills, outcomes and understandings. Tie in sub-questions & prompts here related to their answers for above.
3. Do you think the was community ready for the initiative?
4. Has it been fair? - How to make /would they want it to be more fair or different?
5. What have you had to do to use the electricity? Was it easy to make this transition to using electricity & having it in your life? What is different now?
6. What could have been done to make that easier or quicker or better?
7. Do you feel you are able to use the electricity well?
8. What is the best way to improve this?
 - Best format for this for you & community? – What training have they had?
9. How is the project managed? What is important for this? How can the management be improved for improving SD?
10. What FS are available to you? (which is the best & why) Could it be improved?
 - What would be the characteristics of the most suitable FS for remote villages?
 - What is it being used for? - How could it be improved? E.g. linkages, long-termism, degree of wider benefits.
11. Based on your experience, would you do or advise for anything to be done differently for the energy project & any other projects?
12. What new things do you do since EA? - What new technologies have users bought & use since the EA? Gauge degree, gender & outcomes of use. Has the EA project caused this? - what is hindering better uptake of new practices, e.g. those linked to EA & SD?
13. What things do you now not do? Implications? Distribution of impacts?
14. Has it changed anything else in the HH or community? – such as energy use & energy practices, aspirations, willingness to learn, meanings or practices re working, decision making, participation, saving, lending, planning, investing, group working, daily activities & roles. Independence, empowerment. Spurred & enabled other development activities.
15. Has the experience of the forestry committee / other development organisation or activities had an influence on EA or vice versa? E.g. familiarity and skills of group working, planning, selling, managing
16. Should the project link to any other development activities in the area?
 - a) What do you think you / the committee should be doing with the funds/income?
 - b) Do you feel that you / the committee are able to manage this?
 - c) What would be the best way to provide you the ability to manage this?
17. Tell me about the aloo trade? E.g. who benefits, how important for rural dev.?
 - How did national and international trade link develop?
 - Any relationship between market access and EA? i.e. Did it enhance EA or vice versa?
 - How do improve market access and benefits of aloo business for Sisuwa?
 - How fair is the aloo cooperative? i.e. open to all? it is for profit? What is the best model for such a group? i.e. for profit or not-for profit, focusing more revenues to producers? Should it be giving more profit back to producer? How much more does producer make if go through cooperative?
18. Has the EA project made people think differently about needs, services, sustainable development and projects? In what ways?
19. Mills are in wards 7, 5 and 1. Do you think this location is fair? Equal access? How far is the furthest ward from a mill? Should subsidy or loan service be provided to allow mills in other wards also?

22. Was there any differences in how the EA was provided for the wealthy and elite and the poor and low castes?

20. Is there any difference in how different groups / people with diff backgrounds use and benefit from and made the transition to electricity? E.g. in no 1 = more high value electricity based appliances, for example, laptops, as people better jobs and more educated.

21. What do they think about the fact that in some places in the area people have better access to electricity appliances and services/ have more of them and have greater capability to use them?

22. Most are satisfied with the project. Why do you think some are not?

23. Do the community help in running the project? Should they be paid? E.g. community members voluntarily help the operator maintain and fix wooden transmission poles.

24. Another NGO does similar work in the area, including promoting MH. EcoHimal. Has this helped the uptake of energy practices in Jaidi?

25. If road access was improved, what changes would it have for you? What would you do differently? Would it influence the EA project and how / for what you use electricity?

26. How much should we encourage HHs at the start of such a project to join it? E.g. info & awareness should we give them. How long should we spend doing this? In what ways should we do this? E.g. meetings, house to house?

- Should more have been done to raise the interest of HHs to connect and get EA? e.g. Those without EA was somewhat due to awareness of its benefits. "The ones who didn't show interest and so didn't contribute didn't get EA".

27. Does the community work together for other things? Has the project improved working approaches?

28. Could the community have afforded to pay more at the initial phase, such as for better quality components? E.g. metal pipe instead of concrete pipe and metal transmission poles. – or does it suggest a need for increased external support to ensure sustainable EA?

29. a) What % of HHs have a rice cooker? b) What % use them regularly?

c) What % use biogas?

d) What % of HHs used solar power before the

MH?

e) What % have stopped using the solar because of the MH? f) What % use both? Are they glad they have both or would they recommend doing anything differently?

g) How did they afford the solar? Did they know about the government subsidy?

30. What do they think about the electricity rates? Its 100rs per 20 units then 10rs per unit for anymore per month. Cost for extra consumption is double that of normal unit price. Does this deter extra consumption? Should consumption be encouraged as it results in better sustainability of the project and enhanced benefits for the users? How to do this if so?

- Any final suggestions on how it can be improved?

- Best / most important characteristics of the approach?

- Are there any other questions you would like to ask me. You can also come by the village house to talk to me any more about anything & if you have any extra ideas.

Additional points/ questions to feed as prompts to previous questions:

a) Before EA when they used to make the allo products during the day, did they forego any practices to do the allo work during the day?

b) What do you think about the subgroups modality of the project? i.e. Does it help improve the functioning of the project, the people & their involvement? Are all groups functioning well? Why some functioning differently? How to improve?

c) What were the existing capacities of communities? How did these influence EA SD? How did they change? Could this be done better do you think?

Explore key factors, elements, structures, processes & replicable aspects for insights for pathways scalability, sustainability & improvements?

Appendix VII

Community-level Key Stakeholder Interview's & informal interviews & focus groups for each case study.

Sisuwa-Bala

Key Stakeholder Interviews (KSI):

- Key Stakeholder Interview 1 - Interview with president chairman of MH committee.
- Key Stakeholder Interview 2 – Chairwoman of women's aloo group & member of the market. management committee, female, 35 (ward no 1, Sisuwa).
- Key Stakeholder Interview 3 - Operator 1 of MH.
- Key Stakeholder interview 4 – Teacher.
- Key Stakeholder Interview 5 - Local restaurant owner, female, 44, ward no 4, Sisuwa.
- Key Stakeholder Interview 6 - Chairwoman of ward level financial savings and lending group, ward no 3, Sisuwa.
- Key Stakeholder Interview 7 - functional group member.
- Key Stakeholder Interview 8 - Senior staff of the Himali project, national level GoN programme - Informal interview.
- Key Stakeholder Interview 9 - VDC Secretary, Sisuwa ward no 4.
- Key Stakeholder Interview 10 - Chairman of SODEK.
- Key Stakeholder Interview 11 - Head teacher of school in centre of the project area, Bala 1. The biggest school in Sisuwa-Bala.
- Key Stakeholder Interview 12 – Carpenter, 37, Rai, ward no 4, Sisuwa.
- Key Stakeholder Interview 13 - Operator 2 of micro-hydro plant.
- Key Stakeholder Interview 14 – Manager of VDC Level Financial services group.
- Key Stakeholder Interview 15 – Inn owner / Sherpa household, highest toll, ward no 9, Sisuwa.
- Key stakeholder interview 16 – solar power company no. 2, rural solar home system and appliances distributor, female, Khandbari, Sisuwa-Bala case study.
- Key stakeholder interview 17 - REDP advisor & community mobiliser Khimti, Jitendra Singh.
- Key Stakeholder Interview 18a - Solar electricity provider. Shop Owner & Customer Interaction, District centre, Khandbari.
- Key Stakeholder Interview 18b - Solar electricity provider. Shop Owner, follow-up, in-depth interview.

Informal interviews & focus groups:

- Ad Hoc Focus Group – Dalit Development Group.
- Informal interview 1 – Man from a neighbouring VDC without ENERGY ACCESS.
- Informal Interview 2 - Local restaurant owner.
- Informal interview 3 - Woman with no EA due to poverty and divorce.
- Informal interview 4 - Secretary of committee for new MH project in parts of Sisuwa.
- Informal interview 5 - Owners of our inn & notes on prearranged interviews, Market access and development potential.
- Informal Interview 6 – Elders and key village members in Tamco. One from a neighbouring District.
- Informal interview 7 - Co-owner, developer & manager of local health clinic.
- Informal interview 8 - Civil engineer working in the area.
- Informal Interview 9 - Hotel owner. Chairman of committee also present.

Khimti

Key Stakeholder Interviews (KSI):

Key Shareholder Interview 1 - Owner & chief mechanic at metal workshop, male, 44, ward no 2, Khimti.

Key Stakeholder Interview 2 - Key Persons in District level FS cooperative sector, incl. Chairman of a 2 district-level financial cooperative, Khimti.
Key Stakeholder Interview 3 - Bhishnu Khadga, KREC electrical manager and GM, Khimti.
Key Stakeholder Interview 4 - Founder/owner & 1 of his metalworker employees, ward no 4.
Key Stakeholder Interview 5 - Relatively large community-mill owners & operators.
Key Stakeholder Interview 6 - Technical manager of KREC & line extension officer, 2 males.
Key Stakeholder Interview 7 - VDC assistant officer, ward no 2, Khimti.
Key Stakeholder Interview 8 - VDC officer, ward no 6, Sahare.
Key Stakeholder Interview 9 - Khadga Sunuwar, chairperson of KREC
Key Stakeholder Interviews 10-15 Interviews with Khimti & Jhankre MH plant HPL staff.

Informal interviews & focus groups:

Examples of informal interviews & discussions:

Informal Interview 1 - Fisherman, Late 30s, ward no 2, Sahare, Dalit.
Informal Interview 2 - Fishermen, 6 fishermen, different ages, all young, below 30 except one elder, 60s, Dalit.
Informal Interview 3 - Fisherman, Magi caste, 43, ward no 1, Sahare.
Informal Interview 4 – Patients, staff & local community members, the drop-in health and dental service clinic, ward no 1, Khimti.
Informal Interview 5 - Coffee farmer in a cooperative, male 39, ward no 2, Malu.
Informal interview 6 – Elderly woman collecting firewood. Ward no 7.
Informal interview 7 – A group of teachers on their lunchbreak. 2 men, 2 women. Ward no 9.
Informal interview 8 – Local doctor on his daily 50 minute walk to work. Ward no 5, Phulasi.

Jaidi

Key Stakeholder Interviews (KSi):

Key Stakeholder Interview 1 - District Forestry Officer of the district, male, 30 yrs, Baglung.
Key stakeholder Interview 2 - Active community member & Teacher, male, ward no 5.
Key stakeholder interview 3 - Key members of the 11 person committee, 6 males, 36-69 yrs.
Key stakeholder Interview 4 - Dalit, tailor, male, 45, ward no 7.
Key stakeholder interview 5 – Labourer technician, 1, used in project, male 41.
Key Stakeholder Interview 6 - Female electricity management committee member, 44 yrs.
Key Stakeholder Interview 7 - VDC secretary and village chief, male, late 40s.
Key stakeholder interview 8 – Chhisti Electricity management committee Chairman, 45, Chhisti ward no 3.
Key stakeholder Interview 9 - Technician, Second, male, 38, Jaidi.

Informal interviews & focus groups:

Focus group on Electricity management committee election preparation day. Various household & community-level actors.

Examples of informal interviews & discussions.

Informal interview 1 – Student and farmer, males, 15 & 40 yrs.
Informal interview 2 - 3 farmers met on route to Jaidi, males, 30-40 yrs.
Informal interview 3 – Small restaurant, shop and hotel owner, active man, 45.
Informal interview 4 - Past electricity management committee member, female, 38 yrs.
Informal interview 5 – Brahmin men, 4, 40-50, ward no 8, Jaidi.
Informal interview 6 – 3 women collecting firewood.

Participants did not require their data to be anonymised. Participants are referred to in this thesis via the index 'KSi' plus a number corresponding with the above interviews. Key stakeholder interview 13, for instance, becomes (KSi13).

Appendix VIII


Example of core questions forming the initial basis for Community-level, case study interviews

- 1) How has electricity affected things here? In what ways do you use it?
- 2) Is it difficult to manage community electricity?
 - What are the management challenges?
 - How best to overcome them?
- 3) What do you think are the key characteristics of good management for community development?
- 4) Is the electricity committee size about right or should it have more or fewer members? And more or further sub-groups & group linkages. Any other factors?
- 5) What is the best way to form a community committee?
 - When is the best time to form a committee? i.e. at very start? Why was the committee only formed 2 years after the delivery of electricity?
- 6) How useful were the policy guidelines for starting, managing & running the project?
- 7) Could the guidelines to communities for rural electrification be improved?
- 8) What should be the level of input from the community for rural community electrification?
- 9) What should be the level of input from the government for rural community electrification?
- 10) Should there be input from any other actor for improving access to energy in rural Nepal? What should that input be & how best provided?
- 11) Do you think the users could be doing anything better? E.g. related to use, management, maintenance, financing, reinvesting, saving, wider income generation & development activities.
- 12) What groups are there in the village? Should there be overlap between the various committees in the village?
- 13) Do you think there is a need for financial services in the village? i.e. to improve the use of electricity, i.e. more income gen activities?
 - Should the electricity project provide the financial service or should another institution provide it? How would the financial services be most effectively provided, used & managed.
- 14) Do you think more training is needed for the committee, community or any other actor?
- 15) What do you think is the best format for the training? E.g. toll-level, ward-level, VDC level, district etc; no. of persons; number of days, training in what areas?
 - Who should provide the training?
- 16) How could the committees be improved do you think?
- 17) Should users be more involved in the electricity project? If so, how? Should community members also be more involved in other development work & needs?
- 18) Any other way to improve the management of development projects in remote areas?
- 19) Why were lower quality components used, what was the impact & how to avoid?
- 20) Explain to me the system to help the poor get connected who couldn't initially afford
 - How many HHs have connected under this mechanism?
 - Do you think more should be done for those who couldn't afford the initial cost?
- 21) Would you do or advise for anything to be done differently?
- 22) Any advice to improve policies, projects & outcomes for rural electrification?
- 23) How did you get the idea to start the project? How can others be helped to start or support energy access projects? What would be the best forms of help do you think?
- 24) What % are using electricity for productive purposes?
- 25) What % have rice cooker and what % use them daily?
- 26) What % use biogas? Other cooking innovations?

What are your thoughts on this? Why not higher for these? Any additional tips or insights?

Appendix IX

Sample of Postgraduate Research Information & Consent Form filled in with every participant as part of this research.

 The University Of Sheffield.	
The University of Sheffield Postgraduate Research Information and Consent Form	
Researcher	
Researcher Lewis Cameron Department of Geography University of Sheffield l.cameron@sheffield.ac.uk	Research Supervisor Professor Matt Watson Senior Lecturer in Human Geography University of Sheffield M.Watson@Sheffield.ac.uk
Purpose of the research	
To investigate how to improve ways of providing access to modern energy services in remote areas for sustainable development. To explore nature of access & means for enhancing approaches & outcomes.	
Who will be participating	
A select number Key stakeholders in the energy and development sectors in Nepal who have strong experience and expertise in the research area. This includes local communities & citizens from all positions & perspectives.	
What will be asked of you	
To share your expertise and insights with me on issues related to energy access in Nepal. Participation is voluntary. You can opt in or out & tell me anything & ask me questions anytime.	
What data will be collected	
I will record our interview conversation if you accept. This will be via digital recording & field notes. Any additional material you choose to send me I will also use on your permission.	
What will the data be used for	
I will use the interview and any additional information you send me for my PhD research. All data will be kept secure. The audio will be used for transcription only. Data kept anonymous.	
What will happen to the results of the research	
The research will be used in my doctoral thesis publication, academic journals publications & wider outreach reports aimed at policy makers.	
Approved Confirmation	
I confirm I have read & understand the description of the research & that I can ask questions anytime. I understand that my participation is voluntary & that I am free to withdraw at any time without any negative consequences by simply informing the interviewer. I understand that I may decline to answer any particular question or questions. I give permission to the researcher, Lewis Cameron, to have access to my responses. I agree to take part in the research as described above.	
Participant Name (please print)	Participant Signature
Researcher Name (please print)	Researcher Signature
	Date:

Appendix X

India's Narmada Valley: Resisting multi-dimensional change through practice communities

India's Narmada Valley houses tens of thousands of predominantly lower socio-economic communities united by intertwined practices - farming, fishing, forestry, rituals - that co-create their necessary socio-technical environment (Paranjpye 1990; Grewal 1994; Deegan 1995). In 1979, it became the proposed site for the construction of a mega irrigation and hydroelectricity dam to serve neighbouring states (Chitale 1997; World Bank 1995). Although it required the transformation of the environment and displacement of its marginalised communities (World Bank 1993; cf. McGully 1996: 70), it followed a centralised approach that overlooked the local communities and their situated interdependencies (Fischer 1995: 429; Mehta 1997; Maitra 2009). This included dispersing communities to contrasting settings, cash compensation to communities unaccustomed to a market-economy, and largely officially landless and thus excluded from the compensation, reflecting and extending the external quantification and multi-level elitism of ownership, development and benefits (Maitra 2009). Moreover, this comprised impact assumptions and assessments (Shihata 2000: 132; cf. Tullos 2009), including flow data, "the statistical bedrock for dams", using 'official' rainfall data for lack of the required 45 year flow data, despite over 45 years *observed* flow data (IEG 1995; Ram 1995; Roy 1999: 32).

This approach overlooked qualitative details of wellbeing at the expense of the 'affected persons' and accuracy of the calculations premising the project's outputs, resulting in the dam causing significant unintended socio-economic, cultural and ecological consequences whilst failing to achieve its technical objectives (McCully 1998: 185; Turaga 2000). This included delivering substantially less electricity than projected (CWC 1992; Roy 1999: 32, 38). These limitations and the resulting social opposition, clarifies the dynamic interdependencies of the socio-physical world, and resistance as, either passively and subconsciously or actively, an expression of the necessity of these interdependencies for everyday life and its co-constitutive setting (Somers 1994: 625; Escobar 2005). The myopic approach circumvents these interdependencies, eclipsing their embedded systems of decision-making, acting and legitimising responsive to the uncertainties of the lived environment (Aitken 1992; Dubash et al. 2002; Roy 2007). This erodes social (emotional, symbolic, moral) ties, order, agency and identities, countering practices and engendering resistance (Cosgrove 1989; Turner 1991: 302; Parenti 2015).

Shared narratives bolstered the resistance through signifying a 'global community' of multiple organisations and actors identifying with, reproducing and reinforcing the anti-"high risk/high reward", 'rational progress' 'big development' (Byrne et al. 2006: 199; UNESCO 2012: 321). The narrative utilised a nationally emotive Gandhian discourse of augmenting rural economies through collective action and "our rule in our villages" (Roy 1999: 171; Gandhi 2003), countering the increasingly negatively perceived Nehruian model equating dam building with 'the greater common good' (Parajuli 1996). Narratives integrating socio-technical dimensions thus strengthened the resistance (Fisher 2001). Discourse thus engenders solidarity, structure and socio-technical effects by uniting diverse actors into translocal communities (Khagram 2004). The Kárahnjúkar dam opposition in Iceland, utilising the Narmada narrative, further illustrates this (Bruce 1999; Khonder 2001; Benediktsson 2008: 213).

Appendix XI

Table 8.1. Interlinked theoretical, empirical & methodological thesis conclusions & implications for enhancing energy access approaches for sustainable development (SD).

Research Insight	Implications (For research & development approaches)	Actors & Examples
<p>'Access' is a means not ends. Translates to SD outcomes via ongoing consumption of the commodity & related services. SD contested. Services for SD most effective when demand-driven, contextualised, complimentary & mutual. These are socio-technical & continually (re)defined & (re)produced by patterned, relationally situated social routines intersecting multiple domains (domestic/private, public, work/market, time & space). Social routines thus define institutions & effects that overlap in everyday life. 'Access' for SD thus = innovations in patterned social routines.</p>	<p>Energy access (EA) requires multifaceted <i>co-production</i>, contextualisation & integration, departing from technocentric <i>provision</i> paradigm. Requires intertwining materiality (namely electricity & clean fuels) with inclusive & sustained performativity of SD enhancing services (lighting, cooking, milling, communicating etc.) with others (education, livelihoods, healthcare, market access) & their ongoing use & management. Seek & support key interconnections. Institutions/sectors must cooperate.</p>	<p>Requires coordinated collaboration of all actors influencing integrated systems of production, consumption & control. Socially embedded actors across state, public, private & third sectors across the multiple domains reifying the systems. (e.g. 2.4 2.6, Chapters 5, 6 & 7).</p>
<p>Key interconnections include modern energy with employment, education, telecommunication, financial services, tool hire, road development & related training programmes.</p>	<p>Deliver & maintain these in unison. Enhance this by evaluating & intervening with all stakeholder at key sites (practices, elements, moments & spaces) of interconnection.</p>	<p>As above. Especially the actors in those sectors <i>with</i> users. Onus on practices & collective actors, not simply users.</p>
<p>Ongoing use, management & adaptation essential yet also multi-faceted & contextually-specific. Reinforces 'access' as innovations in social routines. Active, interpersonal, performative process. Signified via terms 'uptake', 'appropriation' & 'practitioner' over 'diffusion', 'adoption' & 'adoptee'.</p>	<p>The focus of 'access' should be co-produced, reflexive use, management & revision.</p> <p>Communities very effective for this. Communities include users/beneficiaries & non-users/excluded. All actors should support this.</p>	<p>As above. Myriad intertwined actors beyond orthodoxy (external engineers, planners & rational users). Prioritise communities for diverse users. (e.g. 2.5-6, 5.6, 6.5, 7.5).</p>
<p>Forms of non-use & resistance provided further insights into enhancing development pathways, such as fear, anxiety, overriding community teleoaffectivities (e.g. 'tradition') & social structural limitations.</p>	<p>Include forms of non-use & resistance in research methods & development pathway design. Includes marginalised forms of these, such as counter-discourses & risk & role change anxiety avoidance.</p>	<p>As above, especially researchers, development bodies, non-users & resisters. (e.g. 5.5 & Chapter 7).</p>

<p>Multifaceted, integrative approach applicable beyond energy access. Requires nuanced capacity building tailored to the consumption practices, their ongoing requisites & systemic patterning. This defines differential & diverse resources, prospects & constraints & thus (social) capabilities, position & needs.</p>	<p>Capacity building must be socio-technical, processual & structural. Most effective when utilising the mechanics of the co-constitutive, intersubjective system. Capacity building must co-evolve in ongoing social routines between influencing actors. Experiential, collective learning-by-doing & saying.</p>	<p>As above. Demands actors across social & technical domains. (e.g. Chapters 5-7, esp. 6.3.2 & 7.5).</p>
<p>Means, constraints, processes & structures, knowledge & agency are co-constituted, socio-technical & entail relations of materials, skills, meanings & emotions made & embodied in social routines. Includes notions of 'SD' & 'appropriate'. Social practice theory accounts for this. Such routines signify 'practices' within systems of practice.</p>	<p>Co-produce 'access', capacities & SD through social practices of & in the society in question & encompassing the issue in question specific to that society (e.g. for EA in Nepali communities via their discursive & non-discursive norms, signalled in practices). Equitability requires all being able to perform the practices.</p>	<p>As above. E.g.s viz. interdisciplinary researchers, experts & practice communities, partnerships, projects, mobilisers, groups, committees & companies.</p>
<p>Social practices presuppose means & ends of social activity through the arrays of socio-technical infrastructures they co-produce (interrelated skills, institutions, embodied feelings, rules, materials etc.).</p>	<p>Provides a lens into past, present & potential futures via how these were, are or may be used in common routines. Understand the nature & importance of the temporalities of actions, consumption issues & SD via practice-informed research.</p>	<p>As above.</p>
<p>Taking practices (what people do & say & commonly associate with them, such as those above) as unit of analysis, provides multiple forms of data. Overcomes limitations of typical approaches, e.g. reliance on recall data, predefined categories & what can be verbalised or readily quantified.</p>	<p>Include actions, embodied, affective, unsaid, implicit dimensions & their relationship with the normativised materiality of daily life in research & SD approaches. Conducted reflexively, enables better accounting for mediating role of researcher, subjects, translators & setting.</p>	<p>As above. (e.g. Chapters 2, 4-7).</p>
<p>Certain practices are key to multiple practices & outcomes. A change in one may especially require (or inadvertently entail) a change in all the related practices & outcomes, especially for those practices closely related ('bundled').</p>	<p>Include these practices in research, access, capacity building & SD approaches (e.g. cooking in Nepal. Melded with socialising, fuel sourcing, eating, order, forestry, identities). Related sectors include energy, water, forestry & food.</p>	<p>As above, but especially prospective practitioners (e.g. females) & key opponents (males) across the related sectors.</p>
<p>Some practices are especially embedded & intersecting among certain settings & social groups. Conserving or changing these</p>	<p>Apply the cooperative practice approach within focal 'sites' of routine meshing (e.g. households,</p>	<p>As above.</p>

practices supported by including these settings & groups. Interconnecting programmes supported in same way.	social discourse, temporalities (e.g. mealtimes), & focal practitioners & their constraints (e.g. females).	
Practices & structures interrelate in myriad ways from adversarial to complementary, horizontal & vertical. Complementary, reciprocal forms best forge the practice repertoires, relations & performances to best aid managing the complex feedbacks, thresholds, dynamics, actions & consequences inherent within complex systems.	Promote cooperation via inter-sector, inter-actor working, evaluating, learning & institutions in & across everyday routines. Foster diversity of practice specificities (discursive, embodied, informal, moral, emotional, reciprocal). Conduct further research into these & their influence for innovation & SD, including within the rhythms & 'spaces in-between' 'official' praxis. Feed findings back into SD efforts.	As above. Researchers, practice communities, & all levels of producers, government, suppliers, institutionalisation & development agencies must be active, collaborative actors. (e.g. 6.5, 7.5.1).
Interrelations & templates also include intersubjective & co-constitutive temporalities & spatialities.	Further expands lens into rules/requisites & effects for/of practices & hence development transitions & research. Include these in access, SD & research approaches.	As above. Actors must marry over time & space, viz. bodies, 'domestic' & publics (e.g. 6.4, 7.4).
Resistance & non/uptake relates to approach countering templates, practices or aspects thereof. Heralds multitudes of uncertainty, risk & disempowerment.	Assure against this for all social groups and multi-level actors, especially prospective practitioners & core practice opponents. Embed this in design & capacity building.	As above. (e.g. 5.5, 7.4.2 & 7.5).
These are centred on marginalised & vulnerable due to social position, access to conventional capitals, & thus volition to improvise practices & adapt to change. Uptake & empowerment requires systemic changes via socialisation yet are unequal.	Assurance/ capacity building efforts should prioritise the marginalised. Yet also include influential/ high status community members within target groups as these will be more likely to uptake & thus catalyse wider uptake & change.	As above. (e.g. Chapters 2, 5 & 7).
Social practices (& thereby capacities, needs, resources, structures & inequalities) are malleable via collective, integrative practices between hitherto tiered & isolated actors, approaches & economies. Dominant development is archetypal.	Co-produce equitable access, capacities & development via co-researching, co-designing, co-working, co-using, co-management, co-(re)investing & co-expanding. Conjoin policies, appraisals, actors & projects in everyday practice.	As above. Plus new, institutions integrating these interrelated actors, domains & practices. (e.g. Chapters 4 to 8, esp. Chapters 4 & 6).
Initiating simplified antecedents to more complex projects could enable the inclusive social use, & thus learning, elements, bonds &	As above. Consider which initial practices would best support further practice developments. For EA, solar systems & social	As above (Supported by analysis in Chapter 6)

<p>improvisations supporting overcoming diverse positionality & uptake capability limitations. May include inclusive practices of saving, rural development, ethical consumption & collective working to develop the dimensions & structure for practices to evolve.</p>	<p>groups could be co-produced with all social groups to build & normalise the capacities for wider developments & practice interlinkages, e.g. micro-hydro & livelihood projects, cooperatives & practice & proto-practice focused research.</p>	<p>& discussion in 6.4). e.gs are the committees & AEPC. Wider e.gs are Sri Lanka's Electricity Consumer Societies & India's IREDA.</p>
<p>Some elements of practice/societies may especially embed conventions or catalyse change & be hence especially influential for development pathways. The influence may correlate with the degree of routines & structures the elements are embodied within.</p>	<p>Evaluate & ensure approach reflects this (e.g. cooking projects aiding the reproduction or revision of valued emotionalities, competencies & sensory qualities). Building & integrating these into collectively modified, overriding teleoaffectivities may bolster this (e.g. related to pride, female labour-saving & incomes).</p>	<p>As above, especially policy consultants, development implementers & researchers. (e.g. 5.3, 5.4, 5.5, 6.7; Chapter 7).</p>
<p>The emotionality & affectivity of practices & communities & how they related with other aspects of community life (e.g. meanings, power, rules, earning, health) highly influenced behaviours, innovations, uptake, resistance, EA & SD effectiveness.</p>	<p>These are generally overlooked factors & effects. Evaluate them further in empirical research & development approaches.</p>	<p>As above, especially academics, policy advisors, development monitors & researchers. (e.g. Chapters 5-7).</p>
<p>Communities may have pre-existing norms that aid or inhibit new practices & development strategies. These signal prospective/ 'proto-practices' or assets thereof. May include certain SD enhancing practices (e.g. group working, sharing, milling, carpentry, metal work, weaving) rapidly integrating & bolstered by electricity, & others requiring greater changes to community norms & structures to form & augment SD (e.g. clean cooking & equal female inclusion in high-level community groups, such as the primary electricity committees).</p>	<p>Evaluate the practices within the society in question & its sub-groups. consider which will enhance practice/ SD transitions. Ensure SD approach supports these (e.g. HPL & AEPC's approach of utilising forms of community discourse, leaders & groups based on pre-existing relations. Examples missed yet worth including within the electricity projects include tool hire cooperative, pickle making, market access, existing competent technicians & capacity builders & emotionalities.</p>	<p>As above, especially academics, policy advisors, development implementers & researchers. (e.g. 3.3, 5.2, 6.3).</p>
<p>Effective SD approaches were socio-technically embedded. Included relatively recent forms (e.g. mobile phone use for enhancing project management, remittance flows & practice uptake & intentions). The social mobilisation & use of such technologies offer conceptual,</p>	<p>Ensure approach aligns with socio-technical landscape of target community. Conduct further research into the social melding, co-production & co-evolution of technologies & implications of this & social agency & telecommunication</p>	<p>As above, especially researchers, policy makers & implementers in concert with target communities & practices. (e.g. 6.2, 6.5, 7.5).</p>

methodological & practical implications related to the co-constitution of discursive & non-discursive routines & their mobility, scalarity, communities & impacts.	technologies on society, policymaking, research, innovation & SD, including their co-production, impact & immediacy.	
The above are distinctive findings supported by the practice-ontology related to overcoming pervasive SD constraints & stimulating self-referential, self-expanding SD outcomes. First example of practice-application in empirical study of SD-focused EA. Also supported insights into international development & rural development; signals the theory's broad applicability.	Further social practice theory applications in research & sustainability efforts extended to new contexts (sectors, spaces, institutions, problematics). Findings & literature gaps suggest these should include forms of innovation, learning, risk, anxiety, resistance, community, (dis)empowerment, belonging, economy & development.	As above (e.g. Chapters 2-8).
A related finding is the value of boosting these by new & co-evolving, interdisciplinary & poly-dimensional benchmarks, metrics, tools, training, spaces & practice-based projects.	Orthodox forms of these miss the contextualised complexity of daily life & sustainability. Requires all stakeholders collectively cooperating, learning & refining.	As above. (e.g. Chapters 2 to 8, esp. 2.4 2.6, 3.4, 7.3, 7.4).
Insights & implications widely supported. Includes findings & concepts in innovation, transition, adaptation, resilience, reflexive governance, design, holistic & sociotechnical thinking & studies. Social practices enhance & operationalise their pros & abates their cons. May facilitate utilising as a means to speak to, & mobilise, diverse actors.	Applicable in multiple contexts. Test this & the additional insights & implications it may yield through more practice approaches to those above plus social & technological research, innovation, policy-making, capacity building & development, Comes at a time of burgeoning calls for revised forms of these.	As above. (exemplified throughout thesis, esp. 2.3 2.4 2.6, 3.1, 3.5, Chapters 4-8 & Appendix I).

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