The International Political Economy of Electricity Markets:

Cross-Border Electricity Trade & Interconnections in East Asia

Clare Garrigus Richardson-Barlow

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The candidate confirms that the work submitted is his/her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

This research examines the extent to which climate change has created imperatives for cross-border electricity trade and power sector reform in East Asia; this will include assessing the role of the dominant sub-regional governance structure, the Association of Southeast Asian Nations (ASEAN), in progressing energy market integration (EMI) efforts among member economies. This research argues there are gaps in current literature on East Asian cross-border interconnections: theoretically, the dominant East Asian studies development paradigm, developmental statism (DS), doesn't accurately account for neoliberal market engagement; technically, the current literature argues for fully liberalised power sectors in order to engage in cross-border interconnections, which is not reflected in market realities. This research will address these gaps using a combination of elite interviews and market analysis, resulting in an updated, East Asian studies-based interpretation of the international political economy (IPE) of Southeast Asian cross-border electricity trade.

This research includes: analysis of the background and development patterns in East Asian countries and the Southeast Asian sub-region; focus on the evolution of DS and creation of neo-developmental statism as an explanatory tool of sub-regional IPE; an explanation of the role for electricity trade given global and sub-regional climate goals and contradictions between these goals and national policy. This research expounds on limits to ASEAN EMI using a case study analysis of the Brunei-Indonesia-Malaysia-Philippines East Asia Growth Area (BIMP-EAGA). Three major themes emerged in data analysis: importance of sub-regional market factors, primacy of national market factors in progressing sub-regional reforms, and governance challenges to EMI and increased interconnections. These themes reveal findings unique to this research: ASEAN EMI targets don't align with national efforts; national EMI efforts appear driven by economic not climate incentives; engagement in global climate commitments remains performative, reflecting sub-regional priority to engage in the global, neoliberal market system; finally, neo-developmental statism offers an evolved development paradigm for understanding the IPE of cross-border electricity trade.

Key Words: ASEAN; ASEAN Power Grid; Cross-border electricity trade; cross-border interconnections; Developmental Statism; Economic development; Electricity Market Integration; Neoliberalism;

Table of Contents

List of Abbreviations

AAG	Australian Asian [Power] Grid
ACE	ASEAN Centre for Energy
ADB	Asian Development Bank
ADBI	Asian Development Bank Institute
AFC	Asian Financial Crisis
AIMS	ASEAN Interconnection Master Plan Study
APAEC	ASEAN Plan of Action for Energy Cooperation
APEC	Asia Pacific Economic Cooperation
APG	ASEAN Power Grid
ASEAN	Association of Southeast Asian Nations
BIMP-EAGA	Brunei Darussalam-Indonesia-Malaysia-Philippines East Asia Growth Area
BRI	Belt & Road Initiative
CBDR	Common but Differentiated Responsibilities
CCD	Climate Compatible Development
CO_2	Carbon Dioxide
DOE	Department of Energy (USA)
DS	Developmental Statism
EGS	Environmental Goods & Services
EIA	Energy Information Administration (USA)
EIU	Economist Intelligence Unit
EMI	Energy Market Integration
EMT	Ecological Modernisation Theory
GDP	Gross Domestic Product

GE	Growth/Environment (Dilemma)
GEI	Global Energy Interconnection
GEIDCO	Global Energy Interconnection Development & Cooperation Organization
GMSR	Greater Mekong Sub-region (Mekong Sub-region)
HAPUA	Heads of ASEAN Power Utilities/Authorities
HPAEs	Highest Performing Asian Economies
ICTSD	International Centre for Trade & Sustainable Development
IEA	International Energy Agency
IMF	International Monetary Fund
IPE	International Political Economy
IPP	Independent Power Producers
IRENA	International Renewable Energy Agency
METI	Ministry of Economy, Trade & Industry
MPAC	Master Plan on ASEAN Connectivity
NAPOCOR	National Power Corporation (Philippines)
NDRC	National Development and Reform Commission (PRC)
NIE	Newly Industrialised Economies
NTS	Non-traditional Security
OECD	Organisation for Economic Cooperation & Development
REN21	Renewable Energy Network for the 21st Century
ROK	Republic of Korea
RQ	Research Question(s)
SAPP	South African Power Pool
SDG	Sustainable Development Goal(s)

TSO	Transmission System Operator
UN	United Nations
UNCTAD	United Nations Conference on Trade & Development
UNDSD	United Nations Division for Sustainable Development
UNESCAP	United Nations Economic & Social Commission for Asia & the Pacific
UNFCCC	United Nations Framework Convention on Climate Change
UNIPCC	United Nations Intergovernmental Panel on Climate Change
VRE	Variable Renewable Energy
WCED	World Commission on Environment & Development
WHO	World Health Organisation
WTO	World Trade Organisation

List of Tables

List of Figures

Preface: Notes on Style and Referencing

This dissertation adheres to Leeds Harvard referencing style throughout. In-text citations consist of the author's last name followed by the year of publication. For works with more than three authors, the first author's name followed by "et al." is provided in text, with all authors listed in the bibliography. Leeds Harvard referencing style is also used in the citation of policy documents and reports issued by governments and international organisations. Since these institutions often have long names, full names followed by abbreviations have been used for the first in-text citation, followed by abbreviations in all subsequent uses. Abbreviations have been used in the bibliography. A full list of abbreviations referenced is included in *List of Abbreviations*.

In addition, this dissertation uses distinct codes to reference interview subjects and conferences or workshops where opinions or feedback was received. Codes are used in order to identify the expert's field, which is relevant to their expertise and viewpoints, as well as to simultaneously protect the identities of interview subjects. For interviews this code is organisation title followed by interview number, ranging from 1 to 32. For example: *Government Official 22.* For conferences and workshops where feedback was solicited and attendees agreed to anonymous reference, this code is event type followed by event number. For example: *Government Workshop 2.* All codes are listed in numeric order in text. A full list of interview codes is available in Appendix A.

Chapter 1
Introduction: Global Climate Challenges & Regional Solutions

1.1 Introduction

In 2020 there is an escalating global health crisis prompted by the novel coronavirus pandemic (Campbell and Doshi, 2020), while at the same time the United Kingdom wrangles over its post-Brexit economic and trade relationship with the European Union (Boffey, 2020). Economic growth in the global south has challenged the traditional global order previously dominated by western powers. The rise of nationalist and protectionist regimes across the world (Snyder, 2019) suggest the Washington Consensus has failed and a series of new development models have been emerging for many years amid a changing global order.

Where the Washington consensus was defined by trade liberalisation, openness to foreign direct investment, privatisation, fiscal discipline and market fundamentalism (Serra & Stiglitz, 2008), capitalism with Asian values (Robison, 1996) has tended towards much higher levels of state investment in infrastructure and government directed policymaking with a partial rejection of market competition prescriptions for all sectors of the economy (Leftwhich, 1995).

The financial and economic institutions of globalisation and trade have to navigate a more complex development terrain, where the conditionality of past international loans from the International Monetary Fund (IMF)/World Bank and recently, regional institutions such as the Asia Infrastructure Investment Bank (AIIB), are no longer legitimate (Koeberle et al., 2005). Trade policy must navigate the historical institutional development of large sunk investments, capital, and cultural attachments to institutions and place. This is certainly the case for the energy sector, in which many years of trying to apply liberalised trade policies and competition and market conditions have produced mixed results, partial privatisations, and a confusing tapestry of political economies of national energy and power systems (United Nations [UN], 2006; Owen et al., 2017).

In parallel, building scientific evidence on the urgency of climate action (UN Intergovernmental Panel on Climate Change [UNIPCC], 2007) and subsequent international agreement on national decarbonisation targets via the Paris

Agreement (EU, 2017) place pressure on both developed and developing economies to direct development in climate compatible ways. The United Nations (UN) Sustainable Development Goal (SDG) 7 prioritises sustainable energy for all (UN, 2015). SDG 7 recognises that reliable and affordable access to energy, particularly electricity, has consistent and proven positive developmental outcomes (UN, 2015). Access to clean and sustainable energy can deliver these developmental benefits whilst simultaneously removing harmful local pollutants and mitigating global greenhouse gas emissions and the destructive environmental impacts they create.

The East Asian region includes many of the dominant actors in the organised, global responses to climate change and economic development challenges, such as the SDGs (UN et al., 2017). East Asian economies have contributed significantly to the root causes of global climate change concerns, including increased air pollution and carbon dioxide (CO_2) emissions; but they are also major global players in clean energy technology development, investment, and policy mechanisms aimed at green growth and sustainable development solutions (Renewable Energy Network for the 21st Century [REN21], 2019a). The economic development story that made East Asia one of the largest contributors to global emissions also made the region one of the dominant global contributors to policy responses and solutions.

The significance of addressing decarbonisation and renewable energy integration challenges, and of incorporating an evaluation of East Asian governance and economic policies as they relate to regional electricity markets, lies in the pressing need for coordinated, multi-level (global, sub-regional, regional, national) responses to climate change. Global economic growth has resulted in significant environmental and climate damage. This is due in part to a heavy reliance on fossil fuel energy sources and industrial and export driven development. East Asia is not alone in its obligation to address global climate challenges. However, as a major contributor to global emissions and emerging leader in world economic growth, technology innovation, and international trade, East Asia is in a unique position to contribute significantly to the global response. One way to do this is by strengthening renewable energy integration and electricity capacity through sub-regional and regional electricity trade and the buying and selling of excess capacity depending on energy needs. However, problems arise in policy coordination and coherence, particularly related to national policy measures that impact sub-regional and regional clean energy utilisation, and in turn have an impact on global markets,

policy, and trade. Understanding the national and sub-regional linkages, and addressing any arising challenges, can positively impact East Asian clean energy development strategies and policy responses to climate change.

This research grew out of an initial desire to better understand the relationship between climate change mitigation, economic development, and trade practices in East Asia, with a focus on cross-border electricity trade. The topic of cross-border electricity trade is alive and well in East Asia, with much research interest in the physical and policy requirements to expand electricity interconnections[1] among neighbouring countries; The Asian Development Bank (ADB), Association of Southeast Asian Nations (ASEAN), the ASEAN Centre for Energy (ACE), Global Energy Interconnection Development and Cooperation Organization (GEIDCO), International Energy Agency (IEA), International Renewable Energy Agency (IRENA), REN21, and many other international research or policy organisations have research projects, initiatives, or whole centres devoted to the expansion of this topic. However, no research to date combines the issue of cross-border electricity trade with a discussion of the political economy of electricity markets in the East Asian economic development context. This research seeks to close that gap, adding context to energy market integration (EMI) discussions by explaining the nuances and challenges of electricity market reforms in a national economic and political environment that is dominated by state-directed policy, yet operating in a global system that is dominated by Bretton Woods notions of free markets and competition. Specifically, this research seeks to explain how East Asian nations, particularly those in the sub-region of Southeast Asia, view the imperative to construct and operate new power sector integration projects, and how the tapestry of competing interests (state, quasi state, private and corporate utilities) that form individual energy markets position themselves with regard to interconnection between markets. The aim to understand these challenges is achieved by exploring the following primary research questions (RQs):

1. How do governments understand the international political economy (IPE) of sub-regional cross-border interconnections in Southeast Asia?

[1] Electricity Interconnections refer to the physical connections that allow the transfer of electricity across borders (IEA, 2019a,d). Interconnection enable cross-border electricity trade and the two are used frequently throughout this research to reference the act of transferring or trading electricity.

2. How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?
3. What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?

Further, in this research a thorough examination and critique of the dominant neoliberal political economy frameworks and their proposed application to East Asian economic & political structures will provide context to the development of sub-regional interconnectors that impact clean energy utilisation and sub-regional EMI. Significant attention will be paid to trade and industrial policy development in an East Asian context. Policies that make the best case for optimising clean energy's contribution in addressing global climate goals, and examples from the East Asian sub-region of Southeast Asia and the Brunei-Indonesia-Malaysia-Philippines East Asia Growth Area (BIMP-EAGA), will be utilised. An analysis of the political-economy of current electricity markets will identify drivers and barriers to cross-border electricity trade utilisation regionally, sub-regionally, and nationally.

The geographical focus of this research lies in the East Asian[2] sub-region of Southeast Asia, due to Southeast Asia's major cross-border electricity trade initiatives and broader, sub-region-wide goals of deeper energy market integration.[3] The collection of 10 ASEAN member states makes up the fastest growing sub- region in world, with the associated economic and environmental issues that come with rapid growth, making it a highly relevant place to examine

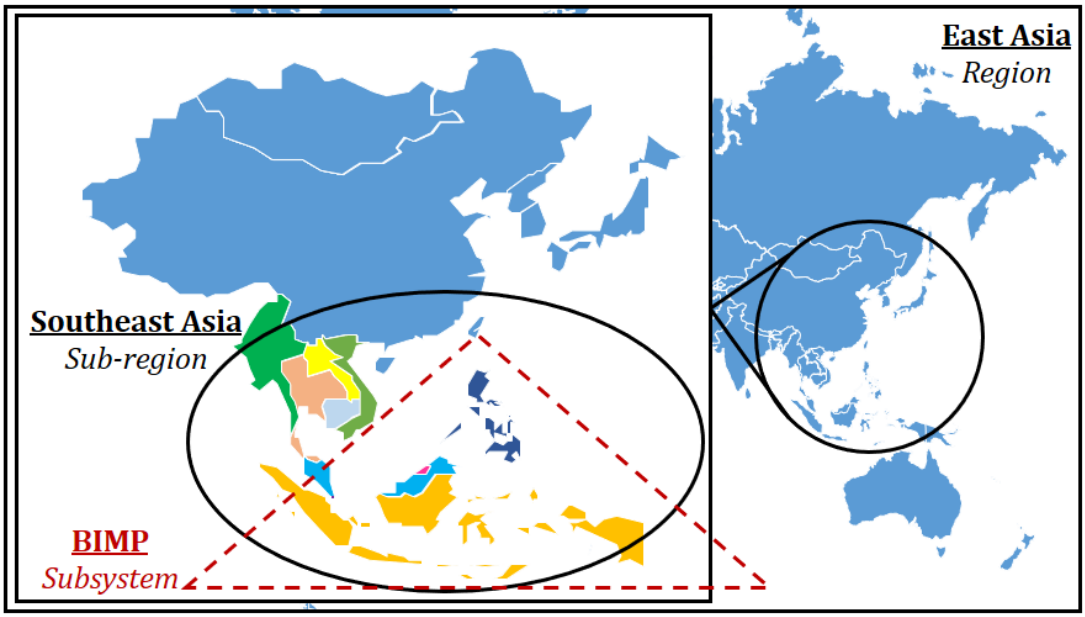
[2] The definition of East Asia used in this context encompasses the two sub-regions of Northeast Asia (which is made up of the economies of Japan, The Democratic People's Republic of Korea or DPRK , the People's Republic of China—hereby referred to as China—The Republic of Korean or ROK, and Mongolia) and Southeast Asia (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam). For similar definitions see work by Dent (2008, 2014, 2016). This definition was chosen under the guidance of senior scholars in East Asian-oriented research and in line with definitions used in East Asian studies at the University of Leeds.

[3] In this research 'region' is used to refer to the region of East Asia (see above definition, footnote 1) and 'sub-region' is used to refer to the sub-region of Southeast Asia. In addition, 'subsystem' is used to refer to the smaller, sub-regional groupings of countries in Southeast Asia, such as the Brunei-Indonesia-Malaysia-Philippines Growth Area (BIMP-EAGA) as it is defined and used by the Association of Southeast Asian Nations (ASEAN), the sub-regional governing body in Southeast Asia (ASEAN, 2004). ASEAN has 10 Southeast Asian member states, including: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. The countries of East Timor and Papua New Guinea are ASEAN observer states and therefore not included despite their relevance in broader Southeast Asian energy security and EMI discussions.

EMI and the IPE of cross-border electricity trade. Over the period of 1997 to 2005 ASEAN experienced an average annual GDP growth rate of 7 percent (ASEAN, 2012b). The region is expected to continue to experience economic growth and prosperity, with a projection of 5.2% average real GDP growth from 2019-2023 (OECD, 2018b). ASEAN is the 7th largest global economy, and the IEA projects its economy will double in size by 2040, reaching roughly the size of China's economy in 2017 (IEA, 2017a). As a result of rapid economic and population growth, the region has experienced high growth in energy consumption and electricity access (Vithayasrichareon et al., 2012).

Unique to this research is the examination of EMI and cross-border electricity trade in East Asia at both the regional and sub-regional level—this has, unexpectedly resulted in additional analysis at the national level. Based on interviews done in Southeast Asia and among relevant parties, the focus of the case study selection will be only one of the identified subsystems and its relevant EMI initiative, BIMP-EAGA (This will be discussed in more detail in Chapter 3, *Research Design & Plan of Enquiry*). This geographical context can be visualised as follows:

Figure 1.1 Geographical Context



Source: Authors own creation

A number of factors play a part in how this research has taken shape: the symbiotic relationship between economic development and climate change; the role of East Asia in global responses to climate change; and the significance of electricity markets in any coordinated policy response to the economic and political challenges associated with climate change. In the following sections

each of these issues will be explained, and their relevance to this research demonstrated.

1.2 Research Rationale

This research is situated between two intersecting issue areas: (1) responses to the global fight against climate change and (2) the political economy of East Asia's regional economic development path. These two areas are interrelated via the energy policy solutions to hydrocarbon intensive economic development and its impact on the global climate. In this section the research rationale will be discussed in more detail, illustrating how the concept of cross-border electricity trade is conveniently situated between the twin challenges of climate change and economic development that are posed to the region of East Asia and the sub-region of Southeast Asia. An overview of the link between economic development and climate change imperatives in East Asia, the concept of green growth, clean energy solutions, and electricity markets are helpful to understand for this research as they set the scene for a deeper discussion in the data chapters regarding the IPE of cross-border electricity trade and the market realities in East Asia. In this section these issues will be introduced in order to provide the necessary background for later analysis.

1.2.a Economic Development & Climate Change Imperatives in East Asia

East Asia has a complicated relationship with climate change—the region is one of the world's ascendant actors in the global fight against climate change. East Asia has significantly contributed to the deterioration of the global environment, climate, and air quality (REN21, 2019a); but it is also the site of increased alternative energy investment and development, as well as innovative clean energy policy mechanisms (ASEAN Centre for Energy [ACE], 2017). The same phenomenon that contributed to the global challenge of climate change—fossil fuelled economic development and industrialisation—has also made East Asia an important geographical locus of the mitigation of global emissions for preventing further degradation of the global climate.

The growing consumption of traditional hydrocarbon energy fuels (coal, gas, oil) as a result of global increases in electricity consumption has been linked to climate change as a result of the greenhouse effect, whereby greenhouse gas emissions, in particular CO_2, are trapped in the earth's atmosphere, heating the surface of the earth at a temperature higher than normal and trapping the

warmth (International Energy Agency [IEA], 2012). It is widely accepted "that the global climate is warming, and we are to blame" (Evans 2012, p. 2). According to the Intergovernmental Panel on Climate Change (UN Intergovernmental Panel on Climate Change [UNIPCC], 2019), global greenhouse gas emissions have increased as a result of human activity, and the resulting changes in the earth's temperature are already having devastating effects on various regions of the globe.

ASEAN'S energy related CO_2 emissions have consistently grown over the period of 1971-2016, despite efficiency gains undertaken across the region (Sandu, et al., 2019, p. 11). As of 2018 ASEAN contributed 3.5% to global emissions; the IEA predicts that contribution could grow to 5% (IEA, 2019a). In addition, average temperatures have risen every year in Southeast Asia, and of the 20 countries predicted by the World Bank and the Global Climate Risk Index to be the most impacted by climate change, five of them are found in ASEAN (Prakash, 2018, p. 2). Climate change impacts by the sub-region and in the sub-region are serious.

The global and regional impacts of rising climate risks and growth in CO_2 emissions include altered ecosystems, financial repercussions, and development challenges—all of which are often the most dramatically felt among less developed communities (UNIPCC, 2007). Additionally, hydrocarbon extraction is also linked to environmental degradation from increased transportation, freshwater shortages, and waste as a result of the extraction and utilisation process. Reducing the use of hydrocarbons as a primary source of energy and as a dominant resource for secondary energy sources (i.e. electricity) holds potential answers to a variety of important climate and environmental problems. Clean energies are a means to realize very necessary changes in global energy use and electricity generation.

Recognition of the disastrous effects of climate change (Stern et al., 2007) has been driven by the nations of the European Union (pre-British exit from the European Union), and the primary signatories to the Kyoto Protocol – an agreement that commits signatories to a reduction in greenhouse gas emissions based on acknowledgment that global warming is real and is a result of human carbon emission activity (UNFCC, 2014). Built under the UN Framework Convention on Climate Change (UNFCCC), the internationally binding treaty places the majority of responsibility for CO_2 emissions on developed economies, operating under the premise of common but differentiated responsibilities (CBDR) based on their history of industrialisation, economics, and capacity (Bauer et al., 2014). The 2015 COP21 Paris Agreement brought signatories

together within the UNFCCC framework to reach climate goals, including emissions, mitigation, transparency and finance, from 2020-2050. This agreement is considered the largest, most comprehensive global climate agreement, with more than 190 signatories to date. The success of the COP 21 Paris Agreement depends on the ability of the signatory countries to not only meet emissions reduction targets, but also balance the challenges of economic growth, climate responsibility, and sustainable development (Stern, 2014).

The unprecedented economic growth and integration of East Asian economies that was viewed with awe from the 1970s onward has come with significant costs. Increased air pollution and a growing public health crisis have caught public attention and are having an important effect on public policy (Corfee-Morlot et al., 2009). Similar to other regions in the world, fossil fuel resources dominate the electricity generation of East Asian countries. The ADB estimates that under the current energy model CO_2 emissions will double by 2035 (ADB, 2013). The World Health Organisation (WHO) estimates that in 2012 around 7 million deaths were caused by air pollution, with roughly 2.7 million of those deaths in the Asia-Pacific, 1.3 million in China alone (WHO, 2014). WHO experts in East Asia believe that reductions in air pollution levels to WHO guidelines could prevent "37,000 early deaths in 27 cities" (WHO, 2014, p. 8). Air quality in the Asia-Pacific is increasingly becoming a global issue; the global community is well aware that air quality is a trans-boundary as well as local issue, and one that not just the largest emitters but their neighbours, allies, and economic partners must address.

The deterioration of air quality, environmental degradation as a result of over reliance on fossil fuels for electricity generation, industrialisation, and heavy industries, rising CO_2 emissions, and a growing range of energy security fears top the list of energy and environmental concerns in East Asia (REN21, 2019a). Public policy and research organisations throughout the Asia-Pacific are increasing their focus on synthesizing public policy to address CO_2 emissions in a variety of industries and policy areas (ACE, 2017). Governments are responding to such demands by increasing focus on alternative energy development, encouraging diversification of energy resources used for electricity generation, strengthening national electricity markets to account for higher shares of renewable energy integration, funding research and development into indigenous energy sources as a means to meet energy demand, circumventing supply disruptions, and tackling further environmental degradation (IRENA & ACE, 2016; REN21, 2019b).

The following sub-section describes East Asian green growth strategies as policy responses to global climate challenges, connecting the use of renewable energy to continued domestic economic development. In East Asia green growth has become an integral part of regional and sub-regional responses to climate change and is reflected in the policy initiatives within ASEAN, including those that utilise cross-border electricity trade. Following the discussion on green growth the author will connect three disparate areas of study that are relevant to this research—international political economy (IPE), sustainable development, and East Asian studies—to the larger research topic of electricity markets and cross-border electricity trade.

1.2.b Green Growth

Green growth is a concept closely tied to global arguments for sustainable development and East Asian economic growth strategies in the age of climate change and environmental concerns. Understanding green growth and sustainable development arguments provides context to justification of this research, setting the scene for the examination of policy responses and necessities for climate change and power sector reform in East Asia and the sub-region of Southeast Asia.

Popularised in the 1970s, 'sustainable development' is a product of growing global awareness of environmental concerns and a hesitance to cede economic development to environmentalism[4] (Evans, 2012) in the age of the Anthropocene, or age of human development.[5] In the case of climate change and

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[4] The 1987 publication of the Brundtland Commission (formally known as *Our Common Future, From One Earth to One World: An Overview by the World Commission on Environment and Development* [WCED]) brought sustainable development to the environmentalist community as a discourse for describing the balance between economic development and the societal exploitation of resources (WCED, 1987). Like the other theoretical frameworks and discourses discussed later in this paper, sustainable development has adapted over the years, and it is used differently depending on the organisation and context. There are a variety of views on how sustainable development can or should be used and what policies and tools would be most helpful in reaching a long-term, sustainable development goals. For example, see: Agyeman, et al., 2003; Dryzek 2013; Heinberg, 2007; Huber 2000; Springett, 2013; World Bank, 2012; Zaccai, 2012. For the case of this research, sustainable development is taken as a widely understood discourse, and one that is used by the global policy community as a means to describe policy solutions to global climate and environmental concerns that allow for continued economic growth.

[5] The Anthropocene refers to the age of humans, whereby the acceleration of human development has impacted nature (Roncancio et al., 2019). For further debates surrounding this epoch refer also to: Arias-Maldonado (2013); Decuypere, et al. (2019); Houston (2013); Johnson & Morehouse (2014); Knight (2015); Knight & Harrison (2014); among many others.

environmental policy, sustainable development is often used in reference to energy consumption, but it can also be used in reference to wildlife, minerals, land, etc. (Ayers et al., 2001). Sustainable development aims to guarantee "non-declining per capita wealth by replacing or conserving the sources of that wealth, namely produced, human, social and natural capital" (Statistics Netherlands, 2013, p. 6). Sustainable development broadly conceived aims to achieve stability between opposing needs juxtaposed with an awareness of the economic, environmental, and societal limitations (Agyeman, et al., 2003). Within sustainability studies there are a number of issues that can be broken down, including the level of sustainability possible, ecological modernisation theory (EMT),[6] green growth, green economy, and others.

Green growth represents a variant of the same idea (United Nations Division for Sustainable Development [UNDSD], 2012), but positions the balance between environmental stewardship and economic growth solely within the framework of capital and economics, often within East Asia and the Pacific region, with emphasis on 'significant' environmental protection (Jacobs, 2013). Green growth is not an alternative to sustainable development, but a method for achieving it (Jacobs, 2013). Green growth seeks a similar environmental and economic balance as sustainable development, but also seeks to move beyond rhetoric and into specific economic policies that take advantages of and create synergies between environmental and economic concerns in order to eradicate poverty (UNDSD, 2012). Similar to sustainable development green growth is built into the economic development and poverty reduction discussions among many global multilateral institutions, including the ADB, UN, World Bank, and also the Korean-based Global Green Growth Institute, of which former UN Secretary General Ban Ki-Moon is in his second term as president and chair. Climate compatible development (CCD) has become an overarching goal that has been similarly written into global economic development strategies and institution mandates (Whitley, 2013a,b).

Green growth is a useful discourse in the context of clean energy use as it provides an alternative to traditional, finite hydrocarbon resources that power most economies and electricity markets (Owusu & Asumadu-Sarkodie, 2016).

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[6] EMT is discussed further in Chapter 2, *Conceptual Approach & Review of Literature*. Further discussion on sustainable development arguments and approaches is limited as they are out of the scope of this research, which aims to focus on the imperative for power sector reform in East Asia specifically as opposed to the variety of government and policy solutions available within sustainability approaches.

Whether or not green growth can actually allow economies to continue economic development at their current level and with a continued focus on industrialisation and improvements to quality of life (World Bank, 2012), but without damaging the environment through hydrocarbon use, is arguable (Vezzoli et al., 2018). However, it is this exact expectation that makes green growth an attractive policy consideration, as reflected by the incorporation of green growth strategies into many East Asian economic policies and energy systems; Clean energy development plans, clean industry strategies, and revised green growth driven development agendas are evident in a variety of East Asian economies (Organisation for Economic Cooperation & Development [OECD], 2017; REN21, 2019a). Unfortunately, many of the industrial structures and electricity markets of these economies still rely heavily on hydrocarbons that receive generous government subsidies (Phoumin & Kimura, 2015).[7] The challenge of sustainable development targets versus green growth realities at the national and sub-regional level is discussed at great length in this research in relation to renewable energy integration and sub-regional EMI, highlighting the challenge of realising these targets given conflicting priorities at multiple levels of governance. The following subsection will introduce clean energy use as a green growth policy response, leading into a primer on the role cross-border electricity trade can play in helping countries reach these clean energy goals.

1.2.c Clean Energy

Clean energy, energy with neutral emissions, often (but not always) from a renewable energy source, holds the potential to address two critical challenges facing East Asia (and the world)— (1) the dual eradication of energy poverty and quest for energy security, and (2) environmental and climate repercussions that occur as a result of traditional, fossil fuel-based energy consumption (REN21, 2019b). Clean energy provides multiple solutions to these two issues: clean energy technologies have a much lower environmental impact than fossil fuels; they offer longer term answers to energy needs than traditional, depletable fossil fuels; and clean energy technologies are not beholden to the same energy market price and supply fluctuations as are oil, gas, and coal (IRENA et al., 2018).

As a result of an increasing global focus on CO_2 emissions and sustainable development programmes, the global market for clean energy has grown rapidly

[7] The contradictions between sustainable development and modernist industrialism in East Asia and Southeast Asia have not been adequately addressed through policy mechanisms but will be discussed in greater length in chapters 4-6 of this research.

in the last decade, with new investment in renewable power and fuels reaching US$2,378 billion in 2018 (REN21, 2019b). Globally, in 2018 the power sector experienced the growth in renewable energy capacity accounting for 75% of net additions to worldwide power generating capacity (IEA, 2019b). Global investment in new renewable power capacity is estimated to increase by 50% by 2024 (IEA, 2019b). Chinese investment in renewables has remained consistently high in recent years, with China regularly ranking as the regional and global leader (REN21, 2019, p. 93). In 2015, China contributed 36% of global investment in renewable energy, it invested more money in renewable energy than the entire continent of Europe, and China contributed 43% of the total growth in global renewable energy jobs (REN21, 2016).

Southeast Asia, on the other hand, has seen uneven investment trends, with renewable investments reflecting the resource capabilities of particular countries (ex: Thailand higher shares of solar PV investment, Cambodia more hydropower, etc.) and varying depending on the year (REN21, 2019, pp. 93-94). Barriers to investment in Southeast Asia are in part to blame for year-on-year investment discrepancies, with only a few regional financial institutions and development banks able to finance renewable projects (REN21, 2019, p. 93). Investment is not low because of lack of need or lack of targets, but a reflection of the market capabilities (p. 95). China's contribution to global and regional renewable energy development may trump all other nations in East Asia, however, opportunity in developing Southeast Asian markets is growing (REN21, 2019).

In Southeast Asia demand and emissions are expected to simultaneously grow in coming years, both as a result of economic and demographic growth (ACE, 2017, p.98): Power demand in ASEAN is projected to triple (to 640 GW) by 2040 (ACE, 2017) and greenhouse gas emissions double (2.3 billion metric tonnes) in the same time frame (IEA, 2017). Enhancing renewable energy use can augment both rises—increase electricity access and help reduce sub-regional emissions (ACE, 2017, p. 22).

Asia's region-wide contribution to global greenhouse gas emissions and the effect of the environment on its economic success and public health have, in part, driven the surge in clean energy investment and sustainable development policy solutions in the region, including the topic of this research, electricity market integration. East Asia, which has an abundant supply of renewable and clean energy resources spread throughout a variety of countries, suffers from uneven distribution, inflexible power sectors, and economic concerns that have

prevented full development and utilisation of these resources for electricity generation (Chang & Li, 2015). Policy measures in developed economies have largely encouraged the adoption of renewable technology through financial support and incentives, regulation and national mandates, and market mechanisms (REN21, 2019b). However, countries in general perceive (sometimes incorrectly) the costs of renewable energy growth as a near insurmountable barrier, necessitating the domestic development of cheaper technology and national policies that promote government investment to overcome existing investment barriers, and entrenched political and business interests.

Integrating clean energy sources into global power grids and markets is challenging for three main reasons: variability, uncertainty, and flexibility (Jones, 2014). This includes variability, uncertainty, and flexibility of resource supply, financial support, physical infrastructure, and policy mechanisms (IRENA, 2018a, pp. 11-13). Variability is the hour-by-hour, minute-by-minute availability of intermittent resources (Impram et al., 2020, p. 2); uncertainty is the longer-term questions regarding intermittency and difficulty predicting future weather and solar and wind power (p. 2). The existing solution to this is to build more flexibility into current systems (National Renewable Energy Laboratory [NREL], 2014, p. 2-3). Variability and uncertainty create the need for flexibility and the need for management through flexibility (NREL, 2014).

At the region-wide level, cross border electricity trading would aid in managing diversity in loads and resources, it would increase supply security and efficiency, could potentially reduce electricity prices, and also encourage further deployment of clean energy technologies (UN, 2006; Kunstýř & Mano, 2013; Chang & Li, 2015). In the case of traditional renewable energy fuels, such as solar and wind power, intermittency in supply poses challenges for larger increases in a country's energy mix. For example, wind power, which is created via the movement of wind turbines, is only available during times when the wind is blowing; Cross-border electricity trade would allow countries to trade excess power across interconnectors to countries that are experiencing power deficits due to intermittent resources, like in this example, those that have larger solar energy resources, etc. Energy Market Integration (EMI) through power connectivity is one-way electricity trading could be encouraged. East Asia is a prime place for interconnectivity to be encouraged given the diversity of clean energy resources available, the presence of pre-existing multilateral institutions,

and governance structures that operate there, plus the economic and physical geography of countries within the region.

Very little work has been done in ASEAN countries on cost comparisons of integrating renewables (General comparisons: UN, 2006; ASEAN specific comparisons: Chang & Li, 2012; Wu et al., 2012; Li & Chang, 2014); however, work by the U.K. Energy Research Council [UKERC] (Gross et al., 2017) suggests that dealing with variability of renewables up to a 30% penetration costs on average £5/mwh; in addition, the costs of retaining sufficient capacity at 30% penetration of renewables is on average between £4-7/mwh. In ASEAN 2016 renewable penetration was roughly 9% of primary energy, with a target of 23% by 2025 (IRENA, 2016, p. 15). This suggests it is not primarily the integration of renewables that will drive any attempt to integrate the ASEAN power grid using electricity interconnectors, however, these costs will be a factor in the future. What is more likely to drive interconnection projects is inefficient, outdated, or unreliable power systems (UN, 2006). In this regard the option of interconnection provides another solution for system operators.

Alternative routes to renewable energy integration solutions exist outside of interconnections—this thesis does not argue that interconnections are the only solution. Rather, this thesis analyses one of ASEAN's preferred solutions, cross-border interconnections. Battery storage of distributed energy systems (DES) in remote areas offers a different solution in rural communities where grid connection is not an option, including mini-grids and nano-grids (Energy System Management Assistance Program [ESMAP] & International Finance Corporation [IFC], 2017, p. 8). Alternatively, grid scale battery storage, or battery energy storage systems (BESS), allow for the storage of energy from a grid or power plant for use later (United States Agency for International Development [USAID] & NREL, 2019, p.1). Battery storage systems allow for increased power system flexibility—whereby power systems can respond to intermittency and variability of renewable energy resources (Jones, 2014). Regulatory, market, and capability barriers prevent the scalability of these systems depending on their location (USAID & NREL, 2019, p.3) and despite continually falling costs the price of large-scale battery storage remains prohibitive (ESMAP & IFC, 2017, p. 1). This thesis does not dismiss the capability of battery storage or the certain evolution of battery storage, it simply looks at the current, present preference of ASEAN and ASEAN member states towards cross-border interconnections.

This brings us to the next topic, an explanation of the relevance of electricity markets and their relationship to the energy mix in East Asia. This primer will

present ways in which electricity markets can be better expanded for renewable energy integration and how challenges to expansion are currently being explored in East Asia and the sub-region of Southeast Asia.

1.2.d Electricity Markets & Regional Energy Mix

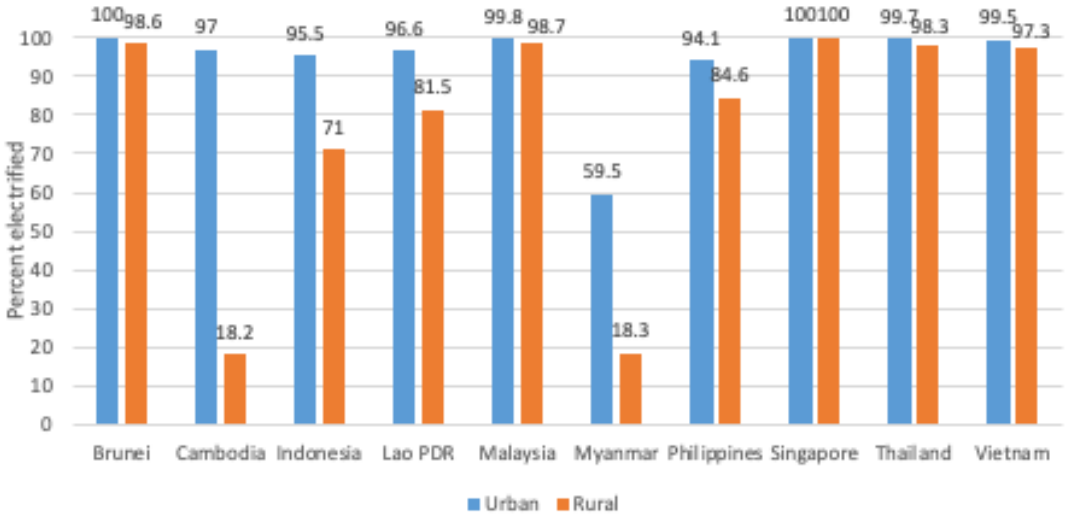
Electricity is defined as a secondary energy source produced by transforming primary sources of energy, such as oil or solar energy, into electrical power (Energy Information Administration [EIA], 2019). In addition, electricity is an energy carrier, whereby it can also be converted into other forms of energy. Primary energy is both renewable and non-renewable, whereas electricity is neither renewable nor non-renewable (EIA, 2019). Traditionally, electricity is produced via hydrocarbon resources;[8] the industrialisation of many countries has been based, in fact, on energy intensive industries that utilised coal, oil and later gas (Harris & Lang, 2015). However, the global energy transition towards cleaner energy resources with less environmental impact has created a number of challenges associated with renewable energy integration in electricity markets, mainly flexibility challenges associated with renewable energy intermittency (IEA, 2019b). In response to these variable renewable energy (VRE) challenges governments have increasingly been focused on the ability of existing markets and regulatory frameworks to continue providing a reliable, affordable, and efficient supply of electricity (IEA, 2019b).

In the case of electricity production, regardless of the source, the power created provides improvements to quality of life, aids responses to global development needs, and is recognised as a necessary requirement for modern life (IEA, 2019d). Globally, roughly 860 million people still live without access to electricity (IEA, 2019c), and the power sector continues to be the primary focus of clean energy policy support among governments (REN21, 2019b). In East Asia the growth of electricity consumption has put pressure on supply side demand for both power generation and transmission capacities (Chang & Li, 2015). In developing Asia 90% of the population has access to electricity (IEA, 2017a) but national electrification rates are extremely stratified depending on rural versus urban electrification (Naimoli & Nakano, 2018). National estimates of

[8] There are exceptions, of course, including a history of hydropower development in the Greater Mekong Sub-region (GMSR) in China, Myanmar, and Thailand (Simpson, 2007). However, due to its negative environmental and social impacts there are concerns regarding the sub-regional deployment of hydropower (Rosa et al., 2004; Huang et al., 2019). Section 7.5, *Suggestions for Further Study,* explores lessons learned in GMSR water policy and how future cross-border electricity trade research might incorporate the GMSR hydropower experiences.

electrification rates across the sub-region range from 57% (Myanmar) to 100% (Thailand), with a variety of national, sub-regional, and regional mandates regarding reliable, affordable access (IEA, 2019). These statistics are even more stratified at the urban versus rural level, with many states seeing a wide variety of electrification depending on location:

Table 1.1 Percentage of electrification in urban and rural areas in Southeast Asia (2017)



Source: Cravioto et al., 2020, p. 3.

Energy poverty arguments are part of the rational for ASEAN's own connectivity agenda, and the efforts of national governments to engage in increased cross-border electricity trade. Whether the climate imperatives are fully operationalised via policy measures and economic changes is to be seen but will be explored further in the data chapters of this research (chapters 4-6).

There is a growing recognition of the potential for cross-border electricity trade to in part respond to the variability, uncertainty and flexibility challenges posed by increased clean energy use in electrification. In East Asia, where geographical, policy, and financial limitations differ from country to country, cross-border electricity trade is viewed with growing interest and hope for contributing to the attainment of future renewable energy and climate targets (Chang & Li, 2015, 2013). In Southeast Asia, under the sub-regional organisational umbrella of ASEAN, the Association of Southeast Asian Nations, has set EMI targets associated with expanding cross-border electricity trade and growing renewable energy's share in the sub-regional and national power sectors by 23% (ACE, 2013a). The global challenge of climate change has forced governments around the world to reconsider their energy mix and approach to electricity

production—transitioning from carbon intensive energy resources towards more renewable sources in an effort to reduce global CO_2 emissions. This is illustrative of part of the climate imperative for increased cross-border electricity trade—higher shares of clean energy in a country's energy mix has a wide variety of advantages.

According to a variety of studies these advantages are as follows: In addition to augmenting a country's reliance on hydrocarbons the transition to increased shares of renewable energy in electricity production has the added benefit of (1) providing increased access to electricity in regions that have not yet reached 100% electrification (IEA, 2014), (2) of improvements to quality of life via welfare impacts (ADB, 2012, 2014) and (3) of boosting national economic development effects at the same time (Shi & Widodo, 2014). Additional benefits to national economies and welfare via increased trade liberalisation and economic integration are varied, but overall positive (Bhattacharya & Kojima, 2010); investment liberalisation would have positive regional impacts on gross domestic product (GDP) and on growth in East Asia (Bhattacharya & Kojima, 2010), with potential to reduce regional economic disparities and reduce the development gaps between the richest and poorest countries in the region (Watcharejyothin & Shrestha, 2009; Sheng & Shi, 2013). Reductions in total energy system costs (Chang & Li, 2012) would also coincide with CO_2 emissions reductions in sub-regional groupings throughout Southeast Asia and represent additional climate and energy system benefits (Watcharejyothin & Shrestha, 2009; Shi & Widodo, 2014).

Additional cost benefits of an interconnected sub-region also abound: Blakers et al. (2012) found that in addition to Southeast Asian electricity demand being satisfied by interconnected Australian electricity, locally produced renewable and conventional electricity could supplement gaps and fulfil the sub-region's goal of higher renewable energy integration. Similarly, research by Taggart et al (2012) found that region-wide interconnection would decrease both electricity costs and emissions related costs region-wide. Taggart (2013) found similar electricity cost-reductions based on an interconnected pan-Asian region, including Australia; and a 2009 ADB & Asian Development Bank Institute (ADBI) study found a net cost benefit of roughly $3.5 billion USD from increasing cross-border infrastructure in Southeast and Northeast Asia (p. 75). A 2004 study by the Asia Pacific Energy Research Centre found net savings across the three proposed ASEAN subsystems, resulting in roughly $662 million in net savings (p. 41-43), a figure that further supported ASEAN study group estimations of net

savings in 2003 (AIMS Study Group, 2003, p. 29) and ACE estimations of cost benefits in 2013 (ACE, 2013a). According to a 2017 study on cost optimization of sustainable power systems in Asia, Gulagi et al. (2017) found that grid integration at a large scale would reduce total electricity costs in Southeast Asia and the Pacific rim, with ASEAN benefiting from increasing interconnection infrastructure and development of sub-regional grids. Owen et al. (2017) argue that, when using cost benefit analysis to select project, its equally important to balance the environmental, security and socio-economic impacts, which is as important as cost reductions in ASEAN EMI initiatives (p. 149)

Overall, the variety of cost analyses that have been done on sub-regional and regional interconnection all pointing to economic benefits from increasing regional interconnections and higher shares of renewables—facts that ASEAN has employed to its advantage. This research will further explore how the IPE of cross-border electricity trade encourages these opportunities, examining the political and economic dynamics that influence individual markets and implications for the development of an integrated sub-regional electricity market.

Meeting growing electricity demand in ASEAN will also require significant development of the sub-regional power system, including changes at the national level for smooth sub-regional integration (IEA, 2017a), which can be achieved via increased cross-border electricity trade. According to the IEA (2017b), power generation capacity will double by 2040, outpacing the global average and feeding sub-regional economic growth. The diversity of resources, varying levels of energy access, complementary systems, and different levels of economic development mean ASEAN is well placed to benefit from increasing its share of renewable energy and increasing the adoption of clean energy technologies as a means to meet projected power generation (Huang et al., 2019). According to Huang et al. (2019) this can include 'leapfrogging' reliance on fossil fuel, shared renewable energy integration practices across complimentary grids, and information sharing among cross-border trading partners and ASEAN members involved in connectivity initiatives and projects (p. 712-714). Interconnections between resource-rich and resource poor economies can also help to meet growing demand, as well as mitigate resource fluctuations and reduce cost of sub-regional electricity demand (Chang & Li, 2013).

In addition to poverty alleviation and developmental impacts described above, ASEAN has also identified that cross-border electricity trade can provide power

sector improvements, too: these include reducing energy prices (Chang & Li, 2012), mitigating against shortages and power shocks (Pollitt, 2008; Shi, 2014), incentivising deeper market integration (Wu et al., 2012), managing regional and sub-regional resource endowment differences (Shi, 2014), and facilitating sustainable development in the power sector (Ahmed et al., 2017). However, electricity accounted for roughly 4 percent of total global exports in 2015 and just 3 percent of total production (IEA, 2015). These numbers are in stark contrast to hydrocarbon energy resources that are widely traded globally, and that illustrate the presence of barriers to cross-border electricity trade in the sub-region.

Commonly identified barriers to increased cross-border electricity trade are often technical, finance or investment-related and have been studied at great length via European examples of EMI and cross-border trade (See for example: Amundsen & Bergman 2006, 2007; Conlon, 2009; Wu, 2012; Wu et al., 2012; Bahar & Sauvage 2013; Mundaca et al., 2013; Oseni & Pollitt 2014; among many others). Nord Pool is one of the most successful and the largest example of an internationally integrated power market. Nord Pool utilises resource complementarities in Denmark, Finland, Norway and Sweden to provide electricity to 17 countries via an energy mix of hydro, nuclear, fossil, wind and biomass resources (Integrated Research and Action for Development, 2016). The Southern Africa Power Pool (SAPP) has similar aims as Nord Pool and is made up of 12 member countries. It is the only functioning energy market in sub-Saharan Africa, with plans for similar power pool projects elsewhere across the continent but not yet realised. Nord Pool and SAPP represent successful, multi-country power pooling projects with reach across many member economies (Barker et al., 1997), with additional, smaller power pooling and trade arrangements present in North America, the United Kingdom, Australia, and across Europe (Wu, 2012; IEA, 2019); The United Kingdom alone offers many examples of successful bilateral and small multilateral interconnection projects, with 17 operating, contracted or planned interconnectors between the United Kingdom and its European neighbours, facilitating successful market coupling (or efficient trading) between partners (Froggart et al., 2017, pp. 15-16). Research into the potential for developing a multi-country power system in South Asia and Southeast Asia has been conducted. However, no markets of the same level as Nord Pool or SAPP currently operates in the East Asian region (Kimura et al., 2013; Mundaca et al., 2013). In Southeast Asia, underneath the umbrella of ASEAN, a number of sub-regional projects have come to fruition although all are still in the development phases (Wu et al., 2012; Shi, 2016).

According to research by Chang and Li (2015) EMI (energy market integration) in ASEAN is the connecting of national power grids in order to trade electricity across interconnectors. EMI is shown to "significantly promote the adoption of renewable energy" (p. 159), contributing to global, regional and sub-regional sustainable development goals and moderate emissions reductions. However, despite disjointed interconnection on a bilateral basis, a Southeast Asian sub-regional power grid has received little progress via multilateral trading (IEA, 2017a). Despite the abundance of renewable energy resources available within ASEAN, over 70% of electricity demand is supplied by fossil fuels, and this number is expected to grow based on current projections of electricity consumption (IEA, 2017a). The International Energy Agency has emphasised the need for ASEAN to strengthen sub-regional institutions if regional EMI is to be fully realised and electricity from fossil fuels decreased. This includes expanding staff and resources as well as the development and harmonisation of policies and regulations that do not yet formally exist. Wu et al. (2012) make similar recommendations, and caution that the link between institutional strength and market liberalisation cannot be ignored if sub-regional EMI is to move forward. Mundaca et al. (2013) firmly insist that ambitious clean energy goals and policy support mechanisms are also a necessary component of EMI and diversification in East Asia.

Additional governance considerations related to EMI broadly, and directly relevant to cross-border electricity trade, have been identified by Oseni and Pollitt (2014) in a multi-country study for the World Bank that identifies the criteria necessary for EMI to take place. These criteria are summed up in the following general requirements: commitment to free trade; efficient market design; governance support; jurisdictional considerations & management; transmission capacity; operational national electricity transmission systems; and management of distributional effects. In addition, modern power systems are efficient, flexible, and reliable in order to meet fluctuations in demand and provide quick response times as supply and demand change rapidly depending on intermittent renewable sources; additionally, physical integration (or connections) between two systems is necessary in order for exchange of power to occur (Shi et al., 2019) and alignment between system processes, standards, and regulations is required between trade partners in order for long-term multilateral trading to occur (Owen et al., 2017). In order to integrate multiple national power systems for the trade of electricity across borders these criteria must be met (the Oseni and Pollitt criteria will be more seriously analysed in the context of Southeast Asia in Chapter 5).

Overall, the market logic for increasing cross-border electricity trade and EMI aligns with climate and development goals, and as such governments use these arguments to justify the economic, policy, and structural changes that are required. One aspect this research explores is whether or not these imperatives are truly reflected in the needs of individual markets. This research seeks to explain the limits to sub-regional power market development and the IPE of these limits, while examining the competing interests at play in their development. In explaining the IPE of cross-border electricity trade in East Asia and the climate change imperatives that have made it relevant, this research also seeks to position the IPE of cross-border interconnections among individual governments in Southeast Asia and their opportunities to engage in cross-border trade.

This section has brought together three areas that are important to understanding this research—(1) links between economic development and climate change via green growth, and the resulting imperatives for sustainability studies that include energy use and diversification of a country's energy mix; (2) East Asia's role in responding to global and regional climate concerns via clean energy utilisation; and (3) the importance of cross-border electricity trade in responding to both of these issues and the resulting economic and political challenges that may arise in sub-regional energy markets if cross-border electricity trade is to become a reality in Southeast Asia. The following section will explain how this research will address these factors and will discuss the gaps in research this project will fill.

1.3 Research Aims

The aim of this research is to explore the extent to which climate change has created imperatives for energy market integration (EMI) and power sector reform in East Asia, with a specific focus on cross-border electricity trade and an IPE explanation of the competing interests at play. The aim to understand these challenges is achieved by exploring the following primary research questions (RQs):

1. How do governments understand the international political economy (IPE) of sub-regional cross-border interconnections in Southeast Asia?
2. How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?

3. What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?

This research will generate a detailed overview of the political economy of cross-border electricity trade and the national markets required for sub-regional energy market integration in Southeast Asia. The variability of electricity produced from clean energy resources provides an opportunity for regional and international electricity market expansion and the efficient disposal and purchase of power capacity. Based on the resulting potential for cross-border electricity trade, this research examines the expansion of these markets in East Asia and opportunities for their further development. A number of issues play a role in this research: including national and sub-regional electricity market development, energy market integration (EMI), sub-regional governance, interconnectors, and the clash of public and private interests. This political economy analysis will include a case study examination of a potential growth market in Southeast Asia's Brunei-Indonesia-Malaysia-Philippines East Asia Growth Area (BIMP-EAGA) sub-region following informative expert interviews that will help shape the view of this subsystem, the sub-region of Southeast Asia, and the broader region. A mix of quantitative and qualitative methods will be used to address these issues in relation to the regional political economy of EMI.

1.3.a Theoretical Framework

The history of economic development in East Asia, and its continued presence within the global, neoliberally-driven economic system has shaped the theoretical framing of this research. First, shared development stories and comparable histories of colonisation and subsequent independence in East Asia have contributed to related government and economic structures, as well as similar policy choices across the region. Secondly, East Asian economies were not afraid of government economic intervention, foreign technology, and inward and outward facing economic policies (Wade, 1988; White and Wade, 1988). Third, the economies of East Asia engaged fully in the global system of free trade as a means of increasing economic development, benefiting from global value chains and the expansion and globalisation of historical trade routes into modern systems of economic exchange. The combination of these three methods formulated the state-led economic development practices utilised by the majority of East Asian countries in their quest towards greater economic and societal advancement.

This model of state-led growth was first utilised successfully by Japan in the 1970s, and subsequent employment of similar practices occurred in South Korea, Taiwan, and Southeast Asia from the 1980s onwards. Commonly referred to as the "flying geese" model, this pattern of development utilised a model of industrial development that is "transmitted from the lead goose (Japan) to follower geese (Newly industrialised Economies (NIEs), ASEAN, etc.)" (Kojima, 2000, p. 376). Industrialisation is passed from one country to another via the transplant of "…comparatively disadvantageous production" from a host country (Japan) to NIEs, boosting the host's comparative advantage while facilitating pro-trade FDI within the NIEs (Kojima, 2000, p. 376). The combination of state-directed economic policies is commonly identified as developmental statism (DS) and represents a combination of state directed policies that includes a focus on industrialisation, industry targeting, and mercantilist trade policies (Leftwich, 1995).

Much of the modern, western economic theory rests on the premise that the best trade is free trade—when prices and industry growth are determined by supply and demand in international markets, not government policy. However, the electricity sector makes a strong case for temporary government policies that support local industry development. This does not, however, mean that free trade is abandoned, advocates say; simply that short-term government protection will aid in industry development and thus economic success. The nature of clean energy is such that international organisations and governments encourage their expansion and use, but the high cost and high level of innovation required for electricity market integration and variability responses requires policy support that promotes innovation and development locally. The pressing need for clean energy utilisation further points to potential changes to the theoretical thinking behind many of the world's most important trade policy decisions and the policy makers who support and implement them. Here neo-developmental statism has a very specific role to play, providing an explanation for a simultaneous reliance on state-directed economic policy that can support strategic industries (like the power sector) and also allowing for integration into global and regional markets via neoliberal trade practices.

The prevalence of this East Asian model of economic development policy (DS, referenced above) within a global, free trade and capitalism values-driven economic system is interesting in light of the competing economic values within the global economic system. Neoliberalism has, it is argued in this research, shaped much of the global system of international trade and exchange of goods

and services. Being a member of this global economic system requires a commitment to market values and liberalisation. Indeed, suggested electricity market reforms deemed necessary for cross-border electricity trade and EMI require liberalisation and a continued commitment to neoliberal economic values. Yet the East Asian DS model persists nationally and regionally. These two seemingly contradictory theoretical frameworks are combined to explain the political economy of current electricity markets in Southeast Asia, forming what the author refers to as *neo-developmental statism*. Neo-developmental statism is rooted in the concepts of liberal developmentalism and neo-developmentalism but, in this context, the combination of these two concepts is applied to Southeast Asian countries and the electricity markets of ASEAN members for the first time. Neo-developmentalism, while an evolution of traditional DS paradigms, represents a theoretical approach to explaining cross-border electricity trade and barriers to EMI in ASEAN that have not been explored in other theoretical iterations of DS paradigms. The author's premise of neo-developmental statism is further elaborated throughout the thesis and used to explain and frame the IPE of cross-border electricity trade in sub-region of Southeast Asia.

DS is commonly applied to the economic development practices utilised across East Asia, offering an explanation for the economic policymaking of these nations predominantly from the 1970s onwards. There are vestiges of these economic practices that are still relevant throughout East Asia and the sub-region of Southeast Asia; however, these concepts have not been applied to EMI questions that dominate energy policy initiatives in ASEAN. Neo-developmental statism offers an IPE explanation for the drivers behind cross-border electricity trade in a complex neoliberal world order, but within subsystems where collectivist, Asian value approaches to policymaking dominate sub-regional and national politics. In the context of this research, neo-developmental statism is used to explain the IPE of common policy and market reforms that are applied to sub-regional power markets in order to achieve increased EMI and cross-border electricity trade. In this sense, neo-developmental statism is filling a gap in explaining the plausibility, difficulty and reality of applying neoliberal market reforms in a collectivist and Asian value-driven political and economic system.

Arguments in support of interconnections are relatively similar across the literature— efficiency and welfare gains which result in lower prices (Turvey, 2006), wider economic growth (Sheng & Shi, 2013), diversification of national supply (Shi, 2014), achievement of energy and sustainability targets (Andrews-Speed & Hezri, 2013), potential for modernisation and infrastructure

improvements (Wu, 2012, 2019), and potential for increased energy access and reliability (Ahmed, et al., 2017). Incentives for cross-border electricity trade are widely recognised by academics and institutions (See: ACE, 2013a; ADB & ADBI, 2009; ADB, 2017; IEA, 2014, 2015, 2017a; IRENA, 2018; REN21, 2019a; UN, 2006; World Bank, 2008). However, conflicts and contradictions at the state and national level prevent full utilisation of cross-border electricity trade, sub-regional EMI, and power sector reform. These conflicts, including difficulty in coordination between state, local, and national/sub-regional interests make progress slow. In addition, states are not just developmental—tensions between neoliberal and developmental interests result in contradictory and slow-moving policy across ASEAN member states. The tension between these interests is in part what makes neo-developmental statism a useful tool of analysis. Unfortunately, there is no single, planned rationale for how to approach cross-border interconnections, and while the rational for cross-border electricity trade exists, it doesn't necessarily outweigh performative state and regional actions and entrenched business, economic, and political interests.

Ultimately, the overarching aim of this research (to explore the extent to which climate change has created imperatives for EMI and power sector reform in East Asia and explain how East Asian economies view the climate imperatives to construct and operate these power sector infrastructure projects amid competing interests) is framed by the concept of neo-developmental statism. Common policy recommendations for the realisation of energy market integration and increased cross-border electricity trade are fundamentally arranged around neoliberal market ideals, yet being applied to traditionally DS economies, where the free market is not the only force and government directed policy remains equally important. Neo-developmental statism offers an explanation for this seemingly contradictory dichotomy of state-vs-market, aiding the political economy understanding this research aims to bring to the multidisciplinary topic of power sector development and renewable energy integration in ASEAN.

1.4 Study Contributions

This research makes a number of contributions across the fields of IPE, Asian studies, and sustainability research. Broadly, this research contributes a unique way of approaching cross-border electricity trade by combining these three fields in the examination of sub-regional EMI. As stated earlier, this approach has not been taken in the same manner, with a consideration of East Asian economic

development practices in the analysis. Overall empirical, methodological and theoretical contributions have revealed the difficulty in addressing EMI in systems in which national and sub-regional interests prioritise neoliberal market factors, and traditional East Asian studies development paradigms struggle to account for the political and economic dynamics at play in power sector integration and cross-border interconnections. In the following subsections these findings and original contributions are discussed in more detail.

1.4.a Empirical Contributions

While there are some academic studies of the BIMP-EAGA sub-region and its potential for EMI, this thesis is the first to analyse the IPE of individual electricity markets in the BIMP-EAGA subsystem while utilising an analysis of economic development patterns via DS. This analysis resulted in three distinct themes, each of which are discussed across the three data chapters, 4-6. These themes include sub-regional market factors (Chapter 4), national market factors (Chapter 5) and governance challenges (Chapter 6).

In Chapter 4 an analysis of the market structures in BIMP-EAGA frames cross-border electricity trade and EMI more fully within the subsystem as well as the wider sub-region. The analysis conducted includes not only mapping existing electricity interconnectors, but also identifying shortcomings in current markets for increased EMI and electricity trade. Most of this interconnection data is publicly available; however, it is not updated across sources and includes some outdated information that required author confirmation utilising a variety of resources coupled with interview subject feedback—resulting in unique updating of the sub-regional interconnection landscape. The energy and economic data analysed is publicly available, however, here it is uniquely compared and contrasted with research into the market structure of the subsystem, resulting in a more detailed image of sub-regional interconnections. This data collection informed the theme of Chapter 4, sub-regional market factors, explaining the collective BIMP-EAGA market landscape. Analysis of sub-regional market factors resulted in the research findings that hydrocarbon resources remain dominant in the sub-regional energy mix across the BIMP-EAGA subsystem despite sub-regional climate commitments and opportunities for renewable energy growth, and also that there is a need for national-level reforms in order for sub-regional EMI to flourish.

Chapter 5 introduces the second theme that emerged from data collection, national market factors. This chapter also covers the additional data analysis

that was conducted via an examination of EMI criteria coined by Oseni and Pollitt (2014), uniquely juxtaposed against sub-regional market factors and BIMP-EAGA data previously introduced in Chapter 4. In addition, the author expands on Oseni and Pollitt's 2014 criteria with information gathered via interviews and documentary analysis, creating what the author terms 'O&PCRB EMI Criteria", which is a unique contribution to research on the necessary market reforms for increased EMI and cross-border electricity trade in Southeast Asia. This data reveals two main findings: (1) the common identified national-level reforms for EMI are neoliberal in nature and reflect the popular needs of the global, neoliberal economic system and (2) the hydrocarbon dominance identified in Chapter 4, coupled with the national electricity needs of BIMP-EAGA and ASEAN identified in Chapter 5, signal that the sub-region is not uniformly committed to decarbonisation of power systems. As a result, sub-regional commitments to climate change appear to be performative in nature and are not reflective of national-level efforts—or needs—given the surplus of electricity in each BIMP-EAGA country.

Elite interviews also largely informed the third theme that emerged from this research, governance challenges, discussed in Chapter 6. Via interviews it became clear that trust and national interests are major barriers to EMI and cross-border electricity trade—not just trust of outsiders but also trust within ASEAN's membership and the prioritisation of national interests over sub-regional commitments. In this chapter the author makes the link between trust and outside actors to China's own power connectivity ambitions in Southeast Asia. The main findings of this chapter are that sub-region and national interests complicate the ability of EMI to address renewable energy integration challenges, and that APG progress is complicated by uncertainty at both sub-regional and national levels and various power dynamics at play.

1.4.b Methodological Contribution

Two issue areas relevant to this research—(1) responses to the global fight against climate change and (2) the political economy of East Asia's regional economic development path—are interrelated via the energy policy solutions to hydrocarbon intensive economic development and its impact on the global climate. These issue areas are situated across three fields: IPE, East Asian studies, and sustainability research. Using a mixed methods approach this cross-disciplinary research has combined conceptual, theoretical and methods choices across these three fields, resulting in unique data and analysis. Detailed examination of these choices and the resulting methodology is carried out in

Chapter 3, *Research Design & Plan of Enquiry*. However, a relevant overview is provided here in relation to the methodological contributions of this research.

First, qualitative analysis of current policies and examples from Southeast Asia are used to fully depict the sub-regional, regional and global electricity trade and energy policy picture. In tandem with the collection of data, elite interviews were conducted to inform this study, increase understanding of the relevant issues, and advancing analysis. Extensive, high level interviews with current and past government, business, academic and technical leaders throughout East Asia provides insight into the current state of cross-border electricity trade in East Asia, governance options for sub-regional expansion of electricity trade, options for sub-regional power market integration, and shortcomings of current proposals for deeper Southeast Asian energy market integration. Each of the three dominant themes identified and analysed in chapter 4-6 are supported via coding of elite interviews for key terms and patterns.

Data collection of national electricity market structures in Southeast Asia was conducted via documentary analysis and simultaneously informed by interviews. This data collection included analysis of existing and proposed interconnections in Southeast Asia and a thorough look at the electricity market structure of the individual BIMP-EAGA economies. The combination of these two methods also resulted in the O&PCRB EMI Criteria that is introduced in Chapter 5.

1.4.c Theoretical Contributions

Various iterations of DS exist across East Asian studies. However, the application of neo-developmental statism to electricity markets is novel in its interpretation and application. The author's conceptualisation of neo-developmental statism provides a unique lens from which to understand the BIMP-EAGA economies and their potential for EMI, highlighting the challenge of applying neo-liberal economic reforms in state-dominated markets. Neo-developmental statism also provides an updated theoretical evolution of the traditional DS paradigm from which to explain the challenge of centrally planned economies participating in neoliberal markets and the impact these challenges have on the political economy of cross-border interconnections in Southeast Asia. This approach draws attention to the economic and political drivers behind EMI in the first place, and the global structure of climate change challenges, performative responses, and sub-regional governance institutions within an East Asian context. The application of neo-developmental statism to sub-regional electricity markets in Southeast Asia also provides a unique response to the author's prior

analysis of sub-regional EMI: it is a mistake to reform on the trajectory towards a fully liberalised power sector—instead, like neo-developmentalism, a hybrid approach[9] to reform is the legitimate form of East Asian developmentalism.

1.5 Thesis Structure

So far this chapter has framed the basis of this research, explaining the rationale behind the research aims that makeup this body of work. This chapter has also introduced the original empirical, methodological and theoretical contributions of this research, which will be further expanded upon in the data chapters 4-6 and the concluding chapter. The following sections outline the structure of this thesis, beginning with the presentation of research objectives and questions throughout data chapters, followed by a detailed overview of each chapter and its contribution to the entire project.

1.5.a Objectives & Questions

Previous sections in this chapter have introduced the different dynamics at play in this research, including the intersection of East Asia's economic development history and climate change, East Asian and global responses to climate change, and the significance of electricity markets in policy responses to the economic and political challenges connected with climate change in the sub-region of Southeast Asia. Ultimately, these considerations developed into the following research objectives and research questions, which frame the subsequent chapters and results of this research. In the following table research questions identified in the introduction section of this chapter have been paired with corresponding research objectives and the resulting themes that have emerged throughout the research process—each of these themes and the corresponding research questions and objectives are discussed in a separate data chapter (chapters 4-6). For example, Chapter 4 is focused on the first theme to emerge

[9] Hybrid approaches to electricity sector reform are not new or novel—examples of hybrid approaches exist throughout sub-Saharan Africa and Europe (Gratwick & Eberhard, 2008). However, these hybrid examples are not prescriptive (Gratwick & Eberhard, 2008, p. 3959)—they are adaptive and based on the experiences and intricacies of individual markets and the economic and business characteristics present. As such, the hybrid approaches mentioned in reference to ASEAN are specific to their characteristics. In addition, in the literature on ASEAN hybrid approaches are mentioned few and far between; the common recommendations reflect the standard model of neoliberal market approaches to power sector reform (Sen, 2008, pp. 1-4) and the standard neoliberal model of development (Kasahar, 2013, p. 1). For more debate on neoliberal approaches to development, and East Asia, see also: Brohman, 1996.

from data collection and analysis, and answers Research Question 1 and addresses (research) Objective 1; Chapter 5 is focused on the second theme to emerge from data collection and analysis, while answering Research Question 2 and addressing Objective 2. Chapter 6 is focused around the third and final theme to emerge, while answering answers Research Question 3, and addressing Objective 3. These pairings are presented together in the following table with the corresponding research objectives and data themes, illustrating the flow of ideas and concepts as they are revealed in chapters 4-6:

Table 1.2 Objectives, Needs, & Research Questions

Objective 1 (Chapter 4 – Sub-Regional Market Factors)
Objective: Provide overview of current status and needs of cross-border interconnections in East Asia, specifically the sub-region of Southeast Asia: • Assess the role of cross-border electricity trade in Southeast Asia sub-regional EMI; • Review and analyse current and projected interconnections; • Review and analyse ASEAN interconnection projects; • Synthesise lessons learned among selected projects. <u>Research Question</u> RQ1: How do governments understand the IPE of cross-border interconnections in Southeast Asia?
Objective 2 (Chapter 5 – National Market Factors)
Objective 2: Assess market factors in sub-region of Southeast Asia and case study selection and identify areas of individual and collective reform needed to reach deeper levels of EMI among ASEAN member states: • Synthesis overview of current market structures in national and sub-regional electricity markets; • Assess national needs for sub-regional EMI; • Review and analyse any links to the integration of renewables into national energy mixes, review sub-regional energy poverty reductions, and identify any links between national energy goals and EMI initiatives; <u>Research Question</u> RQ2: How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?
Objective 3 (Chapter 6 – Governance Challenges)
Objective 3: Identify and analyse governance challenges to deeper EMI and increased electricity interconnections among ASEAN member states and case study selection:

- Identify trade and economic development policies used in response to these issues;
- Provide realistic, relevant, IPE based policy recommendations for further sub-regional renewable energy integration;

Research Question
RQ3: What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian Development?

Central to the research objectives and research questions is the consideration of East Asian economic development paths, highlighting the contradictions between traditional state-led development practices and global neoliberal, capitalist-driven market reforms. These considerations drive the theoretical framework that shapes this research from within, but also the issues themselves—both within national governments and within sub-regional governance structures.

1.5.b Chapter Overviews

Chapter 2, *Conceptual Approach & Review of Literature*, provides context to the intersection of three areas of study (East Asian studies, IPE, and sustainability research) while examining prior cross-border electricity trade research in East Asia and identifying existing analytical gaps. This chapter sets the scene for answering research questions 1-3 and later identified sub-questions. This includes an examination of the literature surrounding energy market integration as a response to climate change, foundations of IPE, functions of IPE in East Asia, and IPE explanations of cross-border electricity trade. In Chapter 2 the theoretical framework that supports this research, neo-developmental statism, is also explained in more detail including an overview of the two theories that make up this explanatory tool, neoliberalism and DS. The common global reliance on neoliberal market economics is contrasted against the DS policies most prevalent in East Asia, providing scope for eventual examination of the IPE of electricity markets in Southeast Asia, and the compatibility of reforms needed in order for EMI and cross-border electricity trade to thrive. As a result of the co-existence of seemingly contradictory economic practices, existing developmental state models used to explain regional and sub-regional economic and political choices do not fully encompass the competing economic and political dynamics in Southeast Asia. The author's conceptualisation of neo-developmental statism is introduced and provides an explanation of the hybrid policy approaches utilised to realise a fully integrated ASEAN electricity market.

Chapter 3, *Research Design & Plan of Enquiry*, explains the methodological approaches and methods utilised in this research. This includes an introduction to the theoretical underpinnings of this research, critical realism, and how this epistemological approach informs the collection and analysis of data. Research design, including case study design and elite interviews are explained in detail, with reference to reliability and validity concerns, ethical considerations, and data protection measures that were employed. This chapter will explore the methods used to reach three themes identified by the author via data collection, setting up the further introduction of these data themes in subsequent chapters (chapters 4-6).

Chapters 4-6 represent the data analysis chapters that resulted from interviews and data collection. The order of these chapters was chosen specifically to paint the picture of cross-border electricity trade in Southeast Asia and the IPE considerations ASEAN and ASEAN member states must make. First, Chapter 4 presents a sub-region-wide picture of the current state of cross-border electricity trade. Next, Chapter 5 drills down into the IPE of specific power systems in ASEAN, with a focus on BIMP-EAGA power systems at the national level. Finally, Chapter 6 presents the shared governance challenges that threaten regional and sub-regional progression of EMI and cross-border electricity trade. Together these three chapters represent the multi-level intricacies and interests of greater ASEAN EMI.

Chapter 4 is the first of these three data analysis chapters, each of which are framed around themes that emerged in the research process. Chapter 4 is structured around the theme of *Sub-Regional Market Factors*. This chapter explores ASEAN-specific EMI projects and the nature of EMI and cross-border electricity trade in ASEAN at the moment, in an effort to address RQ1, *How do governments understand the IPE of cross-border interconnections in Southeast Asia?* This includes an introduction to the case study, BIMP-EAGA.

The findings of Chapter 4 set the scene for the subsequent data presented in Chapter 5. Chapter 5, the second of three data analysis chapters, is framed around the theme of *National Market Factors* and addresses RQ2, *how does the IPE of cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?* Chapter 5 covers the additional data analysis that was conducted via an examination of EMI criteria coined by Oseni and Pollitt (2014) and juxtaposed against ASEAN market structure and national market factors of BIMP-EAGA economies. Oseni and Pollitt's criteria are expanded by the author to include additional market requirements identified in research

interviews and data analysis and the resulting necessary economic, physical and political reforms that are necessary for sub-region EMI to flourish; this new criteria is called the O&PCRB EMI Criteria and provides a thorough view of the IPE of BIMP-EAGA markets and the potential for cross-border electricity trade growth.

Chapter 6, the third of three data analysis chapters, is framed around the theme of *Governance Challenges* and addresses RQ3, *what can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?* This chapter introduces the author's findings that there are three additional barriers to deeper EMI and enhanced cross-border electricity trade that fall under the umbrella of governance challenges, including (1) sub-regional versus national-level interests, (2) trust among ASEAN members, and (3) ASEAN trust of outsiders, particularly China and its role in sub-regional power sector development. This chapter expands on the original two themes of *Sub-Regional Market Factors* and *National Market Factors* to include outside factors that may influence the progress of EMI and cross-border electricity trade under the umbrella of governance challenges.

Finally, Chapter 7, *Conclusions*, synthesises and summarises the main points of this research by further pulling together the threads identified in each of the data chapters and summarising the answers to the primary research questions: Governments understand the IPE of cross-border interconnections (RQ1) as opportunities—but not just opportunities for integration and utilisation of renewables, also as economic opportunities. Similarly, the IPE of cross-border electricity trade provides opportunities for renewable energy participation in sub-regional markets (RQ2), but national policies do not signal the same level of commitment and interest in renewable integration via sub-regional EMI. Instead, many nations are incorporating renewables and upping shares of hydrocarbons in their energy mix while failing to make the necessary national power sector reforms for further EMI. And finally, cross-border electricity trade and renewable energy integration tell us that the IPE of East Asian development (RQ3) generally and Southeast Asia specifically is largely driven by neoliberal markets and economic development ambitions, not climate considerations. Participation in sub-regional and global climate targets is performative and expectations of fully liberalised power sectors in order to reach integrated ASEAN electricity markets are unrealistic in the face of hybrid developmental models explained by neo-developmental statism. At the end of Chapter 7 the author will propose a series of policy changes and adaptations that will suggest

an alternative approach for improving cross-border electricity trade in East Asia along with a series of recommendations for continued research and evaluation of this field.

1.6 Conclusions

The inclusion of higher shares of clean energy in a county's energy mix places pressure on electrical power systems as they are forced to move away from historically fossil fuel-based electricity production. Entrenched, fossil fuel power systems, while polluting, do conveniently allow for ramping up and down of electricity production based on demand; intermittent renewables, on the other hand, have flexibility challenges based on their non-controllable generation patterns. Where previously it was possible to build power sectors within national boundaries, increased pressure to source a substantial and growing percentage of a nation's load from renewable resources means national systems become more variable as more intermittent resources are introduced. The prospect of electricity interconnections, where nations can buy surplus power during low generation hours from a neighbouring market which may not be experiencing scarcity (and vice versa) becomes a more pressing national concern and more attractive international investment than has previously been the case. Put simply, electricity is good for development, but old models of fossil-based centralised systems are not compatible with global climate commitments. Clean energy investment leads to a better case for investment in interconnectors and more interconnectors mean higher shares of renewables and cleaner electricity production with lower emissions. The opportunities for cross-border electricity trade in East Asia broadly, and Southeast Asia specifically, are abundant and well justified.

In order to address the challenges of renewable energy integration, climate change, and cross-border electricity trade development, in the following pages this research will provide a thorough examination and critique of the dominant neoliberal political economy frameworks and their proposed application to East Asian economic & political structures. This examination will provide context to the development of sub-regional interconnectors that impact clean energy utilisation and sub-regional EMI in Southeast Asia. Ultimately the overarching thread described through this research is that climate change adaptation is messy, policy has the potential to be flawed in its incentives, and there is a delicate balance between national, sub-regional and global goals and the necessary means to achieve them (if at all).

Chapter 2: Cross-Border Electricity Trade: Conceptual Approach & Review of Literature

2.1 Introduction

This chapter explores the basics of this complex, multi-dimensional topic by examining the foundational IPE concepts in East Asian and ASEAN specific cross-border electricity trade. Two dominant IPE concepts were chosen from which to build the conceptual understanding of cross-border electricity trade that is framed in this chapter—neoliberalism and developmental statism (DS). Chapter 2 will provide the necessary background needed in order to address the three primary research questions that frame this project:

1. How do governments understand the IPE of cross-border interconnections in Southeast Asia?
2. How does the IPE of cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?
3. What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?

This chapter will make the case for which concepts and empirical theories are relevant to this study, setting the scene for further analysis of cross-border electricity trade and EMI in East Asia via the primary research questions. While none of these research questions will be explicitly answered in this chapter, the literature review and theoretical framework discussed in the following sections will identify what current academic explanations are missing and how the author's own framing can fill these gaps. In the following analysis a major point is that, ultimately, the dominant East Asian IPE theory, developmental statism, is outdated in its application. In addition, the traditional neoliberal, western oriented IPE analysis fails to account for East Asian experiences and is not applied to electricity markets. As such, a combined theoretical framework that includes neoliberal ideals of market access, free trade, liberalisation and open markets with developmental statism ideals of state directed economic policy is necessary in order to frame explanations for increased cross-border electricity trade. The major divergence from previous iterations of alternative developmental statisms is the application to electricity markets and energy sectors in the sub-region of Southeast Asia and within the context of a need to increase cross-border electricity trade in response to renewable energy integration challenges.

This chapter will explore three distinct areas of research and how they relate to this cross-disciplinary study: East Asian studies, IPE, and sustainability research. This chapter will be structured as follows: First, in Section 2.2, *East Asia's Growth Environment Nexus,* East Asia's growth story will be told via the intersection of economic development and environmental challenges, explaining the climate, economic and environmental imperatives for cross-border electricity trade and the relevant sustainable development and green growth themes*;* this section will provide the necessary background and literature for eventually answering RQ1 in data Chapter 4. Next, in Section 2.3, *Cross-Border Electricity Trade*, the literature on cross-border electricity trade and Southeast Asian EMI will be presented, making a case for the governance role of ASEAN and its sub-regional interconnection initiatives and limits; this section will provide the necessary background and literature for eventually answering RQ2 in data Chapter 5. Following, in Section 2.4, *International Political Economy & Foundations of Trade*, neoliberalism will be introduced, explaining its relevance to global economic structures and international trade; then, in Section 2.5, *International Political Economy in East Asia,* the common East Asian studies IPE theme of DS will be introduced, including an examination of the limits to this area of research and the creation of the author's own conceptualisation of neo-developmental statism used to explain the IPE of cross-border electricity trade and EMI in Southeast Asia. Section 2.4 and 2.5 will, together, provide the necessary literature for answering RQ3 in data Chapter 6. Finally, Section 2.6, *Conclusion,* will bring the main points regarding climate change, renewable energy integration, power sector reform, and cross-border electricity trade together, tying the theoretical framework of neo-developmental statism into these issues prior to the subsequent chapter, *Research Design & Plan of Enquiry*.

2.2 East Asia's Growth-Environment Nexus

This section will frame the intersection of the three areas of study relevant to this research and the 3 primary research questions (East Asian studies, international political economy and sustainability research) by explaining the impact East Asia's economic development has had on the sub-regional environment and sub-regional EMI policy making. This section will provide the necessary context for understanding the climate, economic, and environmental imperatives for sub-regional cross-border interconnections, providing the literature needed to eventually address RQ1, *how do governments understand the IPE of cross-border interconnections in Southeast Asia*?

East Asia's modern economic development has been largely rooted in industrial policy and high-tech development. Government policies that promote infant industries, protect domestic producers, and encourage domestic innovation have played a significant role in the economic development and subsequent modernisation of Japan, South Korea, Singapore, Malaysia and others. Modern societies around the world are based upon common notions of growth (economic and cognitive) and the expectation of continued development and advancement (Charlton & Andras, 2003). Modernisation posits that scientific and technological advancements aid in the progress of humanity and society, often incorporated with aspects of equitability or inclusiveness (Hoselitz & Moore, 1963; Bernstein, 1971; Arat, 1988; Tominaga, 1991; Charlton & Andras, 2003; Chatterjee, 2005; McGregor, 2008). Modernisation and economic advancement largely hinge on access to modern forms of energy, and access is a requirement in order to:

> overcome poverty, promote economic growth and employment opportunities, support the provision of social services, and, in general, promote sustainable human development (Johansson et al., 2012, pp. 153).

Access to electricity is a quantifiable economic advancement that can be monitored for the purpose of strategic development plans, and such quantifiable indicators have greatly shaped the policy design of East Asian nations' strategic and economic development (Naimoli & Nakano, 2018). It is common for state-led development practices to include industrial policies, and a number of East Asian economies have utilised or still utilise these practices today (Cai, 2008). Exploitation of the region's human capital and environmental and natural resources aided Northeast Asia's economic giants in their own economic modernisation, and NIE of Southeast Asia have also adopted such practices (McGregor, 2008). Improvements to quality of life as a result of modernisation has made East Asia one of the fastest developing regions of the world, but also one of the key players in innovative technology developments, including those in electricity production and transmission.

Modernisation, while bringing about technological, social, and economic advancement, does have a cost. In East Asia, where modernisation has occurred at a rapid rate, human, environmental and socio-cultural issues have also occurred with great intensity (Broadbent, 1998; McGregor, 2008). The damage of extracting resources for energy production, polluting the air with industrialisation practices, overreliance on fossil fuels for electricity creation, and stressing cities and rural communities with ever-growing populations and

greater electricity needs, juxtaposed with the global dependence on improved quality of life and economic growth, has created what Broadbent (1998) refers to as the Growth/Environment (GE) dilemma:

> If we grow jobs and profits, it seems, we further destroy the environment. But if we protect the environment we slow down the economic growth that makes increasing profits and jobs possible, thereby threatening both (p. xiii).

The GE dilemma impacts most societies and challenges leaders to find a happy medium between (1) consumption and waste and (2) long-term economic and societal survival (Broadbent, 1998). Northeast Asia's largest economies have very publicly battled with the GE dilemma, and in some cases have managed to balance responses to pollution (both the natural and social intensity of pollution) with modern growth strategies (Broadbent, 1998; Jacobs, 2013). Green growth practices, as responses to the GE dilemma, are also built into East Asia's national and regional discussions on climate adaptation, energy system transformation, economic development policies, and clean energy development strategies (UN et al., 2017).

Nowhere is the struggle with the GE dilemma more apparent than Japan, where in a period of 50 years it has undergone a variety of responses: it countered post-war poverty through economic practices that resulted in the Japanese "economic miracle," which in turn led to industrialisation and export expansion, causing the "pollution debacle" and "urban debacle" of the 1970s and 1980s, which were eventually somewhat addressed through investment, efficiency measures, national regulations, and the export of pollution to developing economies (Broadbent 1998, pp. 18). Similar investment, regulatory, and market practices have been emulated in China and the Republic of Korea, with comparable environmental challenges and subsequent green growth strategies (Asian Development Bank Institute [ADBI], 2020). In Southeast Asia the GE dilemma has influenced green growth strategies via integration into the common state-led economic development model, influencing the development practices of NICs as well as industrialised economies, and reflected in ASEAN economic development initiatives (OECD, 2017).

Ecological Modernisation Theory (EMT) offers an evolved form of modernisation in an attempt to respond to the social, health and environmental problems associated with modernisation in East Asia and the GE dilemma, and is also situated within many sustainable development and green growth debates, originally introduced in Chapter 1, *Introduction* (Dryzek, 1993; Mol, 1995; Buttel, 2000; Mol & Spaargaren 2000; UNDSD, 2012; Jacobs, 2013; OECD,

2017). EMT posits that the promises of traditional modernisation can be realised while also considering ecological and environmental concerns but framing the issues as solvable within existing structures (Murphy & Gouldson, 2000; Bailey et al., 2011). Contrary to more dramatic views on economic development and environmental degradation, ecological modernisation was first introduced in the 1980s by Huber (1982) and Janicke (1984) but the concept has evolved, and the debates have changed along with developments in industrialisation and modernisation, resulting in a variety of arguments for and against EMT (See: Langhelle, 2000; Mol & Spaargaren, 2000; York & Rosa, 2003; Bailey et al., 2011; Bowen & Franhauser, 2011; Dryzek, 2013; Jacobs, 2013; among others). Varieties of EMT fail to account for socio-cultural challenges associated with inequality and instead focus primarily on neoliberal structures and processes, further encouraging market driven, neoliberal-based solutions (Bailey et al., 2011).

In the context of East Asia, Dent (2014) argues EMT is deeply integrated into East Asian development practices and is reflected in policies directed at renewable energy industry growth specifically. Dent's (2014) *new developmentalism* places a high importance on EMT in East Asian policy making, particularly in relation to targeting renewable energy industries for increased low carbon development (p.63). Here Dent does not specify beyond types of renewable energies, nor does his examination extend to integration and power sectors; instead, the focus is on low carbon development generally, with emphasis placed on EMT as a theoretical driver. The stated goal of Dent's new developmentalism is to transform economic development, driven by strategic industries,[10] energy security, and environmental imperatives (p. 63); the role of private-public relationships is also stressed, although altruistic, environmentally driven

[10] Protectionist trade and industrial policies such as strategic trade, infant industry protections, and targeted industrial policy have been intertwined for several centuries. The first notable example is Alexander Hamilton's (1791) "Report on the Subject of Manufactures". German scholar Friedrich List (1909) also argued early on in favour of targeted, protectionist government policies as a means of building up infant industries and expanding trade. In the late 1980s targeted industrial policy underwent a period of increasing recognition, due in part to the previously mentioned strategic trade policy research by Brander & Spencer (1985, 2008) and further popularised by U.S. Economist Paul Krugman's (1983, 1986) own work on the theoretical balance between strategic trade and industrial policy. See also: Grossman & Richardson (1985); Stegemann (1985); Carliner (1986); Grossman (1986); Shafaeddin (2000); Katz & Lee (2011); Tawney (2012); and others. In this research these arguments will not be explored further except in relation to developmental statism in East Asia broadly, and where relevant to the power sector specifically.

incentives receive the most emphasis. Dent takes a broad approach to developmentalism, highlighting the importance of state capacity theories broadly rather than developmental statism specifically. In addition, new developmentalism assumes a high level of state capacity and a reliance on industrial targeting and socio-environmental pressures that this author does not believe are reflected in the market drivers among ASEAN economies. In addition, based on a reading of the green growth literature, this author finds that EMT, while relevant, is not the basis for policy responses to climate change; instead, it appears that in Southeast Asia specifically, economic development and neoliberal economic gains make up most of the incentives at the national level. This assertion is supported in chapters 4-6, and relates directly to RQ1 (*How do governments understand the IPE of cross-border interconnections in Southeast Asia?*), RQ2 (*How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?*), and RQ3 (W*hat can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?*), and directly supports the application of the author's own theoretical framework, neo-developmental statism, discussed further in section 2.4.

The prevalence of a variety of green growth and sustainable development strategies and practices throughout East Asia (and elsewhere) are due in large part to the economic interests that support the opportunity environmental protection offers in the form of industrial development and economic growth (Bowen & Frankhauser, 2011; Jacobs, 2013). Green growth and similar sustainable development discourses are directly related to the 'wicked problem' of global climate change—whereby no single, straightforward answer exists for a complicated, transboundary problem (Sun & Yang, 2016).[11] As a result, many conflicting solutions and outcomes persist, each with a different set of issues and sub-issues that crop up (Conklin, 2005). The problem, in a sense, is so complicated that a solution remains evasive, and to answer only part of the solution is to act morally unjust (Churchman, 1967, p. B-141). According to Churchman:

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[11] This research will not delve into a debate about the seriousness of climate change; instead, this research is based on the widely accepted premise that global climate change is a pressing issue that requires policy action at a wide variety of levels. For more on the challenge of climate change please see IPCC (2019); Stern (2014); Stern et al. (2006). For scholarship on the challenge of climate change in East Asia see IRENA & ACE (2016); IRENA (2018); IEA (2019); REN21 (2019a); among others.

> The adjective 'wicked' is supposed to describe the mischievous and even evil quality of these problems, where proposed 'solutions' often turn out to be worse than the symptoms (1967, p. B-141).

Sustainable development and green growth are solutions that solve *part* of the problem (environmental impact) associated with climate change, but not the entire problem (industrial development and environmental impacts of economic development), thereby leaving solution makers to "exclude potentially promising alternatives" (Cook, 2019, p. 36). The wicked problem[12] of climate change cannot necessarily be solved by a single solution, such as green growth or cross-border electricity trade; however, a holistic approach that includes multiple solutions and options but recognises the need for continued adaptation and response is a more realistic way forward. As such this research does not seek to advocate for cross-border electricity trade as the only solution, just one of many.

One such area where an all of the above approach can be quite effective is in East Asian energy markets, where a variety of energy resources are being integrated into the energy mix of economies as a means to reduce reliance on fossil fuels and reduce harmful emissions. As was discussed at the outset of this research, the inclusion of renewable energy in an economy's energy mix creates variability challenges that fluctuate with the availability of renewable resources (Huang et al., 2019). For example, in the case of wind power, which is created via the movement of wind turbines, energy is only produced when the wind is blowing. Economies in Europe have responded to this variability by purchasing power from neighbours when they need it and selling their excess power when they don't. Cross-border electricity trade has enabled this exchange and offers the ability to overcome clean energy limitations in electricity production. In Southeast Asia, ASEAN has acknowledged that cross-border electricity trade has the potential to respond to, and improve, a number of challenges associated with the impact economic development and industrialisation have had on the region (ASEAN 2004, 2007, 2010, 2011, 2012, among many others). ASEAN leads the

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[12] Definitions of wicked problems do vary depending on the scholar and problem explored. Additional classification of wicked problems, super wicked problems, and their application to climate change abound. However, the author has reserved engaging with these debates based on space limitations, and therefore will use the general application of wicked problems described above. However, additional arguments and accounts of wicked problems and the application in climate change and sustainability studies, can be found in the work of Whelton & Ballard (2002); Head (2008); Skaburskis (2008); Lazarus (2009); Levin et al. (2007, 2012); Incropera (2015); among others.

way in region-wide interconnections, not only aiming to increase renewable energy integration among ASEAN member nations, but also respond to energy poverty and climate change concerns simultaneously. The following subsection explains this approach within ASEAN, as well as discusses ASEAN's governance abilities in relation to EMI and increased cross-border interconnections.

2.2.a Sub-Regional Imperatives for Cross-Border Electricity Trade

Established in August 1967, the original five members of ASEAN included Malaysia, Singapore, Philippines, Indonesia and Thailand. The five founding members of ASEAN sought a community that would encourage political and social stability among post-colonial East Asian states (Zhao, 2016). In the 1980s Brunei Darussalam joined the original five, and later in the 1990s Cambodia, Lao PDR, Myanmar and Vietnam further joined. Overtime ASEAN adjusted its focus to an economic and sub-regional integration agenda that is reflected in its progress reducing tariff barriers to trade among member economies, the development of the ASEAN Free Trade Area (AFTA) and growth of the ASEAN Economic Community ([AEC] ADB, 2008a). [13]

Chief among ASEAN economic integration initiatives is the role of energy, and as a result connectivity and electricity market access. It is ASEAN's own need for increased electrification, sub-regional and regional initiatives focused on climate change and renewable energy integration, as well as shared climate challenges, that make Southeast Asia an interesting and unique sub-region of the world to study energy and climate change issues. The irony of needing to study these issues in the first place is not lost on researchers—the need for increased cross-border electricity trade and increased renewable energy integration stems from ASEAN's own poverty alleviation, sub-regional economic development, and the success of the AEC. Linkages between electricity consumption and economic growth demonstrate the positive relationship between electricity access and the development process (Apergis & Payne, 2011). Additional benefits when energy poverty alleviation intersects with climate change mitigation can be realised via policy efforts on efficiency and energy mix diversification (Ürge-Vorsatz &

[13] The AEC is one of ASEAN's flagship initiatives, focused on increasing economic prosperity, developing "rules-based, competitive, resilient" and globally integrated regional market and stronger regional economic community by a 2015 due date (Shi, 2014, p. 116). The AEC was largely achieved, in part due to the broad and generalised goals of improving development and governance across the sub-region. Many of ASEAN's subsequent initiatives involve aspects of the AEC, which remains an important cornerstone of ASEAN identity and achievement (ASEAN, 2015) and is often referenced as a successful ASEAN initiative.

Herrero, 2012). In ASEAN targeting the economic benefits of electricity access have been built into sub-regional programmes and remain a major goal of AEC initiatives. Forecasting of future energy demand in the sub-region shows a continued rise in access and the need for capacity, infrastructure and policies that support this growing demand (Chang & Li, 2013). In addition, rapid economic development requires increased energy access, which puts pressures on the climate and environment and requires energy solutions that respond to global greenhouse gas emissions while incorporating responses to climate change concerns (Gulagi et al., 2017). ASEAN's energy poverty reductions, economic growth success, and environmental challenges are all interlinked in the development and growth story of the sub-region.

Despite progress, the energy security and access picture in ASEAN is predicted to remain mixed. Population, per capita CO2 emissions, and renewable capacity is varied across the sub-region.

Table 2.1 Basic Sub-Regional Environmental Picture

Country	Population (2017)	Per capita CO2 Emissions from Fuel Combustion (2016)	Total Renewables Capacity (2019)
Brunei	0.4 million	14.9 metric tonnes	1 MWh
Indonesia	264.0 million	1.7 metric tonnes	9,471 MWh
Malaysia	31.6 million	7.0 metric tonnes	8,157 MWh
Philippines	104.9 million	1.1 metric tonnes	6,482 MWh
Cambodia	16.0 million	0.6 metric tonnes	1,438 MWh
Lao PDR	6.9 million	No data	5,118 MWh
Myanmar	53.4 million	0.4 metric tonnes	3,315 MWh
Singapore	5.7 million	8.1 metric tonnes	279 MWh
Thailand	69.0 million	3.6 metric tonnes	10,441 MWh
Vietnam	95.5 million	2.0 metric tonnes	18,523 MWh

Sources: UNESCAP, 2019, pp. 2, 40; IRENA, 2019b, pp. 2-4.

Since 2002 energy demand in the region has grown 60%; however, in 2020 10% of the AEAN population still remains without access to electricity (Suryadi, 2020). While the IEA predicts that ASEAN will reach 100% electrification by

2030, it still forecasts that 175 million people in the region will remain without access to electricity for clean cooking in 2040, with a prevailing reliance on solid biomass for cooking fuel[14]; as of 2016 only 56.3% of the population had access to clean cooking fuels and technology (UNESCAP, 2017). The population of ASEAN is estimated to increase to 770 million by 2040 (IEA, 2019a), with universal electricity access reached (ACE, 2017) and energy demand skyrocketing (Huber et al., 2015; Shi & Widodo, 2014). The majority of this demand is projected to come from fossil fuels; coal and gas will remain the majority providers of electricity generation (IEA, 2019a), with a variety of potential increases for renewables depending on sub-regional policy making, investments, and infrastructure growth (Huber et al., 2015). Cross-border electricity trade, EMI, and power system reform provide management and investment options that could counter this growth and aid in renewable energy integration and utilisation (IEA, 2019a; Huber et al., 2015).

Electricity access is a critical focus of ASEAN as an institution (ASEAN 2004, 2006, 2010, 2011), as Southeast Asia remains home to electricity access limitations, particularly in the least developed and island nations of Southeast Asia where energy services remain stranded among non-urban populations (Vithayasrichareon et al., 2012). Since 2000 electricity access has grown 28%, rising to 90% electrification rate across the region; today electricity makes up 52% of the region's primary energy demand (IEA, 2019a).

[14] Solid biomass is responsible for the majority of indoor air pollution world-wide (IEA, 2019a) and indoor air pollution results in 3.8 million premature deaths a year and is a serious health hazard in developing countries and among the world's poor, according to the WHO (IEA, 2017a; WHO, 2018).

Table 2.2 Sub-Regional Electricity & Renewables Picture

Country	% of Population with electricity access (2016)	Electrification Targets (2019)	% Renewable Electricity Generation of Total Output (2016)	Renewable Targets (2019)
Brunei	100.0%	n/a	0.05%	10% RE in power generation by 2035
Indonesia	98.0%	99.7% by 2025	12.8%	23% RE use by 2025, and 31% by 2030
Malaysia	100.0%	n/a	13.5%	RE installed capacity of 2,080 MW (excluding large hydro) by 2020; 20% clean energy use
Philippines	91.0%	100.0% by 2022	24.2%	40% by 2020 100% by 2050; 15.2 GW of RE installed capacity by 2030
Cambodia	50.0%	70.0% by 2030	47.6%	No specific RE target, but establishment of large hydro of 2,241 MW by 2020

Country	% of Population with electricity access (2016)	Electrification Targets (2019)	% Renewable Electricity Generation of Total Output (2016)	Renewable Targets (2019)
Lao PDR	87.0%	98% by 2025	No data	30% RE share of total energy consumption by 2025
Myanmar	57.0%	80% by 2030	54.4%	30% RE sources for electricity generation
Singapore	100.0%	n/a	1.9%	350 MWp of solar power installation by 2020
Thailand	100.0%	n/a	15.2%	30% renewable in total energy consumption by 2036
Vietnam	99.6%	Grid access for most rural house by 2020	39.0%	21% RE of 60 GW installed capacity in 2020

Sources: UNESCAP, 2019, pp. 4, 22, 31; IEA, 2019, P. 52.

Sub-regional access and generation targets highlight the need importance of electrification and renewable contributions, but also show a critical weakness--based on current renewable projections and sub-regional targets ASEAN will still fall short of its 23% renewables by 2025, with just 17% total share of renewables instead (IRENA, 2016, p. 10).

Unfortunately, the geography of ASEAN's many island nations, as well as remote access areas, makes continued, rapid expansion more difficult than many other regions (IEA, 2019a). In addition, upgrading national grids will need to occur, including increased grid capacity, modernisation and standardisation, institutional and regulatory adjustments, and the expansion of national interconnections, among other variables (Porter & Situmeang, 2005). However, according to a multi-country study on preparedness for grid integration of renewables by Huang et al. (2019), ASEAN is well positioned to improve grid flexibility[15] to reach previously discussed 23% renewable energy goals—but only if the sub-region addresses power system flexibility challenges (p. 722).

In addition to the climate imperatives and energy poverty reduction goals of ASEAN member economies, the ability to diversify the sub-regions energy mix via EMI and cross-border electricity trade provides additional incentives for member state support of ASEAN initiatives, primarily within the framework of the APG and associated integration projects. Unfortunately for ASEAN one of its greatest assets (diversity of the region) is also one of its greatest limitations when it comes to growth in renewables (Ahmed et al., 2017). Distribution of renewable energy resources among Southeast Asian states is unbalanced, limiting options for countries with highly variable resource endowments (Ahmed et al., 2017). The unbalanced level of economic development within the region also poses investment and development complications in order to meet growing electricity demand (Atchatavivan, 2006; Chang & Li, 2013). A more integrated sub-regional electricity market and reform of current power sectors would augment cross-border electricity trade from resource rich to resource poor economies, contribute to energy poverty reduction efforts, as well as encourage increased renewable energy investment among ASEAN's least developed members (Ahmed et al., 2017).

Reaching the ASEAN goal of 23% renewables by 2025 requires national commitments in addition to the sub-regional goal, aimed at helping each

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[15] Traditionally grid flexibility refers to the capability of centralised electricity grids to respond to changes in supply and demand from a variety of different sources. Today flexibility also includes the ability to balance intermittent renewable energy sources and accommodate energy storage and new technologies while also responding to supply and demand (Martinot, 2016). Further references to gird flexibility will be made in Chapter 5, National Market Factors, when assessing the national electricity markets of individual BIMP-EAGA economies; these references will continue to be based on a broad definition of flexibility and do not reference flexibility challenges associated with distributed generation. However, distributed generation is referenced briefly in Section 7.5, Suggestions for Further Study. See also: Huang et al. (2019); Martinot (2016); Passey et al. (2011); Quiggin & Froggatt (2018).

member economy make the transition based upon their own particular economic and policy mechanisms (Huang et al., 2019; *Former Government—Informant 1; Multilateral Organisation—Informant 2)*. In the case of Brunei Darussalam, for example, this means increasing renewables to 10% share of energy by 2035; for Indonesia, that number goes up to 23% by 2025 (ACE, 2017). According to the ASEAN Energy Outlook, produced by ACE, ASEAN member economies will not reach this goal unless significant policy and infrastructure changes are made; this currently looks unlikely to happen in the time frame given (ACE, 2017). Similar global renewable energy assessments have the same findings (See: IEA, 2017a, 2019; IRENA, 2016), and multiple experts interviewed for this research also echoed this sentiment (*Former Government—Informant 1; Multilateral Organisation—Informant 2; Multilateral Organisation 18; Academic 21; Academic 25)*.

In addition, while power capacity is expected to increase three-fold to accommodate sub-regional electricity demand, coal is estimated to provide 42% of new capacity by 2040; renewables maintain a lower share, estimated to provide 29% if all proposed policy and structural adjustments are made to accommodate increased variable capacity (ACE, 2017). These numbers do not bode well for renewable targets, however, that does not mean progress won't be made in increasing electricity access and renewable grid integration, a point ASEAN is eager to make (Li & Chang, 2014; Navarro & Sambodo, 2013;. Wu, 2019). Chapter 4 and Chapter 5 of this research explore the sub-regional and national market factors making up this data, offering an IPE explanation for why ASEAN's own targets (both connectivity and climate targets) don't match the national level outcomes, and what this means for answering the first two research questions identified in this research:

1. How do governments understand the IPE of cross-border interconnections in Southeast Asia?
2. How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?

As a multilateral, sub-regional organisation, ASEAN has, by its very existence, made the case for governing cross-border electricity trade in the sub-region. It is this author's position that ASEAN's dominance in East Asia, the membership of sub-regional economies, its focus on processes and shared challenges, and its own creation of cross-border electricity trade initiatives makes it a reasonable choice for exploration of cross-border electricity trade expansion and the governance required to see increased sub-regional EMI. In addition, ASEAN's

combined policy focus on both climate change mitigation and electricity access shifts the focus from one or the other to a multi-faceted policy structure that utilises the political drive behind poverty alleviation to simultaneously address environmental and climate concerns that are linked to sub-regional economic and development challenges (Ürge-Vorsatz & Herrero, 2012).[16] Whether national governments similarly see the IPE of cross-border electricity trade will be answered in Chapter 4, Research Question 1, *How do governments understand the IPE of cross-border interconnections in Southeast Asia?*

This section has examined the growth-environment nexus in East Asia, explaining the climate, economic, and energy imperatives for cross-border electricity trade generally. The following section will drill down further into the sub-region of Southeast Asia by examining the growth of cross-border electricity trade as a response to climate, economic and energy concerns previously introduced.

2.3 Cross-Border Electricity Trade in Southeast Asia

This section will combine literature across sustainability research and East Asian studies by examining cross-border electricity trade in Southeast Asia. This section will do four things: (1) introduce EMI broadly as well as in Southeast Asia specifically; (2) briefly touch upon the governance of EMI globally, making the case for ASEAN as the most relevant institution in the case of cross-border electricity trade in Southeast Asia; (3) discuss ASEAN's governance shortcomings as they relate to EMI and cross-border electricity trade; (4) introduce ASEAN's own cross-border electricity trade solutions and its premier EMI project, the ASEAN Power Grid, which is the subject of data collection and interviews presented in chapters 4-6. Coupled with the literature reviewed in the previous section, this section will provide an introduction to the literature necessary for answering RQ2, *how does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?*

2.3.a Electricity Market Integration

Three primary models of electricity market integration are employed globally—(1) consolidation (of markets and system operators) and (2) coordination (of system operators), or (3) a hybrid of both 1 and 2 (IEA, 2014). Consolidation is

[16] This issue will be discussed throughout data chapters 4-6 and in Chapter 7, *Conclusions*.

more feasible in already integrated or similar markets, coordination ideal for different market structures and areas with geographical variability (p.9). In the case of ASEAN, the IEA (2014) recommends a hybrid approach—coordination and consolidation at the ASEAN and sub-ASEAN level, utilising ASEAN's own incremental approach.

This ASEAN approach to incremental integration is being done via the progression of ASEAN subsystems, which are made up of smaller groupings of ASEAN member countries based on geographical location and power systems. These systems are: the upper west system, which consists of the Greater Mekong Sub-Region (GMSR, established in 1992), including Cambodia, Lao PDR, Myanmar, Thailand and Vietnam; the lower west system, consisting of Indonesia, Malaysia and Thailand-Growth Triangle (referred to as IMT-GT, established in 1994) and Indonesia, Malaysia and Singapore (referred to as IMS Growth Triangle sub-region); and the east system, or BIMP-EAGA (established in 1994), the Brunei Darussalam-Indonesia-Malaysia-Philippines East Asia Growth Area (ASEAN, 2010, p. 28). The case study selection for this research was chosen from these subsystems, resulting in the examination of the BIMP-EAGA subsystem in Chapter 4; GMSR was originally also chosen for a mini-case study, but later abandoned in the case study design (discussed in Chapter 3, section 3.3.a). To date the IEA hybrid approach recommendation still makes sense for ASEAN economies, and is complemented by the variety of market structures represented in the sub-region.

It is this author's distinction that cross-border electricity trade is the physical action of trading electricity across borders, whereas EMI is the structural and procedural process required in order to physically trade. The action of EMI facilitates cross-border electricity trade, whereas cross-border electricity trade cannot exist without some level of EMI. The farthest progression of EMI would be power pools, however, in the case of this research the focus is simply on any increase in cross-border electricity trade and movement towards the creation of the APG, a type of power pool based around sub-regional cooperation and multilateral electricity trade.

Conventional IPE analysis of interconnections proceeds from a strong market and competition-logic, where the ideal is establishment of a strong and efficient national electricity market as a necessary prerequisite in order to engage in cross-border electricity trade (World Bank, 2008; Pollitt, 2004; Oseni & Pollitt, 2014). The development of national electricity markets in industrialised economies has predominantly occurred first locally and progressed to

interconnection between different service areas, via either vertical or horizontal integration depending on the economy and partners involved. National electricity systems that centrally dispatch energy from different stations to provide electricity are referred to as power pools (Oseni and Pollitt, 2014). Regional and international power pooling is one mechanism that allows for the trade of electricity across borders. Regional power pooling is the combining of government:

> efforts to create more robust regional power grids with the potential of lowering capital investment requirements across time and reducing operational costs (World Bank, 2008).

Bilateral pooling agreements between two economies are also conceivable, and additional participants can be added over time, expanding the scope of regional power pools as they develop. The development of regional power pools requires significant upfront costs and investments, and so the involvement of multilateral, independent institutions is encouraged as a means to facilitate and manage capital and human costs.

Overall ASEAN electricity markets are structured around a few key factors: markets are predominantly state driven, with state oversight even in liberalised electricity markets; limited competition with few exceptions (Singapore, Thailand, and the Philippines); presence of supply and domestic electricity subsidies; a range of development levels within national electricity markets; and varying levels of electrification—Cambodia, Lao PDR, and Myanmar with the lowest electrification rates in the region (Wu, 2019). There is no one-size-fits all recommendation for EMI and electricity market development in ASEAN, however, there are common—as well as unique—solutions for each independent market and the sub-region as a whole.

Junlakarn and Wangiraniran (2016) assessed market attractiveness of each ASEAN nation using a modified framework adopted from the Global Infrastructure Investment Index. This assessment sought to provide recommendations for improvements that would increase investment in the sub-regional power sector as a response to economic growth and energy demand. The authors selected 20 criteria from the Index to “assess an overall situation of power generation investment in the region”, aiming to judge the attractiveness of ASEAN markets for power generation investments (p. 496). Based on their framework Junlakarn and Wangiraniran found that three countries in particular are attractive for power sector investment, Singapore, Malaysia and Thailand; Malaysia, one of the BIMP-EAGA countries examined in this research, is

attractive due to its “mature infrastructure, low risk environment and ease of doing business” (p. 477). The Philippines, Brunei and Indonesia fell within the middle of the ranking; notably the largest weakness among these countries was infrastructure, followed by economic, business and financial factors.

Ultimately, the link Junlakarn and Wangiraniran seek to make is that growth in the sub-regional power sector is dependent on infrastructure investment, which is limited by weaknesses in individual economies. These weaknesses can be easily improved with ASEAN cooperation, addressing business and legal concerns for investors, increasing individual market strength through transmission systems like the APG, and developing common regulatory guidelines (p. 478). Each of these issues is, ultimately, an individual market issue and requires reform of current systems and processes at the national and sub-regional level across ASEAN.

The hybrid and common market structures currently in place among ASEAN member economies are, based on a review of the literature, not entirely conducive to the increased integration of renewable energy and growth in cross-border electricity trade as a response to common global energy challenges. The introduction of clean energy technologies for electricity production creates grid and market concerns, including physical pressures, flexibility concerns, and power quality (Zhang et al. 2008; Wu et al. 2012; Oseni & Pollitt 2014; Chang & Li 2015; Huang et al. 2019). Huang, et al (2019) found in their multi-country study of grid flexibility that while flexibility varies across the sub-region and the technical opportunity exists, as a whole ASEAN nations are not currently in a favourable position for increased renewable energy integration without sub-regional cooperation and multi-country engagement (p. 719).

This does not mean, however, that market structures need to be completely revamped. Countries that are better prepared cluster together, as do countries that are least prepared and moderately prepared (Huang et al., p. 719). In the case of these clusters predominantly similar adjustments are required—improved infrastructure among least prepared economies (Cambodia, Myanmar, Vietnam) and improved transmission access to neighbouring electricity markets among moderately prepared economies (Indonesia and Malaysia). Among the better prepared nations needs cluster primarily in pairs—increasing interconnection capacity (Singapore and Thailand), improve forecasting practices (Brunei and Singapore), and increased interconnections among the one outlier (Philippines, also the most flexible economy according to the research). Ultimately Huang et al. find that grid flexibility increases with increased market

integration, creating an environment where the problems and solutions are intertwined in the progress of EMI.

Here an argument can be made for sub-regional interaction and cooperation—in effect, APG efforts will likely address many of the market concerns found within ASEAN electricity markets. Chang and Li (2015) argue that increased EMI can improve existing grid and market limitations, including the mobilisation of stranded renewable resources, coordination of policies and standards, and even mechanisms for trade (p. 39). In addition, knowledge transfer, the sub-regional promotion of renewable energy use vis-à-vis coordinated EMI efforts, and finance and investment region-wide, enabling poorer countries to take part in the necessary physical development.

2.3.b Governance of Cross-Border Electricity Trade

There is overwhelming consensus that institutional oversight is a requirement for significant increases in the practice of cross border electricity trade (Antweiller et al., 2001; Pritchard, 2003; Oseni & Pollitt, 2014; IEA, 2015; Andrews-Speed, 2016; Li & Kimura, 2016; Polit, Yang & Chen, 2017; Grossi et al., 2018; among many others). What does effective and active oversight and management of cross-border electricity trade look like? First, we must consider the issue of governance—the management and guidance of processes to address societal issues and transitions towards collective responses to global problems (Evans, 2012). Governance is the process of decision making undertaken by socio-political groups, states, and even institutions, as a means of addressing problems on a local, national or global scale.

Governance specific to cross-border electricity trade and regional energy market integration is a complex issue when juxtaposed with global climate initiatives and trade regulations. Many of the necessary monitoring and implementation of EMI projects must first occur at the national and subnational level (Li and Chang, 2014); however, global climate and trade regulation is largely overseen by two dominant global bodies, the UN Framework Convention on Climate Change (UNFCCC) and the World Trade Organisation (WTO).

When it comes to climate change governance the prime actor is the UNFCCC. The UNFCCC oversees global environmental and climate change governance through the coordination of state-level action in the form of treaties (UNFCCC, 2020). The UNFCCC, which was adopted in 1992, has been largely ineffective in past endeavours (See: Kyoto Protocol). Under the UNFCCC, the recent COP 21 Paris Agreement is the largest global initiative to address changes to the earth's

climate (Bultheel, et al., 2016), but accomplishment of signatory targets has been mixed. UNFCCC governance has fallen short in providing a single, universal treaty or comprehensive climate institution that incorporates a series of institutions and regimes with multiple policy elements and multiple actors that spans the globe and successfully incorporates regional and national climate considerations (Keohane & Victor, 2011). Keohane and Victor (2011) argue that, given the 40+ years spent trying to address climate challenges with no single regulatory body to speak of, a regime complex remains a more flexible and adaptable choice; they even go as far to suggest increased focus on a climate regime that includes regional trading systems, WTO incorporation, and the strengthening of the UNFCCC to act as a convenor and negotiating forum. ASEAN, in practice, meets many of these requirements, operating as a sub-regional regime, utilising WTO rules, and adopting global climate goals and initiatives. Based on this, as well as other criticisms[17] of the scope of the UNFCCC to govern the intersection of global climate and trade governance, the UNFCCC does not meet the institutional requirements needed to foster increased cross-border electricity trade and power sector responses to climate change.

While the WTO has been largely successful in reducing tariff barriers to trade and increasing transparency it has played little role in global energy markets and impacting climate change responses involving higher shares of VREs. Today the WTO does not have any energy-specific trade measures,[18] and it only address clean energy technologies through general rules, which largely target industrial policies that encourage unfair trade competition. Electricity plays no significant role in WTO rules as a result of the fact that it is both a good and a service; production and transmission of energy requires technology, which falls under the purview of intellectual property rights (WTO, 2009). In addition, "the [energy] sector shows a high level of governmental involvement which calls for

[17] Notably, for example, the COP21 Paris Agreement does not mention trade at all, even though trade and economic development are a major catalyst for the changing global climate (Dent & Richardson-Barlow, 2016). In addition to Keohane & Victor (2011) see also: Epps & Green (2010); Whally (2011).

[18] The Environmental Goods and Services (EGS) liberalisation trade negotiations were initiated under the Doha Development Round in 2001. The EGS will, it is hoped, clarify boundaries of environmental and clean energy trade and help further progress in environmental protection among trading partners. However, the progress of the negotiations has been held up over disputes about product classification and the delayed progress of Doha. A number of Asia-Pacific regional trade agreements have attempted to further clarify EGS trade, but progress is slow and will still not result in WTO clean energy specific rules (Dent & Richardson-Barlow, 2016; WTO, 2016a).

coherent rules on competition and government procurement" (WTO, 2009, no pagination). At the time of this writing the WTO has failed to adequately provide a platform for governance of cross-border electricity trade in-line with the specificity and cohesion of other WTO trade governance initiatives.

Therefore, given the paucity of impact the UNFCCC and WTO have, to date, had in EMI and cross-border electricity trade, respectively, the issues of governance moves beyond the two dominant global governance bodies in trade and climate change. Here, the author believes, ASEAN governance has a role to play; this assertion is supported by expert interviews (*Former Government—Informant 1, Multilateral Organisation—Informant 2, Multilateral Organisation 4, Think Tank 5, Academic 10, Academic 21, Business Leader 22, Academic 26, Former Government 27, Former Government 28*), a thorough review of the literature, and analysis of cross-border electricity trade progress (Chapter 4, *Sub-Regional Market Factors)*. The multiple dynamics at play in ASEAN EMI (global, regional, sub-regional and national) also suggests that a regional or sub-regional organisation may be better equipped to accompany regional or sub-regional goals.

Governance considerations relevant to cross-border electricity trade and EMI have been identified by Oseni and Pollitt (2014) as necessary in order for market integration to take place. These criteria include national commitments to free trade; efficient market design; governance support; jurisdictional considerations & management; transmission capacity; operational national electricity transmission systems; and management of distributional effects. Deeper analysis of this criteria will take place in Chapter 5, aiding the answering of the three primary research questions:

1. How do governments understand the IPE of cross-border interconnections in Southeast Asia?
2. How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?
3. What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?

Where this subsection has introduced the governance of cross-border electricity trade, making the case for the role of ASEAN over other governance institutions adjacent to this research space, the following subsection will discuss ASEAN governance of cross-border electricity trade as it relates to the sub-regional focus of this East Asian oriented research. The following subsection will introduce the organisation of ASEAN, examine relevant institutional limitations,

and introduce its EMI initiatives and power sector connectivity goals in the context of cross-border electricity trade expansion and sub-regional climate and economic goals.

2.3.c ASEAN Governance

Among the many regional governance organisations in East Asia, ASEAN remains the "primary shaping mechanism in these bodies" (Foot, 2011, p. 1).[19] As a result, the majority of regional institutions in the broader East Asian region (the ASEAN Regional Forum, aspects of the Asia Pacific Economic Cooperation (APEC) Forum, the ASEAN Plus Three, or APT, and other ASEAN member organisation such as ASEAN Plus Five and ASEAN Plus Eight, as well as the East Asian Summit, EAS) are modelled after the original formation of ASEAN (Foot, 2011). In addition, many of ASEAN's regulatory norms are highly reflective in subsequent organisations—non-interference, respect and acknowledgment of the importance of territorial boundaries, and the supremacy of sovereignty (Foot, 2011). Many of the alternative regional and sub-regional organisations also follow in the footsteps of ASEAN's own focus on equality among members, mutual prosperity, and growth of a regional community, setting the stage for recognition of the importance multilateralisation plays in driving both positive international relations and the agenda of many regional initiatives (Sudo, 2003; Acharya, 2009; Foot, 2011).

Additional aspects of ASEAN's organisational structure have carried over into other regional and sub-regional groupings. This includes an institutional focus on cooperative efforts, transmission of ideas, and the use of social and institutional pressures as opposed to binding legal constraints (Foot, 2011). A number of the institutional practices within ASEAN, including a preponderance of meetings, internal membership groupings, issue focused initiatives, and a rotating leadership or "hosting" duties, have also carried over from ASEAN into other regional and sub-regional organisations. As a result of ASEAN's primacy in the creation and operation of many sub-regional groupings (Acharya, 2018), ASEAN is a natural multilateral governance institution to explore when it comes to questions of sub-regional or regional initiatives and responses to shared challenges.

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[19] In this research the author refers to ASEAN when referencing the organisational structure. When discussing individual ASEAN economies the author references 'ASEAN member states/economies' or references individual states, groupings of states, or subsystems by name.

In the case of cross-border electricity trade and EMI in Southeast Asia, ASEAN is the most active governance structure. However, there are governance limitations that ASEAN has experienced consistently since its inception. Many of the positive commonalities of ASEAN's governance structure are not the only aspects to carry over into other regional governance institutions—the shortcomings are as well. Supremacy of state sovereignty has resulted in a region-wide focus on non-intervention and its subsequent normalisation (Foot, 2011). As a result, non-binding resolutions and lack of legality are a norm in East Asian regional institutions, and often associated by critics with slowly progressing initiatives, frequently moving deadlines, and a tendency towards bilateral not multilateral cooperation (ADB, 2008a; United Nations Conference on Trade & Development [UNCTAD], 2017). These limitations are a common theme in ASEAN relations and are reflected in initiatives across a wide span of issue areas.

One of ASEAN's greatest strength—its diversity—is also its greatest weakness. While ASEAN member states share some commonalities previously referenced, such as culture, history, and language, within each overarching similarity there are many differences (Albert, 2017), in some cases hundreds. For example, ASEAN member states have shared colonial histories. However, few of them share a similar controlling colonial power. Where culture within ASEAN is similar in that it is East Asian, within ASEAN member states there are hundreds of cultures and languages represented. The presence of different religions (Islam in Brunei and Indonesia, for example), different government systems (a sultanate in Brunei versus a parliamentary representative system in Singapore), and different levels of democracy (Myanmar and Cambodia versus Singapore) all complicate national priorities when juxtaposed with regional, ASEAN goals. Conflicting national concerns cause a lack of movement on some issues within ASEAN, and electricity trade and energy policy are no strangers to this stagnation.

Further arguments against ASEAN's effectiveness include a lack of sub-regional identity and limited unifying message (Hutt, 2017). When ASEAN was first formed more than 50 years ago the member economies were unified around a message of anti-communism amid the cold war (Beeson, 2009). Today that message no longer exists, and instead the organisation is arranged around a variety of issues and challenges, for which each member economy has its own problem, perception, and goal—not the least of which is energy security.

As with many analyses of ASEAN projects, a major limitation to progress in ASEAN initiatives is the bureaucracy of the organisation itself. Intersecting committees, overlapping organisational groupings, and a plethora of sub-initiatives litter the progress of institutional development. Multiple feasibility studies with different outcomes, long wait times on program progress assessments, and competing interests within ASEAN sponsored institutions have resulted in difficulty assessing the long-term feasibility of the APG and other EMI efforts. Interview subjects from within relevant government organisations are positive, but very vague as to the eventual completion or adjustments to, the APG. Just as there is ambiguity within ASEAN's overarching goals (the ASEAN Economic Community and sub-regional interconnection and integration), there is also ambiguity within the APG and ASEAN EMI (Leu, 2011). Indeed, ASEAN itself has ambiguous organisational governance mechanisms, as the operation of the organisation relies on a practice of non-interference, fraught mutual trust, and non-binding resolutions.

In addition, within ASEAN an aversion to legalisation has resulted in "…voluntary compliance and polite non-interference with each other's actions even in the face of violations of commitments…" (Habito et al., 2004). As it currently stands, the ASEAN legalisation processes falls into the category of "soft legalisation", identified by Abbott et al. (2000, p. 404) to primarily include non-legal norms, as opposed to binding rules; vague principles, as opposed to precise, highly elaborate rules; and diplomacy, as opposed to international courts and domestic legal application.[20] To address this shortcoming, both in ASEAN and in other regional institutions, policy recommendations often include strengthening peer pressure processes and improving (or developing) legal ramifications.

Additional ASEAN limits coincide with global movements towards more highly integrated, neoliberal market economies. While community building has been a staple of ASEAN policy for 20 plus years it has been met with opposition from national level actors for just as long. According to Chandra (2016) "The rise of protectionism, as an expression of economic nationalism, in particular, has been seen by many experts and practitioners alike as a key hindrance to ASEAN's effort to deepen its economic integration project" (p. 1). Chandra goes further to point out that protectionism and economic nationalism within ASEAN are rooted

[20] Kahler (2000) takes this delineation one step further, articulating that while ASEAN does lean more towards soft legalisation than hard, there are exceptions to every rule; however, to date, few examples of legalisation processes and enforcement in ASEAN exist.

in the national economic policies of member economies and perceptions of free trade and liberalisation. For example, while ASEAN pledges sub-regional reductions in non-tariff barriers to trade, developing and emerging economies within ASEAN have historically expressed their scepticism that increased competition would benefit their national economies at this stage in their development (p. 2). This scepticism has carried over into other economic issues, giving rise to economic nationalism throughout the sub-region (Jones, 2016).

Clearly, these shortcomings have the potential to be augmented by other international, multilateral institutions. In fact, the role of the WTO may become increasingly important as cross-border electricity trade grows and dispute settlements become relevant.[21] Given the difficulty in ceding to international, multilateral organisation and the value-set of ASEAN (Kahler, 2010) when it comes to sub-regional growth in EMI and cross-border electricity trade, ASEAN is currently the supreme sub-regional governance actor. Development of EMI will no doubt precipitate the need for inclusion of rules and regulations specific to cross-border electricity trade; however, likely not until disputes arise and/or:

> *require settlement that ASEAN's [practice of] non-interference and social pressures… cannot address (Business 22)*.[22]

These exact issues remain relevant in cross-border electricity trade, EMI, and sub-regional climate responses, and will remain present throughout chapters 4-6 as they are repeatedly raised among expert interviews.

The previous subsections have established a number of issues relevant to this research: the need for cross-border electricity trade, the role of governance, or management, of cross-border electricity trade generally, and the role of ASEAN as the governor of cross-border electricity trade in the East Asian sub-region of Southeast Asia. The following sub-section will introduce ASEAN's cross-border electricity trade solutions in light of shared energy and climate challenges among member states.

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[21] The Asia Pacific Economic Cooperation (APEC), for example, flirted with WTO involvement in dispute settlement practices in the 1990s, although ultimately compliance—not legalisation—was the result (Kahler, 2000).

[22] In the long term a climate regime that incorporates multiple organisations, as laid out earlier in this chapter (the regime complex envisioned by Keohane & Victor, 2011) may be a logical development; however, at this point in time no regime like this exists.

2.3.d Cross-border Electricity Trade Solutions in ASEAN

ASEAN began including energy within its sub-regional integration efforts early on in the global fight against climate change, first committing to the Agreement on ASEAN Energy Cooperation in 1987, where ASEAN member states agreed to cooperate on shared energy and environmental challenges. This was followed by the establishment of the ASEAN Centre for Energy (ACE) in 1999 (ACE, 2019). ACE acts as an intergovernmental organisation underneath the umbrella of ASEAN, meant to represent the interests of the 10 member states in energy and related sectors; today this includes sustainable development, sub-regional environmental stability, and climate change responses, as well as coordination of energy policy strategy within the region (ACE, 2019). Working with the relevant energy ministries, ASEAN related networks (ex: sub-sector networks within ASEAN, Specialised Energy Bodies, etc.) and the ASEAN secretariat, ACE facilitates the implementation of the ASEAN Plan of Action for Energy Cooperation (APAEC) within the wider ASEAN community and integration goals (ACE, 2019).

Outlined in APAEC 2016-2020, ASEAN set an aspirational 23% renewables target that followed on ASEAN's previous renewable integration targets and includes an additional goal to achieve a 20% reduction in energy intensity by 2020 and 30% by 2025 (ACE, 2015). Increased EMI and sub-regional electricity interconnection are at the centre of these ASEAN energy goals, reflected in a variety of programmes, projects, and ministerial meetings, as well as a key goal of the APAEC since its inception in 1998 (Andrews-Speed, 2016). ASEAN has committed to deeper renewable integration on paper, but there is some scepticism about the viability of such targets given a regional and sub-regional reliance on coal and the dominance of hydrocarbon-oriented companies in the regional political economy. This clash of interests—ASEAN goals versus national reliance on hydrocarbons—remains a theme that is present throughout this research (and is reflected in IPE analysis at a later point, in chapters 4-6).

ASEAN energy and electricity access related projects run the gambit of broad, cooperative programs and commitments that span a variety of energy resources and environmental concerns (Andrews-Speed & Hezri, 2013). The ASEAN Power Grid Project (APG)[23] was announced in 1997 based on recognition that

[23] The APG technically falls under the management of the Heads of ASEAN Power Utilities/Authorities (HAPUA), tasked with promoting energy security and energy cooperation across the region (ASEAN, 2013) in tandem with regional energy goals and additional

integrating electricity systems across the region would benefit ASEAN Vision 2020 goals, including greater energy access, reduced energy poverty, and increased sub-regional connectivity (ASEAN, 1997). The Greater Mekong Sub-region (GMSR) and the BIMP-EAGA are included in current power grid expansion proposals utilising ASEAN member states in the APG, and the Australian-Asian [Power] Grid (AAG) proposal also incorporates the ASEAN governance structure in the implementation of deeper power systems integration.[24]

Via the APG ASEAN member economies primarily trade electricity between transmission system operators (TSO). At this point in time an ASEAN merchant model is extremely unlikely, however, each case within the sub-region is different, as is each proposed interconnector (IEA, 2015). While cross-border interconnectors are desired, the performative nature of neo-developmental statism means the region isn't there yet, and interconnections have been implemented primarily on a bilateral basis (ACE, 2018b); ASEAN as a whole is nowhere near internal market coordination or a uniform standard that everyone works to, so a piecemeal approach has been taken across the sub-region (see also the subsystem approach illustrated in Figure 2.1). The current approach includes TSO-TSO interconnections, as well as "joint venture agreements between state-owned companies", where differing national regulations and lack of uniformity creates delays and complications (IEA, 2015, p. 15). The establishment of "an APG transmission system operators' institution and an APG generation and transmission system planning institution" would solve some of the harmonisation and standardisation issues (IEA, 2015, p. 16), but the development of these institutions is still underway within ASEAN (ACE, 2018b).

Today the APG complements ASEAN's Paris Agreement commitments, and ASEAN targets and the APG are further justified via the potential for carbon emissions reductions via the decoupling of economic growth and energy

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coordination among ASEAN members and the relevant energy ministries and national level government bodies. HAPUA has no APG enforcement capabilities. HAPUA was established in 1967 with the aim of increasing electricity interconnection and collaboration, however, it remained relatively dormant until the 1997 announcement of the APG and its sister project, the Trans ASEAN Gas Pipeline (TAGP), as part of the ASEAN Vision 2020; an MOU for the APG was signed by ASEAN member states in 2007 (ASEAN, 2007).

[24] The AAPG will not be focused on due to the large scope of the project, limitations in project development, and interview insight into the lagging nature of such a large, multilateral project within the scope of governance, societal and cultural pressures. Further insight into the AAPG can be found in Halawa et al. (2018) or Gulagi et al. (2017).

demand. The 10 ASEAN member states were among the early signatories of the Paris Climate Accord, signing the agreement in April 2016 (EU, 2017). ASEAN member states have also agreed to a sub-regional goal, increasing renewable energy up to 23 percent of the region's primary energy mix by 2025 (ACE, 2017). The ASEAN Energy Outlook (AEO) 2015-2040 provides three policy scenarios, similar to those used by the IEA in their own global outlook, providing policy and structural recommendations for decreasing energy intensity, increasing the share of renewables, and addressing energy and electricity concerns. ASEAN believes all three scenarios complement the Paris Climate Accord and has incorporated recognition of man-made climate change into the majority of its energy and environment policy documents (ACE, 2017).

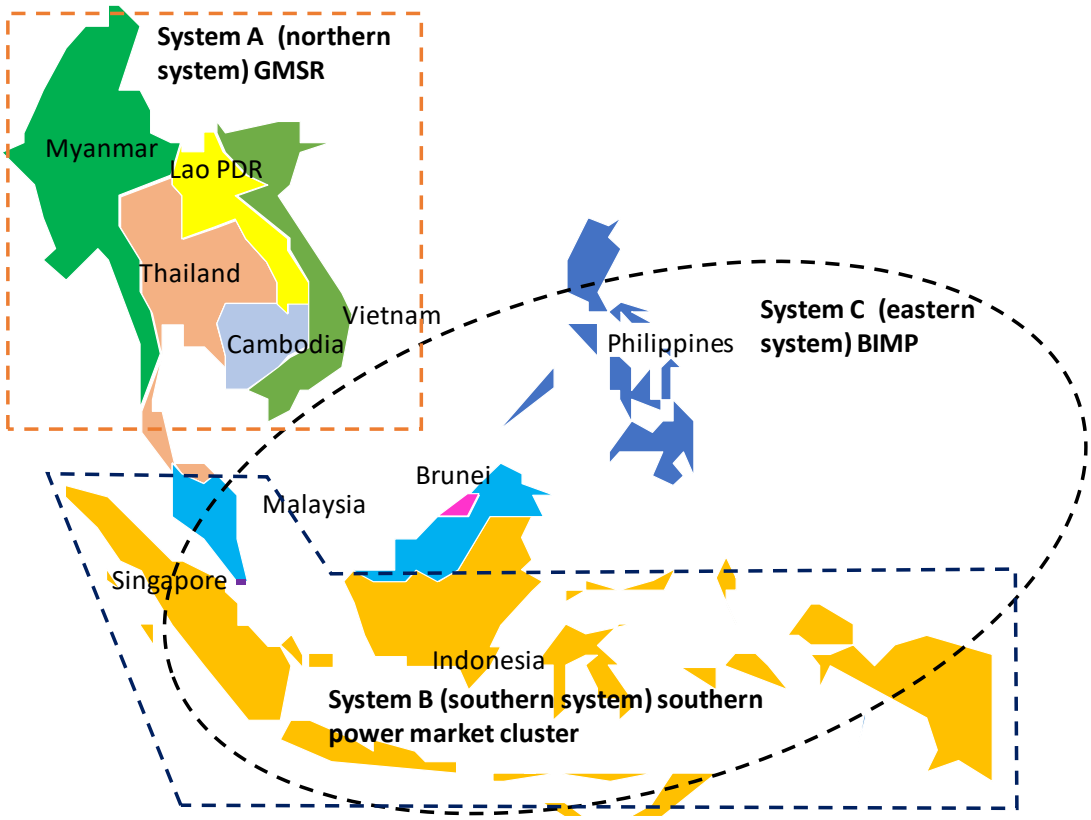
Analysis of the motives behind these targets and commitments, and how they are reflected in the IPE of current and projected cross-border interconnections as well as sub-regional power sectors emerges in chapters 4-6, reflected in both the market factors, reform needs, and governance challenges outlined in these later data chapters.

In 1997 ASEAN member economies prioritised energy security and access by establishing the APG blueprint (ASEAN, 2016). The APG Blueprint seeks to respond to energy security concerns by increasing connectivity and developing interconnections among member economies all while balancing concerns related to energy poverty, variability, service access, and infrastructure restrictions (ASEAN, 2016). This blueprint also follows the common ASEAN model of facilitating knowledge exchange and increasing economic and social connectivity in line with the wider AEC goals. A further vision for the APG and ASEAN connectivity is addressed in the Master Plan on ASEAN Connectivity (MPAC) 2025, overseen by the Heads of ASEAN Power Utilities Authority (HAPUA) (ASEAN, 2017a). This specific policy focus within ASEAN has resulted in pledges for increased integration of renewables, diversification of the sub-region's energy mix, increased connectivity between members, national and sub-regional electricity market expansion, and financial pledges at the national and sub-regional level. This includes incorporation of the energy goals within the ASEAN Vision 2020, an agreed upon vision of ASEAN as a "concert of nations" committed to shared prosperity and peaceful resolutions to common problems, including territorial, economic, societal, and environmental (ASEAN, 1997a).

Development of the APG has followed recommendations outlined in the ASEAN Interconnection Master Plan Studies (AIMS), of which three have been completed and updated since 2003 (AIMS 2003, 2010, 2018). Each AIMS is

carried out by regional experts with oversight and management from HAPUA. The first AIMS studies (AIMS I) was published in 2003 and actually found that it was economically prohibitive to construct a sub-regional grid, instead advocating for bilateral connections across the region; specifically, AIMS I proposed eleven interconnections be made by 2019 (not all of these were achieved). AIMS II was published in 2010, following the reorganisation of HAPUA, and found that an ASEAN power grid was, in fact, economically viable but should be approached incrementally, via subsystems and then linkages developed between and among subsystems, eventually forming the wider APG (this approach is discussed in more detail in Chapter 4, *Sub-Regional Market Factors).*

Figure 2.1 ASEAN Interconnection Subsystems



Source: Author's creation from description in Li & Kimura, 2015, p. 42.

Section 2.3 has discussed the cross-border electricity trade imperatives and solutions present in East Asia, including an introduction to: EMI broadly and in Southeast Asia specifically, energy and climate imperatives for increased cross-border electricity trade in Southeast Asia, the governance of cross-border electricity trade generally and in Southeast Asia specifically, and the ASEAN specific EMI projects that are relevant to this research and questions regarding the IPE of cross-border electricity trade in the Southeast Asian sub-region. The

following section, 2.4, will transition to the foundational IPE theories relevant to this research, providing context for later IPE analysis and identifying gaps in the current IPE literature as it can be applied to cross-border electricity trade in Southeast Asia and EMI initiatives among ASEAN members.

2.4 International Political Economy & Foundations of Trade

One of three bodies of literature relevant to this research falls into the broad category of IPE. The literature covered in this section, coupled with Section 2.5, will provide context to understanding the IPE of cross-border electricity trade and answering RQ3, *what can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian Development?*

IPE is a common theme in many forms of economic analysis, often referred to as the study of production, distribution and consumption of resources and the government institutions that interact with these forms of economic activity (Krugman & Obstfeld, 2009). It is a main tenet of IPE "that individual and sectional interests not only do compete for the possession of resources but that this competition is healthy and should be encouraged" (Atkinson, 1991, p. 3). The OECD defines political economy analysis as being:

> Concerned with the interaction of political and economic processes in a society; including the distribution of power and wealth between groups and individuals, and the processes that create, sustain and transform these relationships over time (OECD, 2010, pp.2).

IPE is, broadly, the combination of political science, international relations and economics to explain global events and economic interactions, often among nation states and relating to the management of political and economic affairs (Strange, 1988, p. 8). As IPE is a large, multidisciplinary field of study with a vast array of literature across disciplines, this research will focus on a narrow selection of literature chosen for its direct relevance to EMI and role in answering the previously posed research questions. Initial reviews of IPE literature included an examination of trade policy broadly, seeking to identify the specific role of trade within cross-border electricity trading. This included exploration of trade policy limitations, the history of trade policy development sub-regionally, regionally and globally, modern trade governance via the WTO, and even trade policy linkages within climate governance structures and global energy transitions. However, as the research expanded and cross-border electricity trade was conceptualised within East Asia and eventually Southeast

Asia, this literature became less relevant.[25] Instead, market structures emerged as the necessary focus for creating an environment conducive to increased cross-border electricity trade and integrated electricity systems in national markets and the creation of a fully integrated sub-regional electricity market.

Here the IPE of cross-border electricity trade emerged more clearly in the literature—examination of regional and international market structures revealed the dominant role of neoliberalism globally and, ultimately, the basis for much of the world's economic systems of exchange. Neoliberalism emerged as one of the areas within IPE literature most relevant to improving EMI and cross-border electricity trade within national, regional and global markets. In addition, in an effort to identify how governments understand the IPE of cross-border interconnections in East Asia (RQ1) and how the IPE of cross-border electricity trade affects opportunities for renewable energy to participate in national markets (RQ2), political and economic structures emerged as central to progress from an IPE perspective. The following subsection will introduce neoliberalism as a foundation of IPE analysis. This examination will provide context to the spread of neoliberal economic policies in a region and sub-region historically dominated by state-led economic policy making.

2.4.a IPE Foundations: Neoliberalism & the World Economic Order

Neoliberalism, referred to in this research in relation to the existing, dominant global economic ideology, is the first step to understanding current international trade and global economics. Neoliberal ideology is rooted in classical liberalism but has evolved past a primary focus on markets and the free exchange of goods and services to now include political and social factors of the global system as well as power[26] dynamics across actors (Hill, 2007; Strange, 1998). The global

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[25] See for example: Aaron (2011) for work on renewable energy subsidies in the WTO; Antweiler et al. (2001) on free trade and the environment; Araya (2016) on the environmental goods agreement and sustainable development goals; Bhagwati (1995) and Panezi (2016) on the global proliferation of FTAs; Epps and Green (2010) on the WTO and climate change; Mundaca and Richter (2015) on economic policies targeting renewables; Urpelainen (2013) on trade and international environmental cooperation; and the International Centre for Trade and Sustainable Development (ICTSD) for a wide variety of research on the intersection of trade and climate change, among many other resources.

[26] Power comes into play repeatedly throughout this research via the challenges of working with actors across global, regional, sub-regional and national markets and the incentives behind actor actions. The author has explored various definitions of power that could be utilised in understanding power dynamics in energy markets, including: political science-based methods of power via Foucault's (1991) notion of knowledge and discipline; international relations-based theories of power via Luke's (2005) three faces of power—decision making, non-decision

spread of neoliberalism is largely a result of western adoption, beginning with the United States and United Kingdom and spreading from there (Hill, 2007, p. 1); as such much of neoliberal thought is conceptualised differently from place to place but does, ultimately, include the "commodification of resources" (Radice, 2008, p. 1155). Like liberalism before it, neoliberalism is able to flexibly meet the needs of those using it; similar to many political ideologies, neoliberalism is flexible and is a conceptual redefining of the root concepts of liberalism based on the needs and changes of the global economic system (Radice, 2008).

Today neoliberal economic thought is centred on "free markets in land, labor and money; models the state on the enterprise, the citizen on the consumer, and governance on business management" (Radice, 2008, p. 1). While Neoliberalism may vary in its implementation from economy to economy or state to state, there are a few root neoliberal beliefs that can be found across different economies. These include "a belief in the self-regulating capacity of the market" (Radice, 2008, p. 1155), commitment to free trade, deregulation of financial markets and "privatisation of state enterprises" (Hill, 2007, p. 2) and instructions to leave the market alone (Weiss, 2012). In their analysis of neoliberal climate policy MacNeil and Paterson (2012) argue for a nuanced conceptualisation of neoliberalism whereby neoliberalism is understood to be made up of various parts depending on where it is utilised:

> All neoliberalisms are distinct; all neoliberalisms have competing logics and interests that fight for expression in the policy process; and all neoliberalisms exist within path-dependent institutional contexts that inform policy responses and the specific forms they take (p. 231).

Neoliberalism has experienced setbacks in relation to the ideology in theory versus in practice. Electricity market stakeholders, including those on the consumer and supply side, have made a concerted effort to deregulate—or restructure—global electricity markets in favour of more competition (Anderson, 2009, p. 70). This has been justified in an effort to reduce prices and encourage investment and innovation based on assumptions about consumer

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making, and ideological; and IPE notions of power via Strange's (1988) characterization of structural and relational power. All of these definitions play a role in the author's understanding of power, given the critical realism epistemological approach the author has chosen to take (see Chapter 3, Research Design & Plan of Enquiry for more on epistemology). However, this author is particular to Strange's characterisation of power given the structural and relational challenges the author has identified in Southeast Asian EMI. However, focus is not given to power in this research as its relevance emerged in the data analysis process. Future research could focus more specifically on power, a choice that is discussed further in Chapter 7, Section 7.5.

choices and market forces resulting in "efficient supply and demand" (Hall & Nguyen, 2017, p. 100). As a result global institutions and leaders have collectively attempted to unbundle markets for the sake of prices, recommendations that have been repeated at various levels of governance and research (see, for example: World Bank, 2008; IEA, 2014, 2015; IRENA, 2018a). Unfortunately, efforts at deregulation and restructuring have not collectively fostered more efficient markets or price decreases as a result of consumer choices (Anderson, 2009, p. 71). Instead, prices have increased as many markets have become more inefficient, reflecting generator and supplier ignorance of consumer concerns, power prevalence in market structure (whereby stronger powers influence structure regardless of price or efficiency goals), lack of technological innovation, difficulty in contract negotiating, resource inadequacy, lack of consumer protection, and inadequate transparency and policing (p. 83). In short, international experiences across Europe, the Americas and Asia shows that unbundling and deregulation has proven different in practice than in theory (Anderson, 2009; Hall & Nguyen, 2017; Aris et al., 2020).

Regardless of failures in implementation of neoliberalism in practice versus theory, some level of competition and restructuring is still recommended across the literature; however, the level at which this takes place will vary across markets (Aris et al., 2020), as seen in Southeast Asia's restructured markets. Chapter 5 discussed how the Philippines' markets liberalisation, while more than its BIMP-EAGA neighbours, is still limited in implementation though it is the farthest along in the subsystem, followed by Indonesia and Malaysia, where state owned companies still dominate the sector. Hall & Nguyen found in their 2017 study that reform and liberalisation efforts across 20 developing countries over a 20 year period did not, in fact, create new markets, restructure markets entirely, or even increase competition across the majority of countries (Hall & Nguyen, 2017, p. 112). Instead, many developing markets have frozen or reversed their liberalisation efforts and in the process are increasing state involvement in the power sector in order to continue driving state investment and also state support of private investors (p. 113). Tensions between neoliberal market ideology and practical implementation in developing—and developed—economies continue across power sectors and integrated markets (p. 114).

The adaptive ability of neoliberal economic policy to be conceptualised in different ways from country to country is similar to other political and economic ideologies that may differ slightly from case to case. Here neoliberalism intersects with the concept of globalisation, whereby economic, political and

social processes "transcend national borders" and connect the world in increasingly complex ways (Beeson, 2014, p. 20). A large part of this interconnection is economic in nature, via trade relationships, global value chains, and international production networks (Radice, 2008; Beeson, 2014; Kimura, 2015; Taguchi & Murofushi, 2014). The process of globalisation has spread neoliberal economic policies, creating a standard global expectation about liberalisation, free trade, and open markets (Wong, 2004).

Notably, in this context globalisation and neoliberalism also intersect with ASEAN and the global challenge of climate change. The continued success of the current, interconnected global system is dependent, in many cases, on finding solutions to transnational issues; many of these global solutions require monitoring and enforcement through a system of governance. The interconnectedness of ASEAN member economies via trade and economic cooperation, and the building of a sub-regional economic community centred around shared goals and values, is one of many global examples where the theory of interdependence (and predecessor of globalisation) established by Keohane and Nye in 1970 is alive and well. Also related to this research, globalisation and neoliberalism have both exposed power imbalances between national and subnational governments and governance.[27]

The elaboration of neo-developmental statism is one way of furthering this analysis and can be applied in a variety of East Asian economic systems where energy and environmental concerns lead economic development challenges while simultaneously creating opportunities. In the next subsection, focus will be given to IPE in East Asia and the common economic practices employed in these centrally planned economies. This information sets the scene for the examination of the common economic practice of DS, explaining how this government directed policy making is realised in the context of EMI and cross-border electricity trade in Southeast Asia.

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[27] Chapter 6, Governance Challenges, includes an examination of the issue of trust, one of the governance challenges identified across elite interviews and documentary research. This analysis includes an examination of regional versus national policy considerations and perceptions, which are linked to similarities described here regarding neoliberalism at the global, regional, national, and sub-national level and the power dynamics that emerge.

2.5 International Political Economy in East Asia

Whereas the previous section examined IPE theory and the theoretical foundation of the global, market economic system, the following section will specifically examine IPE measures as they are applied, adapted and utilised in East Asia via developmental statism. This section will situate the economic development of East Asia and regional growth in energy and environmental concerns within the framework of IPE and neoliberalism. The literature presented in Section 2.4 and this section, 2.5, will aid in answering RQ3, *what can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?* While all the research questions will be answered later in chapters 4-6, the basics of the IPE theory that will assist in this later analysis will be explored here.

Just as there are common arguments in support of cross-border interconnection (discussed in Section 2.3, including efficiency and welfare gains, diversification of supply, sustainability and energy goals, among others), there are also a number of common explanations for limited progress in the development of cross-border interconnections globally and approaches to understanding these limits. These include: business arguments that take into account both economic and business model approaches to designing efficient market environments (Poudineh & Rubino, 2016; Hall & Roelich, 2016); neo-realist approaches to state sovereignty, which can cross-over with nationalism and challenges of trust among cross-border trade partners (Andrews-Speed & Len, 2013); neoliberal arguments related to liberalisation and market reform, closely linked with the 'standard model'[28] of electricity reform (Sen, 2014); political approaches related to governance and policy limitations (Puka & Szulecki, 2014); disparities in government ideology and leadership capacity (Erdogdu, 2014); and even the 'dual market model of dual firms'[29] (Victor & Heller, 2007), a transitionary phase found somewhere between pre-reform and the standard model of reform.

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[28] The standard model of electricity market reform includes liberalisation, increased competition, corporatisation, divesture or privatisation of competitive sectors, and unbundling of markets (Sen, 2008, p. 1). The standard model is, in fact, in line with many of the recommendations reflected among interview subjects in this research. This model is also reflected across a variety of popular studies and has previously been recommended across global markets (Gratwick & Eberhard, 2008).

[29] The 'dual market model of dual' firms was coined by Victor & Heller (2007) and encompasses the process whereby a firm is able to simultaneously (1) utilise resources via political connections and (2) avoid the pressure of taking on uneconomic projects via government

While the author could have used any of these approaches, individually, to analyse cross-border electricity trade among ASEAN member states, the choice to focus on developmental statism and the elaboration of neo-developmental statism reflects a merging of all these issues. The neo-developmental statism lens allows an inclusion of economic, political and governance explanations under the same umbrella—and in a geographical area where developmental statism has historically been applied and recognised. The research findings spread across chapters 4-6 highlight many of these issues, including national incentives and nationalist arguments against power sector cooperation, regional governance challenges associated with ASEAN's capacity as an institution with no legally binding power and where issues of trust persist, limits to market structure and national governance capacity, and a propensity among ASEAN member states to make performative agreements but act in their own national interest. The prior application of developmental statism (the predecessor to neo-developmental statism) in Southeast Asia also makes the use of neo-developmental statism a natural choice for the author in this context. [30]In addition, the contradiction between neoliberalism and legacy elements of developmental statism make the use of neo-developmental statism an interesting application in electricity market reform, where the standard reform model relies heavily on liberalisation.

It should be noted that upon further inspection in the sub-region (as discussed in chapters 4-6), competing factions within individual states also contribute to the existence of and arguments for neo-developmental statism. For example, in Indonesia and Brunei there is the existing energy regime, which includes international policy makers and ministers at the head of national departments. In addition, there are also local departments that actually run the system—the local ministries and their staff, for example—and they don't necessarily want to change, so policy moves slowly or in contradictory manners. Thus, the prevalence of national policies that don't reflect larger sub-regional targets.

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pressure—all while operating in a market that is both neither entirely liberal or entirely state protected and driven. This model is described as a transitionary phase by critics (Bartle, 2007; Hope, 2008).

[30] The author does not presume that application of neo-developmental statism elsewhere in the world, including Africa and South America (where vestiges of developmental statism have been adopted both unsuccessfully and successfully), would offer similar useful methods for analysis of power sector reform and cross-border electricity trade. Prior research on developmental statism by Singh & Ovadia (2018) offers some insight into application of developmental statism elsewhere in the world. However, further examination of this area would benefit expansion of neo-developmental statism, power sector reform, and the political economy of cross-border electricity trade.

Here, the performative nature of liberalism in ASEAN is uniting and agreeing before coming up against entrenched interests at the state level. The tension identified in interviews and data analysis lies here, in-between the different interests; there is no single, planned rationale for how to approach cross-border electricity trade, EMI, or even climate targets. Instead, there are competing notions with seemingly no resolution, and this tension can best be described as neo-developmental statism.

As a result of the conflict between neoliberalism and developmental statism within ASEAN member economies, the author has chosen to examine the tenets of neoliberalism and developmental statism in this chapter, drilling down into the two foundational theories behind neo-developmental statism in section 2.4 (previous section) and section 2.5, to follow. In the following section the author also explores how neo-developmental statism combines some elements of neoliberal policy with legacy elements of the developmental statism paradigm.

First, an explanation of developmental statism in relation to the development practices of East Asia will be provided, explaining the dominant development paradigm in East Asia; second, a description of the limits to neoliberal economic explanations of East Asian economic development practices, given state-led economic policy, will be presented, making room for the theoretical framework of this research. The completion of this section will lead into a description of how the dominant, neoliberal IPE frameworks can be combined with the East Asian IPE practice of developmental statism to create neo-developmental statism in East Asia. This application fills the gaps left when applying neoliberal economic policy to cross-border electricity trade in DS-dominated East Asian economies. This combined approach will be used as the dominant theoretical conceptualisation applied in this research to describe the IPE processes related to electricity market expansion and cross-border integration in East Asia.

2.5.a IPE Foundations: Developmental Statism

There are a variety of theoretical approaches[31] to understanding state-directed economic development and the various tools advocated by governments and international organisations as a means to achieving economic growth, including

[31] Dent (2014) groups the variety of developmental policies utilised by East Asian states under the title state capacity theory; however, as this is not widely used by other DS theorists these theories will be described individually for the purpose of this research.

targeted industrial policy, mercantilism, and, in the case of East Asia, DS. DS is the paradigm used to explain the political and economic process whereby states:

> Shape, pursue and encourage the achievement of explicit development objectives, whether by establishing and promoting the conditions and directions of economic growth, or by organising it directly, or a varying combination of both (Leftwich, 1995, 401).

In the 1980s Chalmers Johnson first identified Asian developmental states as having a close relationship with the private sector and a heavy hand in setting and reaching economic goals, what he called developmental or plan-rational states (Johnson 1982, 1987, 1999). Johnson also attributed the creation of the industrial policy of the developmental state as a Japanese invention. In practice, developmental states typically encourage the utilisation of strategic policies and developmental partnerships, "encouraging the emergence and growth of private economic institutions" (Leftwich, 1995, p.417) while also allowing government agencies administrative guidance over the economy (Johnson, 1982; Beeson & Pham, 2012) and privileging industrial governance and growth over other processes (Thurbon, 2014, p. VIII). Developmental states are believed to aid the development process by lessening the human cost and decreasing the amount of time economic transitions require, allowing emerging markets the opportunity to quickly catch up with industrialised economies (Leftwich, 1995). In addition, there is often a strong link to targeting specific industries as well as a dominant role for political elites in directing policy priorities where DS is realised (Johnson, 1982; Thurbon, 2014).

When mapping the economic geography of East Asia, the developmental state plays an important role in the history of the region. Few, if any, discussions on political economy in East Asia fail to mention the developmental state paradigm and its role in the economic miracle of Japan (the most common developmental state success story), Malaysia, the Republic of Korea, Taiwan and Thailand.[32] Developmental statists attribute the success of these countries to efficient and flexible policy choices which "relate economic performance to institutional arrangements centred on the state" (Moon & Prasad, 1998, p. 9). As a result, DS theory is focused on the role of the state as a strong unitary actor, and its cooperation with the private sector as a means to "minimize the risk of opportunism" by individual actors (Moon & Prasad, 1998, p. 9). Thurbon (2014)

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[32] See Singh and Ovadia, eds. (2018a) for a thorough summary of developmental state literature; or Gârdu (2015) for an overview of early statist literature in relation to East Asia

further describes DS as an important theoretical, IPE tool used to explain state goals and national interests (p. VI). Chan et al. (1998, p. 2) emphasise this point:

> the main premise of the statist perspective is that, compared to other competing variables, the state offers the greatest explanatory power in accounting for the East Asian experience.

In the case of East Asia, state intervention and market interference have been built into the core of macroeconomic and industrial development practices used across East Asia and Southeast Asia (Johnson, 1982; Chan et al., 1998). The practice of developmental statism that was common to East Asian economies in the 20th centuries includes neomercantilism, strategic trade practices and targeted industrial policy still present today. Among HPAEs (highest performing Asian economies) continued utilisation of targeted industrial policy and strategic industries have transitioned industrial structures towards modern sectors as a means of increasing national welfare (World Bank, 1993).[33] Japan has the longest regional history with state-led growth, but China's renewable energy policy, South Korea's Green Growth Development Plan, and Taiwan, Thailand, Indonesia and Malaysia's industrial development have made use of the policy practice as well (World Bank, 1993).

Following the 2008-2009 Asian financial crisis (AFC), many emerging economies in the region more firmly integrated targeted industrial policy into their state-led macroeconomic development plans as a means to confront the multiple challenges of energy security, climate change, economic growth, and low carbon development (Dent, 2014). Asia's approach to addressing these challenges and further incorporating clean energy sector development into the domestic economic engine has been to create "strategic master plans specifically for renewables," and is a unique feature of Asia's policy strategies (Dent 2014, pp. 68). In the case of East Asia, strategic trade and targeted industrial policies have been used to target a variety of energy industries, including solar panel development in China and Thailand, oil in Indonesia, Nuclear and power sectors in Japan, and others (Dent, 2014).

The key for many of East Asia's developmental states was a combination of state governance and market forces, utilised alongside targeted industrial policy. Indeed, industrial promotion, while commonly unpopular among mainstream,

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[33] Japan is a good example of this: following the economic and security failures of the early 1900s, the Japanese Ministry of Economy, Trade and Industry (METI) took long term economic views in order to coordinate and enact creative industrial policies that targeted areas of future growth, and eventually grew into the standard of the region, state-led industrial growth (Johnson, 1982).

neoliberal economists[34] does expand economic options when coupled with: strong government oversight, adaption to geopolitical changes, incorporated with national competitiveness, and policies that encourage education and advancement (Wade, 1992). This argument supports one of the premises this author's conceptualisation of neo-developmental statism: that an all-of-the-above economic approach (whereby the tools of both neoliberal and state-directed economic policy making are utilised in order to achieve goals) is necessary in order to fully realize the potential of trade as a means to respond to intermittency concerns in regional and international electricity markets due to clean energy expansion in electricity generation.

In East Asia targeted industry policy making is a noted part of economic development via DS. Subsidies for hydrocarbon energy resources are an illustrator of this, and relevant to East Asia and Southeast Asia, where national energy companies continue to receive economic advantages despite conflicting with national and regional climate goals.[35] As with many economic policies, short term benefits need to be balanced with long-term phase outs and alternative options as industries grow. In the power sector, where reliable, affordable energy is a priority for national governments, questions about local content vs foreign content can arise. This challenge arises further in chapters 4-6, when market factors are contrasted with sub-regional interconnection goals, and indeed this emerges as a major part of national versus sub-regional contradictions in goals and outcomes of EMI.

2.5.b Criticisms: DS Policy

Different levels of success have been experienced in utilising the DS paradigm across East Asia. In the case of emerging economies, the traditional DS model required incentives for elites to engage in the necessary institutional reforms for long term success, a factor that has not been fully reflected in Southeast Asian states that have grappled with what comes after the DS industrialisation and techno-upgrading, or post-developmentalism (Sen, 2018, p. 6). The case of China

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[34] During the latter half of the 20th century industrial policies gained support from a variety of international organisations, including the UN, World Bank, and ADB. These organisations advocated for limited, short-term government support of local industries as a means of aiding economic growth and encouraging international trade, however, much controversy surrounds the utilisation of industrial targeting in a predominantly free market, globalised economic system, where the common economic structure focuses on less market intervention, not more (Wade & Mkandawire, 2017).

[35] See prior introduction to Oseni and Pollitt (2014), which is further elaborated in Chapter 5, *National Market* Factors.

is similarly explored in relation to the developmental state paradigm, with East Asian economists positing that authoritarianism is both a requirement of DS success as well as a burden for continued growth (Breslin, 2018; Öniş, 2018). In the same report Yeung (2018) identified ways in which targeted industrialisation and niche-industry growth coupled with global production and value chains has contributed to the evolution of DS and its role in regional economic development in East Asia (pp. 20-22).

While they do not deny the importance of the developmental state in Asia's development experience, many political economists (Wade, 1992; Chan et al., 1998; Gereffi, 1998; Moon & Prasad, 1998; McGregor 2008; among others) argue that the developmental state is not the only source of economic success in East Asia, nor should it be the primary tool used for continued economic growth. Instead, an approach that utilizes state, "society, culture [and] market" fully encompasses the key hallmark of the Asian "economic miracle" (Chan et al., 1998, p. 8)—variety, and remains a foundational characteristic of IPE analysis in East Asia. Moon and Prasad (1998) posit that it is the reductionist assumptions, misleading links, and "doubts about the positive correlation between the state and economic performance" that have led many East Asian political economists to advocate for economic policies that utilize both developmental state practices and free market approaches, while recognizing the influence of societal pressures and international competitiveness on economic prosperity among NICs in East Asia (p. 10).

McGregor (2008) has also noted that many Southeast Asian developmental states saw reductions in economic development and increases in domestic unrest compared to their neighbours during the 1980s. As a result, a number of these Southeast Asian nations (referred to at the time as transitional economies and today as newly industrialised economies, NIEs) adopted a combination of policies that included state-driven and market-led approaches to development which resulted in subsequent economic gains (McGregor, 2008, p. 54). Wade (1992) also argues that the role of ideas and culture need to be properly attributed to the East Asian miracle as much as DS, a place where traditional DS theory falls short. This is reflected in the evolution of DS theory in East Asia, particularly in the work of Thurbon (2014). Moving forward, any DS definition must similarly reflect this point, as the developmental state paradigm of modern society is not just an economic tool but a political and social one that is not static but evolved based on economic, geopolitical and socio-cultural changes (Thurbon, 2014; Gao, 1996). This becomes a particularly important

consideration when examining Research Question 3 (*What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?*) as an examination of cross-border electricity trade growth in Southeast Asia reveals winners and losers in societies where EMI may be encouraged for a variety of rational economic and energy reasons, but instead results in less reliable or affordable power 'products' and furthers urban and rural divides—issues which are discussed in more detail in Chapter 6 (*Governance Challenges*).

An additional criticism of developmental statism is directed at a perception of the prevalence of corruption and rent-seeking[36] among developmental states (Doig & McIvor, 1999). However, similar to other criticisms of developmental statism there are multiple viewpoints and much debate on the linkages between rent-seeking and developmental statism (See Singh & Ovadia, 2018a, for a broad overview) and the various iterations the presence of both can take around the world.[37] This author agrees with the supposition by Khan & Jomo (2012) that corruption and rent-seeking have been present across the variety of economies in the East Asian region; however, development success elsewhere is not a result of the lack of rent seeking. Rather, while the effects of corruption differ across countries the presence of corruption does not mean economic success will be significantly limited or that a standard response to or outcome of rent-seeking and corruption is predictable (Khan & Jomo, 2012, p. 5). Similarly, Moudud & Botchway (2008) argue that it is not the presence of state intervention that results in corruption, but disempowerment and lack of professional development and capacity that explains corruption among state authorities.

Corruption and rent-seeking operate and exist in developmental states similar to how they operate and exist in neoliberal, market economies. In addition, relationships between political and business elites are often discussed as traits of developmental states, however, that does not mean these relationships are always corrupt (Moudud & Botchway, 2008). Corruption and rent-seeking are

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[36] Rent-seeking refers to incomes which are commonly higher than they would be otherwise and the way in which the presence of high incomes results in the formation of "incentives to create and maintain these rents" via legal and illegal business, institutional and societal practices (Khan & Jomo, 2012, p. 6). Corruption, which often overlaps with rent-seeking (Khan & Jomo, 2012), is defined by Khan (1996) as deviations from social norms and formal rules of conduct over the actions of individuals in positions of public authority as a result of power, status and wealth motives (p. 12). See also: Doig & McIvor (1999).

[37] See for example Booth (2011) or Kelsall (2011) on developmental patrimonialism in Africa.

not a result of developmental state or interventionist practices, nor are they a result of a lack of democracy or monarchy, for example.

Arguments regarding corruption and rent-seeking are relevant in the case of power sector governance and reform in Southeast Asia due to the nature of institutional change that is required for reform to take place and the prevalence of corruption in a variety of different sub-regional economies (Sen et al., 2016). According to Khan:

> …all institutional change involves creating or destroying rents and almost all distributive conflicts can be described as conflicts where one or both sides are seeking rents. (p. 6).

Numerous examples of corruption and rent-seeking in Southeast Asian (and indeed other) economies exist, for example in the case of entrenched fossil fuel subsidies in the Philippines' energy market or the dominance of oil in Brunei's economic and political history. Rent-seeking is an economic and political practice that is present across economies and generalities about the result of rent-seeking and corruption as a result of certain economic practices does not serve political economy analysis, but instead reflects the bias and/or ideological approach of the analysis (Khan & Jomo, 2012). In addition to value-negative impacts commonly identified in traditional economic analysis of rent-seeking, rent-seeking can have value-positive impacts as well; for example, in the redistribution of wealth—which Khan & Jomo (2012) believe can have both negative and positive impacts in developing economies. Corruption is similarly intertwined with political economy analysis of economic development (See: Bardhan, 1997; Leff, 1964; Myrdal, 1968, among others), having both value-positive and value-negative impacts depending on how corruption is controlled and within which populations it is present (Doig & McIvor, 1999; Mungiu-Pippidi & Hartmann, 2019). In the case of electricity market reform, reductions of rent-seeking policies and increased transparency in an effort to reduce corruption are common recommendations (See: Sen, 2015; Sen et al., 2016, 2017), and this was also reflected among interview subjects (explored in data chapters 4-6).

Instead of positing whether corruption and rent-seeking are or are not a result of developmental statist approaches (See: Buchanan, 1980 for example), this research posits that corruption and rent-seeking are present across most societies, they are present in different and similar ways across the Southeast Asian sub-regions' economies and energy sectors, and they have primarily value-negative impacts depending on the actors, factors, and situations in which they are present (Khan, p. 6-9). Corruption and rent-seeking are not the focus of this

research. While they exist in the economic and political structures of some of the economies studied here, their presence is not based on the type of economic or political structures examined and so they will not be explored in relation to developmental statism—except to posit that developmental states and neoliberal market economies both (Moudud & Botchway, 2008) face the challenge of managing the positive and negative impacts of corruption and rent-seeking in power sectors.

It is worth noting another impact on the perception of the success of DS theories in East Asia's specific history of economic development, the AFC of 1997/98 . The Southeast Asian economies most negatively impacted by the AFC also represented previously thriving examples of DS in practice (Gârdu, 2015). The AFC was the result of a dramatic drop in the value of Thai Baht, which resulted in widespread currency devaluation throughout Southeast Asia, eventually spreading to Northeast Asia (Arndt & Hill, 1999; Tan, 1999; Tan, 2000). This region-wide weakening of financial and economic systems exposed weaknesses in the national and regional mechanism meant to prevent financial uncertainty, exposing structural weaknesses in once strong economic systems. As a result, the East Asian miracle slowed dramatically (Kim, 1999) and criticisms of DS as a viable, replicable option for other developing economies emerged (Pang, 2000; Beeson, 2006; Thurbon, 2014; Gârdu, 2015; Wade & Mkandawire, 2017; and Bishop et al., 2018c provide thorough overviews of the criticism along with mong many others).

As a result of this fall out, other common criticisms of DS refer specifically to the inability of the DS paradigm to be applied to other emerging economies, replicating the East Asia experience (Thurbon, 2014; Bishop et al., 2018). These criticisms specifically point to: changing roles of the state, in particular emerging regulatory roles as opposed to developmental, therefore managing and engaging in markets as opposed to strategic intervention (Jayasuriya, 2005); embracing neoliberal market values and benefiting from market competition (Pirie, 2005, 2008; Bishop et al., 2018), which some experts argue is in fact commonplace and actually compatible with standard neoliberal economic policies and therefore cannot even be considered DS in nature (Cerny, 2005).

Thurbon (2014) responds to this criticism in the context of Korea specifically, however, it is this author's belief the response has application to the wider East Asian region and the sub-region of Southeast Asia. Thurbon's argument is that DS practices are not bound by single policy instruments—indeed, DS is a combination of state directed economic policies; the absence of a common policy

tool among DS (say, targeted industrial policy, as is the case with Taiwan) does not mean other state-directed policies were not utilised (p. IV). In many cases the DS paradigm has evolved to include new economic policy choices and new industries, such as clean energy industries in Southeast Asia. Narrow conceptualisations of DS models do not serve the actual model, which is marked by state adaptation and the directing of policy choices based on economic goals (Thurbon, 2014, p. V). Wong (2004) similarly points to the adaptive nature of the developmental state, a by-product of the nature of globalisation and quickly changing national, regional, and international markets.

This section has presented the main tenets of DS theory, application of DS models in East Asia, as well as common arguments for and against DS models of economic development and policy making. This has set the scene for understanding what cross-border electricity trade and renewable energy integration can tell us about the IPE of East Asian development. The following subsection will take this formulation of DS policies and practices and apply it to a neoliberal, market-oriented power sector and sub-regional electricity market, resulting in the articulation and conceptualisation of a neo-developmental statism model applied throughout this research and subsequent data chapters.

2.5.c Neo-Developmental Statism

Neo-developmental statism represents an evolution of the developmental state paradigm that has previously been used to explain state led economic development in East Asia. Where Johnson's original conceptualisation (1982, 1987) of the developmental state lost favour in the late 80s and early 90s for a neoliberal explanation of world economic order (McGreggor, 2008), the re-emergence of the developmental state today is representative of a combination of these theoretical explanations—neo-developmental statism represents a degree change and evolution of traditional DS paradigms and neoliberal ways of explaining global economics that were previously separate. Neo-developmental statism is an evolution of the developmental state idea that people like Wade (1992), Gao (1996), Carlos-Bresser-Pereira (2007a, 2007b, 2008, 2009, 2010a, 2010b), Liow (2011), Ban (2013), Dent (2014), Thurbon (2014) Bishop et al. (2018), and Bishop & Payne (2018a), have explored. In addition, neo-developmental statism is used to explain challenges in cross-border electricity trade and EMI specifically, with application limited to power sectors and energy policy, a niche application of the latest iteration of the developmental statist theory as a result of specific characteristics among ASEAN member states. This sub-section will explore the evolution of the traditional DS paradigm, the nuance

and intricacies of this evolution, and the theoretical conceptualisation of neo-developmental statism that is used in this analysis.

While the world has changed dramatically since DS was first introduced, the developmental state remains alive and well in East Asia (Wade & Mkandawire, 2017). Indeed, the developmental state is different today than when it was first imagined; strong interventionist state policies still exist in many East Asian countries, materialised in strategic industrial policy and market regulation as described previously in this chapter. Dr. R. Wade described the evolution of the DS today as being one that:

> manoeuvre[s] within investment and trade rules to promote domestic industries, building on their existing role in the global supply chains as a means to move into higher value add products, and fighting corruption (Wade & Mkandawaire, 2017).

The developmental state of previous years cannot be perfectly replicated, that is true; however, economies across East Asia are using a combination of DS practices and engaging in neoliberal trade and economic policy making, just with limits compared to the "free markets" of the west. It is important to note here that the original DS literature is quite dated and used to primarily explain the economic development and industrialisation practices used in the 1980s and 1990s; the theories behind the paradigm have not, for the most part, been updated to reflect changes post-global financial crisis, the emergence of climate change as a serious international crisis, or changes to global energy markets based on supply constraints and environmental challenges. There are vestiges of developmental statism in the way economic policy is made in East Asia, but its application to specific modern contexts is limited. An updated conceptualisation of the DS paradigm is appropriate in this research as it offers an explanatory tool for the IPE of seemingly contradictory economic development practices of East Asian economies amid dynamic changes to sub-regional and regional power systems in response to climate and environmental concerns.

Neo-developmental statism[38] is the utilisation of common DS economic policy practices, including privileging industrial development and the targeting and state directives of markets, while also utilising free market tools typically associated with neoliberal market structures. The neo-developmental state is not entirely neoliberal in nature and still relies heavily on state directions and

[38] Not to be confused with statism, neo-developmentalism or neo-statism. See Chowdhury (1999) or Cammack (1990) for overviews of statist literature, whereby focus is given to the primacy and autonomy of the state.

targeting. However, it also benefits from engaging in a free market, whereby the state regulates interaction and impacts (or attempts to: see 97/98 AFC, for example). The neo-developmental state theoretical framework includes not just economic policy planning, but social and ideational policy planning as well; the green developmental practices of many East Asian economies (Tan, 1999) could fall within this range, quite obviously, via the promotion of clean energy development and power sector integration and adaptation for regional and sub-regional CCD . In the case of Southeast Asia, the entire EMI directive of ASEAN is being played out via developmental states, whereby member economies are supposedly directing investment in power sectors while also supposedly[39] advocating for the liberalisation of electricity markets in order to increase competition and naturally upgrade systems (whether or not national policies reflect these ASEAN targets and goals is a recurring theme, discussed in chapters 4-6).

It is worth mentioning a parallel concept, neo-developmentalism, in order to avoid confusion with a similar yet different IPE evolution of the original developmental state paradigm. Neo-developmentalism is a term coined by Brazilian economist Luiz Carlos-Bresser-Pereira (2007a, 2007b, 2008, 2009, 2010a, 2010b, among many others) to describe an alternative economic framework to the neoliberal, Washington Consensus policy recommendations for post crisis developing economies (Ban, 2013). In this theoretical model, neo-developmentalism exists on the same spectrum as neoliberal policy making, but less open than neoliberalism and less controlled than DS (Liow, 2011; Ban, 2013). The neo-developmentalism of Carlos-Bresser-Pereira is standard in development discourse, and commonly applied to Latin American countries,[40] primarily Brazil (Carlos-Bresser-Pereira, 2009). Similar to the DS model in East Asia, neo-developmentalism stresses industrial growth using targeted industrial policy, the use of development strategies, and engagement in global trade (Ban, 2013). Neo-developmentalism also stresses wage policies (raises, government guarantees and cash transfers) and avoidance of variabilities in exchange rates

[39] Chapters 4-6 will further address the 'supposed' part of this statement, as some national policies do not fully reflect these ASEAN specific goals and directives. This is more a consequence of translating large, sub-regional goals to national ones and the incentives behind making large, structural and potentially economically powerful changes, such as the redirection of subsidies for oil and coal to renewable sources in national energy markets.

[40] See Gereffi (1989) for an examination of development theory contrasted in East Asia and Latin America.

and market sentiment via financing from domestic savings (Ban, 2013, p. 302). Ban (2013) analyses the progress of neo-developmentalism in Brazil, where neo-development first began in Latin America, and concludes that Brazil does not fit the perfect neo-development paradigm but has, in fact, adopted some of the liberalisation policies of the Washington Consensus. Therefore, the neo-developmentalist model applied to Brazil has, similar to DS, evolved past original definitions; it is not a perfect definition, but instead a hybrid that includes more focus on liberalisation than state directed policies, with priority given to financial controls in avoidance of common financial failures found in the economies of Latin American states.

In the case of neo-developmental *statism*, this author's application differs from Carlos-Bresser-Pereira's neo-developmentalism, in that it is a hybrid of neoliberalism and DS with a focus given to targeted industries and state management of the liberalisation process. The author's neo-developmental statist framework is not directed specifically at post crisis economies (although some may be) and emphasis is not placed on countering the Washington Consensus or similar neoliberal economic policies. In this case, neo-developmental statism is a mix of state directed and market liberalisation policies which are used to continue to direct development across Southeast Asia. This can particularly be illustrated in the power sector in Southeast Asia, where a mix of public and private markets exist and operate, and governments aspire towards further liberalisation while also directing financial and economic measures that suit national economic development goals and state-business relationships. Chapters 4-6 will call further attention to these structures, and the application of Oseni and Pollitt's (2014) EMI Criteria to economies in the BIMP-EAGA subsystem will also highlight these relationships and market factors specific to power sector integration.

Bishop et al. (2018) delve into the re-emergence of the developmental state, and its relationship to neoliberalism in recent years. In Bishop et al. (2018) Bishop and Payne identify the goal of developmental statists as building a market but distorting that market in an effort to feed national interests via financial and policy tools (p. 2). This is an important point, given the different characteristics of neoliberal economists and developmental statists, explored further by Bishop and Payne (2018a, p. 2):

> Where liberals believe countries should accept and exploit their 'comparative advantage' almost as if it is naturally determined and therefore static, theorists of the developmental state see comparative advantage as dynamic and changeable, and

> something to be manipulated in a relentless process of industrial upgrading.

Pointing to the vast literature on DS, Bishop et al posit that the DS has always been intertwined with neoliberal economics and is in fact a part of the developmental story of many western countries, just not named as such—arguments that help justify this author's neo-developmental state model. In their position, Bishop et al. (2018b) conclude their recent DS research and analysis by positing that the DS model is still relevant today, just not exactly replicable, characterised by operating in a more competitive international system, and also evolved from the traditional definition made famous during and after Japan's economic rise by being applied differently from economy to economy (p.25).

The weaknesses of Dent's (2014) *new developmentalism* were noted when discussing EMT in section 2.2 of this chapter. These are minor differences, however, in addition, new developmentalism's analytical framework has not previously been applied in ASEAN power sectors or to EMI policies; based on the combination of these factors new developmentalism has thus not been adopted by this author. Another relevant, although still not replicable, theoretic framing this author has identified lies in the work of Liow (2011) on the theoretical framework of the neoliberal-developmental state in Singapore. In Liow's work focus is given to neoliberalism as not just a tool of economic policy making but also a tool of state political rationality in Singapore, an outlier of liberalisation and neoliberal economic policy making among Southeast Asia's economies (Huff, 1995; Gainsborough, 2009; Low & Johnston, 2001). Following on the work of Foucault (2003) and Brown (2005), Liow rationalises the impetus for focusing on decision making and political rationality when examining state economic actions, which are often underpinned by similar political values that reflect the governance ideology of the state (Liow, 2011, p. 2). Liow argues that while state-led industrialisation is present in his theoretical conceptualisation of the neoliberal-developmental state, the desire to liberalise has become so engrained in policy making that it is now reflected in the political ideology of the ruling elite, and therefore has become more entrenched in the governance actions of the state and thus more dominant than the state-led policy making rationale of previous years (Liow, 2011, p.3). In addition, according to Liow (2011, pp. 3-4) this liberalisation ideology has also been incorporated into all aspects of the Singaporean state, including:

> …social, political and economic life of Singapore society around the ideology of pragmatism from its early days of development, of which the overarching purpose is to enable the quicker and

> more efficient accumulation of capital through high levels of economic growth.

The political and economic history of Singapore, and its unique development as the economic centre of ASEAN with a focus on trade and openness to foreign businesses, make it stand apart from most other ASEAN examples (Hill, 1994; Low & Johnston, 2001). The country did utilise industrialisation in a similar DS manner, but with the widespread integration of global financial norms into the political and economic structure of the country, still present today (Huff, 1995). In addition, unique calibre of leadership, planning for development and stability of economic progress have all contributed to the successful integration of Singapore into the global economy (Huff, 1995, pp. 1430-1434). In this regard the Singaporean model of neoliberal developmentalism is not replicable, nor standard across the sub-region.

The adaptation of Liow's neoliberal-developmental state theory to this research includes more focus on state intervention and less integration of neoliberal ideology into the state political system. Similarities include a persistence of power dynamics and competing interests (Liow, 2011, p. 8), which in the case of power sectors is very evident at the national versus sub-regional level (discussed in more detail in chapters 4-6). Additional differences between neo-developmental statism as it is used in this research and Liow's neo-developmental state include a wider regional focus and the experience of unique, developing and emerging markets with quite a way to go until achieving the liberalisation and integration of the Singaporean economy.

While IPE can be used to explain a variety of global economic and political interactions and the theories that underpin them, the application of IPE in East Asia can vary slightly as a result of the unique political, economic, and social contexts within the broader region (where there is already a lot of diversity within political and economic systems just based on geography, history and culture), but often leads back to DS practices as the basis for economic growth in the region (Beeson, 2014). This is relevant here as the dominant neoliberal economic explanation for economic and political interactions are not directly applicable given different approaches to economic policy making in centrally planned economies versus free market economics. A state-directed economy will not, by very definition, freely give up economic development to the movements of the global market or to liberalisation agendas, despite the many incentives for doing so (in this case climate change adaptation, energy poverty reductions, or increases in energy security, for example). Instead, the economies of Southeast Asia appear to be taking a combined approach to economic policy making in the

energy and power sectors, which can be explained using the theoretical conceptualisation of neo-developmental statism. While Neo-developmental statism is aligned with some notions of liberal developmentalism, in this context it is applied to Southeast Asian countries and the electricity markets of the BIMP-EAGA subsystem for the first time.

Throughout the thesis, neo-developmental statism will be used to explain the plausibility, difficulty, and reality of applying largely neoliberal reforms in national and sub-region power markets. The application of neo-developmental statism will be used to explain a variety of EMI and interconnection challenges across Southeast Asia: Chapter 4 will examine the sub-regional market factors that make up interconnections in the sub-region, highlighting the limitations of current and planned interconnections; In Chapter 5 the market factors of national markets will be examined. Here the author will use neo-developmental statism to analyse the application of Oseni and Pollitt's (2014) EMI criteria to BIMP-EAGA economies, contrasting the governance, liberalisation, and management recommendations embedded in these criteria with the reality of state-directed policy making and national interests. In Chapter 6 additional governance challenges will be discussed, using the neo-developmental statism framework to explain the (1) contradictions between national versus sub-regional incentives and (2) trust in policy and practice within the sub-region.

2.6 Conclusions

This chapter has traced the IPE based development path of East Asia to provide context for (1) the challenges development has exposed, particularly in relation to energy intensive development and industrialisation practices; (2) the standard IPE explanations for this process both generally and in Southeast Asia specifically; (3) and the models employed to provide context to this process in relation to EMI in Southeast Asia. The two seemingly contradictory theoretical approaches of (1) neoliberal market practices and (2) directed state policy making via DS have been combined to form the neo-developmental statism.

In this research neo-developmental statism will be applied to Southeast Asian countries and the electricity markets of the BIMP-EAGA subsystem for the first time. The application of neo-developmental statism will assist in answering the primary research questions and provide context to the study of EMI in East Asia: (RQ1) *How do governments understand the IPE of cross-border interconnections in Southeast Asia?* (RQ2) *How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national*

markets? (RQ3) *What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?* This application will illustrate the difficulties Southeast Asian countries face in expanding EMI and cross-border electricity trade, discussed around the issues of sub-regional versus national market factors, reform, and governance.

The following chapter will outline the methodology used to explain the processes of EMI and cross-border electricity trade expansion in Southeast Asia. A focus on data collection and elite interviews will be given, along with the conceptualisation of this research and the processes utilised. These processes will frame the subsequent thematic chapters, using data and information that was extracted during the data collection and interview process. These methodological considerations will also structure the outcomes of this research, offering context to the actors involved and the difficulty of examining this interdisciplinary topic with an IPE approach. Neo-developmental statism will continue to play a role as the historic and current need for energy poverty reductions and increased electricity access will be contrasted with market structure and proposed neoliberal-oriented reforms within Southeast Asian sub-regional electricity markets.

Chapter 3
Research Design & Plan of Enquiry

3.1 Introduction

Chapter 3 introduces the methodological approaches of this research, presenting an overview of how these approaches have developed and shaped the design of this research project. This chapter includes mention of the required elements of the thesis (reliability & validity, risk assessment, data collection methods, documentary data used, data protection plan, case study design, methods of analysis, etc.) as well as a deeper breakdown of the case study research design and two methods of data collection employed—documentary analysis and elite interviews. In short, this chapter will provide the necessary understanding to see the links between "the research problem, the method, and the results" (Rudestam & Newton, 2007).

In this chapter an explanation of interview subjects, how they were chosen, and how they were approached will be explained, as well as reference to the interview protocol and methods used for coding interviews, resulting in thematic analysis. The choice of case study will be also be introduced, recounting the natural progression from East Asia to Southeast Asia via interviews, followed by interview feedback on narrowing down the case study to BIMP-EAGA. The conclusion section of this chapter will provide a link to the subsequent sections, which focus on specific themes identified in interviews and data analysis.

This study brings together two disparate areas of research under the umbrella of IPE—East Asian studies and sustainability research. These two distinct areas of study provide insight into the multidisciplinary research of climate change policy responses, bringing focus to this research from different, complementary viewpoints. Two data collection approaches were used in the case study design: the first, documentary analysis, aimed to explore the current realities of cross-border electricity trade in East Asia using publicly available policy documentation, stakeholder reports and grey literature; the second, elite and stakeholder interviews, was used to provide critical context to policy decisions that have contributed to the current state of energy policy and will impact future progress in electricity trade.

The three primary research questions these methods are designed to answer are:

1. How do governments understand the IPE of cross-border interconnections in Southeast Asia?
2. How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?
3. What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian development?

These research questions were derived from the gaps identified in the literature review both in the academic debate on IPE and poor stakeholder understanding of the development of electricity interconnection in East Asia as a geopolitical issue of importance and a practical problem for regional energy ministries (See White, 2009 for more on policy context and formulating research questions that reflect social problems).

These research questions are theory confirming; for example, question 3 produces and fine tunes a theory (White, 2009, p. 25)—the theory of neo-developmental statism described in chapter two is interrogated in light of the particular technical and political-economic challenges of electricity market interconnection. In addition, the iterative methodological choices made in this research reflect the nature of the research questions chosen and their ability to address complex social problems (energy security, sustainability, and access challenges) and the relevant contemporary policy linkages.

This chapter is structured in six sections: In the second section, *Methodological Approach,* the epistemological reasoning of the author is introduced, including a brief overview of critical realism and how it frames the author's research design and choices regarding methods. The methods used in this research are grounded in critical realism, and as such the epistemological and philosophical context will be explored first. In section 3, *Research Design,* the case study design of this research is explored, examining the author's approach to overall research design, elite and stakeholder interviews, reliability & validity, ethical considerations, the necessary risk assessment, data protection, and how the author has ensured a quality research design. This also includes explaining how the case study was narrowed down to a single subsystem within ASEAN, the BIMP-EAGA subsystem.

In section 4, *Methods: Data Collection & Analysis*, the varieties of data collection and resulting analysis of data is presented, focusing primarily on documentary analysis and elite interviews. In section 5, *Positionality of Research,* the author's research is framed in the context of the author's pre-existing viewpoints and

internal bias. Finally, in section 6, *Conclusions*, all the methods will be summarised, explaining their relevance to this research, highlighting their complementary research contributions, and propelling this research forward from its initial research design through to subsequent analysis chapters.

3.2 Methodological Approach (WC: 2641)

The approach to use multiple methods—both data analysis and elite interviews—was intended to reveal patterns between Oseni and Pollitt's 2014 EMI criteria and actual cross-border interconnections or potential interconnections in Southeast Asia (Oseni and Pollitt's EMI criteria outline general requirements necessary for the integration of multiple national electricity systems and electricity trade across borders, including management, policy, physical, and system requirements.). This methodological approach is an exercise in theoretical triangulation, whereby comparing, evaluating and/or testing of multiple theories or concepts is used (Rudestam & Newton, 2007; Sovacool et al., 2018). In the context of this research project this methodology revealed relationships between elite opinions and political and economic realities in the electricity and energy market space, shedding light on what is needed in order to expand cross-border electricity trade and meet sub-regional EMI goals.

The overarching aim (A1) of this research is to explore the extent to which climate change has created imperatives for energy market integration (EMI) and power sector reform in East Asia, shedding light on what trade and economic development policies are used in response to these issues. From this aim the following research plan was identified, combining research objectives with the corresponding research questions (RQs), data needed, data collection methods required for said data, data analysis methods, and potential links to the analytical framework identified in Chapter 2 (*Cross-Border Electricity Trade: Conceptual Approach & Review of Literature*), neo-developmental statism. The research plan shown in table 3.1 is organised around the three core research questions (Andrews, 2003, p. 51-62).

Table 3.1 Research Plan

Objective 1 – Provide an overview of cross-border interconnections and assess market factors in Southeast Asia;	
Research Question: (1) How do governments understand the IPE of cross-border interconnections in Southeast Asia?	
Data Needed	• Electricity data for countries involved • Relevant elite's opinions • EMI data • Energy poverty data, sub-regional (and national) • Climate and energy related policy goals at sub-regional and national level
Data Collection Methods	• Review of literature • Interviews • Data set analysis
Data Analysis Methods	• Quantitative and thematic analysis via coding in NVIVO • Explanation building • Abstraction of interview data
Links to Analytical Framework	• History of development in the region (state-led, predominantly) • Role of IPE in development practices • Structure of sub-regional climate/energy related initiatives (non-binding, led by ASEAN or another multinational organisation)
Objective 2 – Assess market factors of Southeast Asian case study selection and identify areas of individual and collective reform needed to reach deeper levels of EMI among BIMP-EAGA economies;	
Research Question: (2) How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?	
Data Needed	• Regional electricity trade stats; sub-regional (BIMP-EAGA) stats • Relevant elite's opinions • ASEAN data for APG, bilateral and national initiatives; • Electricity trade and increased renewable integration data from other regions? • Oseni and Pollitt (2014) EMI recommendations
Data Collection Methods	• Data bases, government statistics, and ASEAN material research; • Review of Literature • 1-on-1 Interviews • Conference, workshop discussions or relevant meetings

Data Analysis Methods	• Case study analysis of single case (embedded design)—develop a descriptive framework for organising case study? • Explanation building • Thematic analysis via coding in NVIVO
Links to Analytical Framework	• IPE of sub-regional and national markets—structure
Objective 3 – Identify and analyse additional governance challenges to deeper EMI and increased electricity interconnections among ASEAN member states and case study selection;	
Research Question: (3) What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian Development?	
Data Needed	• Current interconnector data • Electricity data for countries involved • Relevant elite's opinions • EMI data • Data from other regions? • IPE theory
Data Collection Methods	• IPE theory research • Review of literature • Interviews
Data Analysis Methods	• Case study analysis • Thematic analysis • Theoretical analysis and analytical generalisation • Explanation building • Some historical analysis
Links to Analytical Framework	• Theory underpinning commonly proposed liberalisation/integration methods • Contrasted with common sub-regional / national market structure • Linked with commonly identified reform impediments • Contrast of specific IPE (trade & economic) policies and development practices regionally (national issues build into sub-regional, based on original questions)

This research plan is reflective of the recommendations of Robert K. Yin (1981a, 1984, 2003) and Rudestam and Newton (2007) on case study design and research plans, respectively. To answer these research questions a thorough examination and critique of the dominant IPE frameworks and their proposed application to East Asian economic & political structures will provide context in this research to the development of sub-regional interconnectors that impact

clean energy utilisation and sub-regional EMI. Significant attention is paid to documents covering trade and industrial policy development in an East Asian context. Policy documents that make the best case for optimizing clean energy's contribution in addressing global climate goals, and examples from Southeast Asia and the Brunei-Indonesia-Malaysia-Philippines East Asia Growth Area (BIMP-EAGA), will be utilised to address these research questions. An analysis of the political-economy of current electricity markets based on semi structured elite interviews is also used to identify drivers and barriers to cross-border electricity trade utilisation regionally, sub-regionally, and nationally. The historic and current need for energy poverty reductions and increased electricity access is also contrasted with market structure and proposed neoliberal-oriented reforms within Southeast Asia's sub-regional and national electricity markets. The East Asian practices of state-led economic development and targeted industrial policies is contrasted against commonly proposed liberalisation reforms of national electricity markets.

The three primary research questions are presented across three thematic chapters, each with a different objective and different analytical needs. These are demonstrated in table 3.2 as follows:

Table 3.2 Objectives & Analysis Needs

Objective 1 (Chapter 4 – Sub-Regional Market Factors)
Objective: Provide overview of cross-border interconnections in Southeast Asia; Assess market factors in the sub-region of Southeast Asia: • Assess the role of cross-border electricity trade in sub-regional EMI; • Review and analyse current and projected interconnections; • Review and analyse ASEAN interconnection projects; • Synthesise lessons learned among selected projects. <u>Research Question</u> RQ1: How do governments understand the IPE of cross-border interconnections in Southeast Asia?
Objective 2 (Chapter 5 – National Market Factors)
Objective 2: Assess market factors of Southeast Asian case study selection and identify areas of individual and collective reform needed to reach deeper levels of EMI among BIMP-EAGA economies: • Synthesis overview of current market structures in national and sub-regional electricity markets; • Assess national needs for sub-regional EMI; • Review and analyse any links to the integration of renewables into national energy mixes, review sub-regional energy poverty

reductions, and identify any links between national energy goals and EMI initiatives; • Identify areas of individual and collective reform needed to reach deeper levels of EMI among ASEAN member states. <u>Research Question</u> RQ2: How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?
Objective 3 (Chapter 6 – Governance Challenges)
Objective 3: Identify and analyse governance challenges to deeper EMI and increased electricity interconnections among ASEAN member states and case study selection: • Identify trade and economic development policies used in response to these issues; • Provide realistic, relevant, IPE based policy recommendations for further renewable energy integration sub-regionally; <u>Research Question</u> RQ3: What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian Development?

The inclusion of interviews and documentary analysis as data collection methods is supported by the "ontological and epistemological underpinnings" of critical realism, which frames the philosophical approach of the author and this research. In the following subsection critical realism will be introduced and its application to this research presented, "identifying, explaining and justifying the epistemological stance" (Crotty, 2003, p.8) that has been taken in forming this research and the plan of inquiry.

3.2.a Critical Realism

While the theoretical framing of the data collected is rooted in IPE theory, the paradigm through which cross-border electricity trade is examined is critical realism. The inquiry paradigm (Punch, 2014) of this research informs the ontological questions (what is the reality of this research), the epistemological questions (what is the relationship between the researcher and this research reality), and the methodological questions (what methods will be used in this research) highlighted in this chapter (p. 14-15).

Critical realism is used here because it is framework of understanding that allows researchers to excavate the 'real' causal factors driving objective phenomenon like trade negotiating strategies or motivations behind prioritising specific infrastructure projects. While the creating of empirical data may

uncritically point to a hegemonic narrative (such as free trade and renewables interconnection to tackle climate change) the critical realist will interpret this data in light of more critical theory. Thus, the critical element of realism goes beyond observable objective phenomena, to interpret this 'real' through the lens of wider theory (Yeung, 2003).

This allows for the identification of multiple causal structures in the development of cross-border electricity trade in East Asia, as well as for understanding IPE in both sub-regional and national electricity markets. These multiple causal structures may well be explicit and observable in empirical data, but they may also be occluded by it, obscured by ideological bias or official narratives. The work of critical realism is to determine which casual factors are driving the observed phenomena by a mix of observation and theoretically informed inference.

Critical realism as an inquiry paradigm (Punch, 2014) enables the author to explain and consider the international relations, national and sub-regional political structures, and economics as interrelated and equally impactful on EMI and cross-border electricity trade in East Asia; no one factor of IPE plays a singularly dominant role.

When used in a methodological context critical realism refrains from reducing ontology (nature of reality) to epistemology (knowledge of reality) and is instead rooted in the belief that "human knowledge captures only a small part of a deeper and vaster reality" (Fletcher, 2017, p. 182) and a systematic critique of processes, structures, and powers is necessary for understanding (Sayer, 1992; Yeung, 1997). In the critical realist perspective knowledge is gained using theories:

> that help us identify causal mechanism driving social events, activities, or phenomena, [and] are selected and formed using rational judgment of these social events (Fletcher, 2017, p. 182).

Critical realism recognises that theory is based on the study of a specific set of events where not all possible events are included, making exploration of social and political issues a natural fit (Easton, 2010). As it pertains to this research critical realism is a natural fit, given the multifaceted topic, inductive approach, and breadth of situations in which the IPE of cross-border electricity trade could differ.

Alternative epistemological approaches can of course be utilised across the breadth of cross-disciplinary social science research.[41] Crotty (2003) identifies common epistemological approaches across the social realism sciences, these include: objectivism, whereby meaning and reality exist apart from consciousness (p. 8), and truth and meaning can be acquired through objective research (p. 5); constructivism, whereby meaning and reality exist within engagement with the world (p. 9), i.e. meaning is constructed by people based on their individual interaction with the world (p. 43); and subjectivism, whereby meaning is imposed from a subject onto an object (p. 9). In addition, different approaches can be employed alongside different epistemological types, including positivism (relying on statistics and data to answer societal problems), interpretive, and post-positivism (a balance of positivist and interpretive approaches to analysis) (Crotty, 2003; Denzin & Lincoln, 2011; Yin, 2011). Here, however, critical realism was chosen and is reflected in the theory construction and case study design of this research as ultimately this IPE research is based on critical inquiry into economic and political structures that play a role in sustainability and economic development. Critical realism also allows for abstraction of complex phenomenon, particularly in the methods necessary for interviews (Yeung, 2003, p. 57), which is also applied here via analysis and abstraction of elite interviews (See Section 3, *Research Design* and Section 4, *Methods: Data Collection & Analysis).*

Critical theory, generally, encompasses many different approaches (Yeung, 2003), including Marxism and critical feminist theory, but have in common a critical approach to scientific inquiry (Kincheloe et al., 2011, p. 163). By and large critical inquiry is research that challenges (Crotty, 2003, p. 113). Critical researchers recognise the difficult dynamics at play between values, power, social relations, subjectivity, privilege and oppression (Kincheloe et al., 2011, p. 164) when exploring social challenges. Here the linkages to this research become clear, as green growth and energy access both largely hinge on power dynamics (economic and political), social values (green development versus heavy industry development with no regard for environmental concerns), and equity

[41] Additional analysis of critical realism and its application in IPE, case study dominant, research could be included. However, as Rudestam and Newton (2007) point out, the philosophy of science behind PhD research is relevant only in so far as it explains the research strategy and data generation within the confines of a particular project (p. 106). As such no further debate on epistemological approaches will be covered here beyond a brief overview; however, in further research this could be explored and alternative epistemological and ontological viewpoints employed.

of access (access to electricity vs access to affordable, reliable and sustainable electricity) (Lockwood, 2015c), among other paradoxical challenges identified within this research.

Bhaskar (1979, 1997), credited with the early development of realist philosophy (Yeung, 2003), posited that researchers must not commit to a single theory initially, and instead build upon potential theories as research progresses, avoiding the conditionality of a single theory and fostering deeper investigation (p. 6). Tendencies, or demi-regularities, can be identified in data analysis, resulting in themes or trends that can occur, but are not taken to be law by critical realists—the reality of the situation could change and as a result a different trend or outcome could occur (Archer et al., 1999; Danermark et al., 2002; Easton, 2010; Gorski, 2013; Fletcher, 2016; among others). This flexible approach is a common theme in the methodology of this research, contributing to both the research design, data analysis, and potential for future research (discussed in more detail in Chapter 7, *Conclusions*).

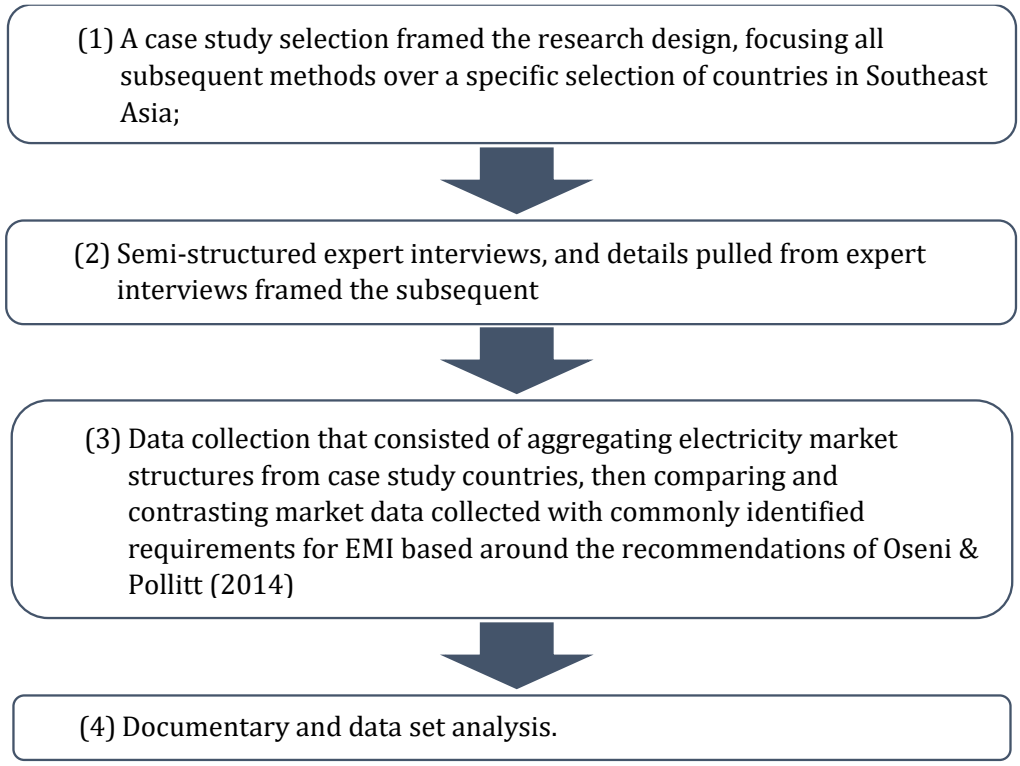
This critical, explanation-building research is well positioned to be informed by epistemological approaches of critical realism, where knowledge is reflected in the context of action building and critical awareness of societal issues and the power dynamics at play within them (Crotty, 2003). In the context of this research critical realism provides the ability to identify the drivers behind cross-border electricity trade in a neoliberal world order, but within subsystems where Asian values and collectivist approaches to policy making dominate regional and national politics. Critical realism shapes the philosophy of this research, whereas IPE shapes the theoretical work, thus forming a balanced approach to analysis and abstraction (Yeung, 2003, p. 53). Critical realism allows the utilisation of multiple avenues of explanation, across a wide variety of fields and issues, in order for us to understand the IPE of cross-border interconnections in an East Asian context.

The author's choice of case study research is a natural fit for the epistemological underpinnings of critical realism, because it reflects the changing and interpretive reality of the complex economic, political, and social structures within sub-regional and national electricity markets. In the next section, a case study design compatible with this critical realist perspective is developed.

3.3 Research Design

The research design of this study was approached with the work of Robert K. Yin (2003, 2011, 2013) informing case study design and qualitative analysis of the chosen case study; the work of Sovacool et al. (2018) was used to formulate a case study research design specific to qualitative, energy social science research. The work of Braun and Clarke (2006) on thematic analysis in social science research was used in analysis of interview data and coding related to the identified case study. Ultimately, however, this research design includes a variety of techniques common in energy social science research, what is understood as methodological triangulation (Sovacool et al., 2018). This design used a combination of methods to answer the posed, cross-disciplinary research questions. The approach used here includes 4 interconnected means to answering the proposed research questions:

Figure 3.1 Interconnected Case Study Methods



Source: Author's adaptation of Yin (1984, 2003) and Sovacool, et al. (2017).

This design is inductive in approach, with no hypotheses to prove but rather investigating in detail the applicability of a neo-developmental statism to the ongoing development of electricity market interconnection . This theory driven inductive approach requires interpretative analysis and meaning-building (Trafford & Leshem, 2008, p. 98). In the following section the case study design

will be explained, followed by description of the data collection and methods chosen, providing a "philosophical and technical foundation" (Trafford & Leshem, 2008, p. 89) from which to understand the progression of this thesis research and the methodological considerations and methods utilised.

3.3.a Case Study Design

The case study of this research design provides a detailed examination of EMI and cross-border electricity trade within a specific selection of countries, Brunei, Indonesia, Malaysia and the Philippines. At the outset of this research it was clear that the whole of East Asia was too large for the amount of time and resources devoted to this research project; it was the author's intention to narrow down the focus within East Asia via feedback from 4 background interviews (which also served to test suitability of initial questions); two of these interviews (one former government official and one current multilateral organisation representative) subsequently became informants, offering a variety of background and case study specific resources throughout the research process. This included professional reports, meeting minutes, and personal notes used to frame this author's knowledge and subsequent case study development. In this instance documents were identified by subject experts as being relevant to this study—while these documents were explored and utilised to direct the overall research, they are unique tools in that the author did not chose them independent of interview subjects or based on prior epistemological framing. Interviews are referred to, in this research, by their field (i.e., relevant job affiliation) and a unique number reference; for example, the two informants are referred to in the text as *Former Government—Informant 1* and *Multilateral organisation—Informant 2*.

Yin (2013) demonstrates the importance of case studies in a wide variety of social science research whereby "a desire to understand complex social phenomena" exists (p. 14). In this research approach the author chose to use a selection of countries to analyse cross-border electricity trade based on Yin's characterisation of a case study:

> ...[as the investigation of] a phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident (2003, p. 13).

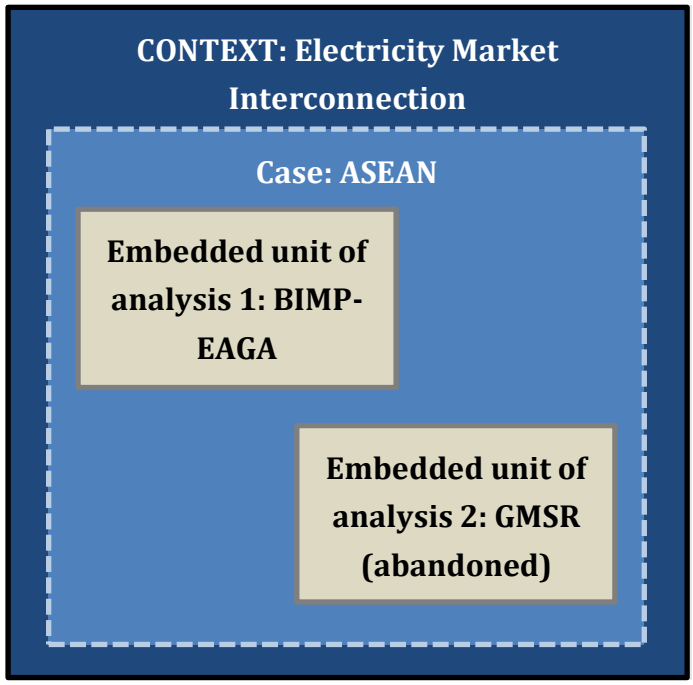
The justification for cross-border electricity trade is in part the impact of changes to the global climate, the need to manage variability of renewable energy in electricity markets, and the difficulty in multilateral cross-border electricity trade based on EMI needs and requirements; the roles of trust, market

structure, and political, technical, and financial barriers all provide the context for both the success and failure of cross-border electricity trade in East Asia.

Focusing on these issues within a group of similar countries in East Asia provides a snap shot of cross-border electricity trade that includes a variety of political and economic factors. This was also more realistic in terms of time, access, and author capacity. Odell (2001) similarly reflects the benefits of qualitative case study design in IPE focused research, lending credibility to the author's case study choices and use of qualitative methods.

An embedded case study design (Yin, 2003, p. 38-53) was constructed prior to data collection, guiding the development of relevant interviews, data analysis, and the write-up process. This design involves a single case (ASEAN) with two embedded units of analysis (BIMP-EAGA, the primary unit of analysis and the Greater Mekong Sub-region, or GMSR, the secondary unit of analysis, which was later abandoned). An example of Yin's (1984, 2003, p. 40) design can be seen below:

Figure 3.2 Embedded Case Study



A single,[42] embedded[43] case study was decided upon. Justification for this design choice was made based upon a number of case study design issues identified by Yin (2003): (1) time limitations and access challenges (p. 45) identified with mapping electricity markets in Southeast Asia; (2) the critical nature (p. 40) of a single case study, where the circumstances that have made BIMP-EAGA the least successful EMI subsystem in ASEAN make it a unique case among other subsystems and where the GMSR offers lessons to learn from; and (3) replication (p. 45-49) of circumstances across the BIMP-EAGA subsystem to the other ASEAN subsystems would be difficult based on unique national power markets, leaving doubt as to whether or not replication would be possible within the amount of time available for analysis and without knowing what data would be attainable. Taking into account these considerations, and others, the initial[44] case study was designed is as follows:

Table 3.3 Case Study Design

This is designed as an explanatory, single-case study, that could be complemented by an "exploratory" and "descriptive" study as well if time allows: • Case 1: BIMP (Brunei, Indonesia, Manila and the Philippines) • Case 2: GMSR (Greater Mekong Sub-region, Cambodia, China, Lao PDR, Myanmar, Thailand, Vietnam) *later abandoned*

Initial case study questions	How does the current system of electricity trade (in GMSR and BIMP) work? • Why is it successful or failing? • What does it need to be successful? • What is the difference among partner countries? • What role does ASEAN play?

[42] An additional, exploratory case study, GMSR (Greater Mekong Sub-Region), was included in the initial case study design; this was abandoned due to time and relevance as a result of interview feedback. As a result, the GMSR case study is not included in data chapters 4-6. However, the author does identify opportunities for expansion of this research with an examination of GMSR water policy and potential replication in BIMP-EAGA. This is discussed in Section 7.5, *Suggestions for Further Study*.

[43] Here 'embedded' refers to multiple units of analysis being embedded within the case study, in this case the BIMP-EAGA member countries (Yin, 2003, p. 42-43).

[44] Yin (2003) advocates for continuing to revise case studies as they develop (p. 24, 55), an approach the author employed throughout the research and data collection process and reflected in the abandonment of one case study (GMSR).

	• What other governance

Potential exploratory questions	If the goal is to develop pertinent hypotheses / propositions for further inquiry: • What do these two cases have in common? • What do these two different markets have in common? • What is the difference in ASEAN's role within each case?

Proposition of case study questions	• Successful cross-border trade is in place, at some level • Each country in the subsystem being studied (BIMP vs GMSR) is taking part in cross-border electricity trade in some form • Cross-border electricity trade is facilitating increases in clean energy utilisation (at some level) • ASEAN is relevant in both cases • Both cases are relevant to ASEAN's Energy Market Integration (EMI) efforts • Expansion of cross-border electricity trade is desired by each country • Propositions will be linked to data
Units of analysis	• Geographical limits: BIMP, GMSR • Time limits: this will be developed based on interviews, and likely represent the initial project development through to current day (i.e., February 2014 through January 2019) • Potential for inclusion of energy / electricity data points related to consumption and production

Case study method	• Systematic interviewing:
	  ○ Researcher will follow interview protocol as well as incorporate new questions based on prior interviews or respondent recommendations
	  ○ Including 2-3 key informants, 2 of which have been identified
	  ○ Potential for inclusion of direct observation based on interview development.
	• Document analysis
	• Data analysis
	• Time series analysis (if time):
	  ○ Including the analysis of chronological events (sometimes considered a special form of time-series analysis); not limited to a single independent or dependent variable, but will need to identify specific indicator(s)
	  ○ Identify any embedded units for additional analysis if relevant.

Embedded Design	• Literal Replication: Researcher will state the conditions under which a particular phenomenon is likely to be found—if at all • Theoretical Replication: Conditions when it is not likely to be found; generalisable to theoretical propositions identified earlier
Analysis: use of documents, interviews	• Dominant Modes of Analysis: pattern matching, explanation building, time series analysis • Secondary mode of analysis: embedded units

Issues to consider
 	
Issues to consider (cont.)
	• Construct Validity: to strengthen, the researcher will:
	  ○ Use multiple sources of evidence, particularly encouraging convergent lines of inquiry
	  ○ Establish a chain of evidence
	  ○ Have draft case study be reviewed by key informants
	• Internal Validity: Yin cautions internal validity is a concern only for causal or explanatory studies, where an investigator is trying to determine whether event x led to event y.
	• External Validity: In case study analysis theory will be used as a vehicle for examining case studies and explaining key themes.

Data collection	• Interviews • Electricity market data • Review of the literature

Final Report will contain separate chapter narratives about each of the chosen cases singly as well as a discussion section on cross-case analysis and results.

The case study design that developed this research included identification of the number of case studies (single case design versus multiple case design), units of analysis to be employed, replication that will occur (if any), type of analysis that will be used, issues to consider (construct/internal/external validity) and data collection methods, as we well narrative style and writing process to be employed during the write-up of data. A number of reliability and validity concerns are addressed within the design, as well as a grounding of the research

in propositions of the original study and methods and methodology that were planned in advance (Yin, 2003, p. 33),

Based on Yin's analysis of case study types, the author designed an explanatory, embedded case study, that would be complemented with exploratory data collection and descriptive analysis based on data collection via interviews, data evaluation, and documentary scrutiny; this case study design also included theoretical replication by utilising Oseni and Pollitt (2014) EMI criteria among embedded units of analysis (member countries), as well as replication in the descriptive analysis of electricity markets within individual BIMP-EAGA member countries;[45] this research seeks to build an explanation of the occurrence of cross-border electricity trade in a particular subsystem of Southeast Asia. The IPE theories of neoliberalism and DS were identified as "vehicles" for explaining key themes identified (Vaismoradi, 2013) within this case study, resulting in analysis of deeper IPE implications and the progressive elaboration of neo-developmental statism in energy and sustainability-based IPE analysis.

3.3.b Elite & Stakeholder Interviews

When interviews were first initiated the topical focus was cross-border electricity trade in East Asia broadly. However, initial background interviews with F*ormer Government—Informant 1, Multilateral Organisation—Informant 2, Academic 20,* and *Academic 26* led the author to explore Southeast Asia more specifically. Feedback pointed to Southeast Asia as a central location for increased clean energy investment and development, as well as a key player in the global response to climate change; concurrently it was also demonstrated that the sub-region is under extreme energy pressure, both for supplies to power the expanding regional economy and for growing electricity demand as a result of increased access (IEA, 2019a). The reality of the sub-regional climate and energy situation pointed to Southeast Asia as a logical location for deeper analysis. An additional background interview with *Academic 26* and subsequent snowball sampling of further interviews led the author to narrow down the case study focus to BIMP-EAGA, which data analysis demonstrated was an interesting practice to undertake due to the role of cross-border electricity trade in sub-

[45] Not to be confused with literal replication of multiple case studies, which Yin (2003) discusses at great length in case study design (pp. 39-42). This case study is not representative of all cross-border electricity trading relationships, it is representative only of the situation between the economies examined; this also supports the use of Critical Realism in the epistemological framing of this research, whereby a variety of experiences can be true in the same setting but differentiated by only a few changing variables or actors involved.

regional energy and electricity access, as well as the role of ASEAN in advancing EMI in the subsystem.

Elites and experts (both of which make up the interview subjects of this research) have been identified by Sovacool et al. (2018) as being exceptional groups that contribute to empirical novelty in research and extracting data from them "can provide an important, often missing contribution to a given literature" (p. 20). In this case, being able to combine interview data from subjects that are members of 7 different fields (Academic, Business, Development Bank, Former Government, Multilateral Organisation, Journalist, Think Tank), offered increased novelty and insight into this specific topic that is not available in the same way elsewhere.

Prior to the commencement of interviews the author created a mind map using NVIVO Plus 12. This map was meant to connect the disparate areas of study, various perceived actors to be involved, and potential issues that may arise in relation to the research topic, cross-border electricity trade in East Asia. The author attempted a mind map as an organisation tool (see figure 3.7 in Section 3.4), finding this also helped inform the development of the research project aims, research questions, and research objectives as interviews progressed. Revision of these items based on clarity of issues and interview feedback was helpful in the development of the research approach, and fundamental in the progression of the research methodology. The subsequent research project aim, research questions, and research objectives are summarised in Table 1: Research Plan, previously introduced in Section 1, *Methodological Approach*.

This method of matching research objectives and questions with the appropriate means of data collection and analysis is identified by Sovacool et al. (2018) as an important factor in producing rigorous qualitative research. This author chose to use a content analysis of interviews via thematic analysis of interview responses, identifying commonalities among interviews and matching these commonalities with themes that emerged and axial codes that stem from each theme.

In addition, the author chose to identify a case study for in-depth examination of a particular set of countries in East Asia and their engagement in cross-border electricity trade. Yin (2009) points to case studies as using multiple sources of evidence:

> …with data needing to converge in a triangulating fashion, and as another result, benefits from the prior development of

> theoretical propositions to guide data collection and analysis (p. 13).

Yin argues that, as such, a case study design is not just one method, but a collection of methods and designs used to create a research strategy that is used to answer clearly defined questions. In this context, the defining and refining of research questions based on interviews and data collection allowed the author to assess the groups, organisations, policies and countries (Sovacool et al., 2018) involved in cross-border electricity trade in East Asia and their contribution and role in the expansion of EMI in the region.

The author's approach to data analysis developed into a combination of both a narrative and systemic review—structured, including the creation of research questions, careful choice of interview subjects, thematic analysis of interview results, and also synthesising collected data within identified themes (Denzin & Lincoln, 2011). Sovacool et al. (2018) identify systemic literature reviews as being time intensive and subject to bias; this is true in the author's experience. Ultimately this inductive approach seeks to generate ideas and hypotheses (Denzin & Lincoln, 2011) related to the success and failure of cross-border electricity trade and EMI initiatives in East Asia, rather than prove one policy approach is better or worse.

3.3.c Reliability & Validity

Arguments for and against validity in research are often divided across quantitative and qualitative fields. In the case of this research the author does not believe that full validity can be achieved, or that reliability of interview subjects and data can be 100% guaranteed.[46] However, the author did take certain steps to ensure measures taken were consistent and promoted trustworthiness in research design and methodological rigor (Rudestam & Newton, 2007). These include conducting multiple interviews via the snowball sampling method, refraining from giving opinions on interview subject feedback, and the creation of a thorough interview protocol (see section 3.4 and Appendix C for more details) with open ended questions, question bridges, probe notes, and predetermined questions to focus on if time were to run out (Berry, 2002, p. 681). Efforts to ensure internal validity included utilising multiple data sources (Rudestam & Newton, 2007), consisting of stakeholder documents provided by informants, publicly provided data, and organisational data sets. The audit trail

[46] See also Lincoln and Guba (1985) or Rudestam and Newton (2007) for more debate on the presence and presentation of validity and reliability in qualitative research.

(Rudestam & Newton, 2007) of this research was also detailed and organised, allowing for quick reference to interview transcripts, data about interview subjects, recommendations, and author notes on interviews, enhancing the trustworthiness of data gathered. Triangulation was another trustworthiness tactic that was employed, whereby the author used multiple methods and sources to illuminate common themes (Rudestam & Newton, 2007, p. 114), which is also in line with methodological choices outlined previously in this chapter. In addition, the author thoroughly read up on each interview subject prior to meeting, offered conversational questions about subjects' roles and organisations to begin, and was flexible where interviews took unexpected turns (Berry, 2002, p. 682).

The choice of interview subjects was decided via two avenues—first, a selection of interviews were identified and confirmed prior to commencing. Then using the snowball sampling method additional interviews were explored. While snowball sampling was useful in expanding the interview sample size, and also exposing the author to increasingly narrow expertise relevant to this research, there are critiques of the method. Notably in social sciences the critiques centre around sample diversity and do in some cases call into question the validity of research where all interview subjects come from the same or similar views, or when the 'grounding' of an interview sample comes from the original interview that snowball sampling originated from (Biernacki & Waldorf, 1981).

In their work on snowball sampling Kirchherr and Charles (2018) provide a broad overview of scholarly arguments for and against sample diversity, arguing that ultimately validity itself is a contested idea but sample diversity can be improved across qualitative research areas. Kirchherr and Charles (2018) define sample diversity as "the diversity of a sample as a measure of the range of viewpoints that have been gathered on a central phenomenon" (p. 3). Providing sample diversity can be achieved in a number of ways, which Kirchherr and Charles expand upon from previous literature, providing a quantitative analysis of effectiveness of particular methods. This includes using a diverse sample 'seed'—the initial interview subjects must be as diverse as possible. This was done in this research, where a variety of organisations and subjects were targeted, with additional subjects from the same organisation only being used if recommended by the original seed. Additional methods used to ensure diversity in the snowball sample included face-to-face interviews where possible and persistence (to a certain extent, as suggested by Kirchherr & Charles, 2018) in soliciting interviews from particular subjects.

One particular argument in support of snowball sampling that resonates with this author is that generalisations about complex issues do not serve the contextualisation of complex ideas or issues (Creswell, 2005, p. 203). This is particularly true in area studies, where generalisations of populations or regions are avoided (Huotari et al., 2014). Other arguments against validity concerns in snowball sampling include support for the value of unique knowledge that is obtained via interviews—no interviews like this, for example, have been conducted at this exact time or with these exact people in history (Noy, 2009).

Snowball sampling was limited to a certain number of interviews as a result of sample saturation—whereby the collection of additional interviews did not reveal new or novel results (Glaser & Strauss, 1967; Morse et al., 2002; Rudestam & Newton, 2007). Among qualitative PhD research examined by Mason (2010), the average sample size is in the low 30s, reflected similarly in this author's own work. A thorough review of literature on sample saturation by Mason found that the recommended sample size for reaching saturation in qualitative research ranges from 6 to 60+, as is similarly reflected in PhD research that was surveyed (p. 4). This presents an interesting quandary, as qualitative research requires a large enough sample size that important or relevant positions are uncovered (see earlier point re: generalisations), but small enough that the data collected does not become repetitive (Mason, 2010, p. 2). While sample saturation (or *adequacy*, as referenced by Morse, 1995) is a common tool employed by researchers across fields (and particularly among PhD researchers in qualitative research projects) sample saturation is a contested topic and can lead to research bias and flaws in sample selection and data analysis (Mason, 2010). Despite this contestation there are a few steps that can be taken to strengthen validity—this includes exploring context of saturation further if time allows, following the data and results as opposed to aiming for an arbitrary sample number, recognition of the limits of qualitative research, and understanding that saturation is a degree not a finite number that is dependent on the research and tools available at that particular time (Mason, 2010). In addition, this research plan did not have a final number goal for interviews and aimed to avoid directing interview sampling based on data but instead on snowball sampling.

A significant limit to the validity of this research is the sub-populations sampled. The sub-populations chosen for this research included public and private sector leaders in areas of energy, electricity, trade, and climate policy as well as some academics. A significant sub-population missing from this sample is civil society. The author chose to omit civil society subjects due to access, potential language

limitations, and already existing contacts among potential interview subjects. This limitation, and how it can be addressed in future exploration of this topic, will be discussed in the final chapter of this research Chapter 7, *Conclusions*.

An additional limit to the validity of this research can be found in the recommendations—the majority of interview subjects had similar liberalisation recommendations for national electricity markets. This recommendation is also reflected in the majority of literature, and in the author's view, reflects a common global and societal tendency towards capital driven economic systems and practices. This is not to say these recommendations are inherently incorrect, simply that the positionality of interview subjects is reflected in their interview responses.

3.3.d Ethical Considerations

In order to ensure reliability of data collection and research outcomes the author completed an ethical review prior to the commencement of interviews. This was completed in line with University of Leeds standards and practices and was reviewed by the University of Leeds Faculty of Arts, Humanities, and Cultures Research Ethics Committee. In addition to responding to questions related to the ethical considerations of the research planned, the author was also required to submit a risk assessment in which cultural and geographical considerations were taken into account in the research design and interview protocol. This ethical review application was approved with no corrections (See Appendix B for ethical approval response). The following subsection will explore these considerations in detail, situating the author's ethical considerations within the greater research design and methodological choices.

Elite interviews, while effective, do pose ethical challenges for researchers. In this case, the author was seeking to obtain the views, opinions, and insight of interview subjects rather than official views from the organisations they work through or represent in a professional capacity. As such, the author did not encounter any ethical issues related to conflict of interest or culturally/politically sensitive issues. The information looked for was largely based on the experience of interview subjects working publicly or researching in an energy, trade or governance capacity, therefore limited politically sensitive information was exchanged.

In one instance the interview subject (*Think Tank 11*) asked for certain experiences related to national policy making in East Asia to be omitted. In that case the questions and answers were redacted and not included in the

subsequent interview coding and thematic analysis. In another instance *Former Government—Informant 1*, who began as an interview subject but became an informant, providing multiple interviews and a variety of resources, asked for some internal organisational materials to be omitted from final presentation, but suggested they would be helpful in providing insight into the dynamics of trust within ASEAN. This was fundamental in improving the author's approach to trust, and guiding the author's exploration of the theme, but naturally influenced the author's positionality.

Information on the purpose of the research, the researcher's responsibility, and the subjects' rights to remain anonymous were introduced to the subject before he/she agreed to participate. The interviewer's identity as a non-judgemental, politically neutral researcher was especially clarified before the interview to minimise potential misunderstanding in the conversation. Information was provided via email and in person prior to the commencement of the interview, offering the interview subject opportunity to withdraw, general expectations, and insight into topics to be discussed. The author aimed for each interview subject to enter into the interview exchange fully informed with no surprises.

The researcher was also attentive to different cultural contexts and aimed to employ cultural competencies as a means to build trust with participants and effectively carry out qualitative interviews (Suh et al., 2009). Suh et al. (2009) adapt the work of Campinha-Bacote (1994, 2002) in health care industries to interviews with Asian immigrants. In this context cultural competencies are identified as cultural awareness, knowledge, skills, encounters and desires employed with interview subjects from different cultural backgrounds or in different cultural settings (p. 195). For the use of this research the author employed different cultural competencies with different interview subjects; With Japanese subjects honorific speech was spoken throughout the interview; with Chinese subjects social norms were also abided to show the interviewer's respect for subjects; with Southeast Asian interview subjects consideration of shared knowledge, experiences, and reverence for expertise were demonstrated; with American interview subjects shared connections were utilised to demonstrate utility of building relations and 'networking'. Post-interview contact (e.g., thank you letter, gift[47]—as is common in Asian cultures

[47] For more on gift-giving for relationship building in Asia see D'Souza (2003). This practice was also referenced in the ethical review and approved given author's careful considerations of implications. See Appendix B.

when engaging in exchanges with senior officials—information about research progress, etc.) was made with all interview subjects in order to encourage a reciprocal relationship and aid in follow up post interview. The work of Huotari et al. (2014) was very helpful in placing regional studies within the research methodology and cultural considerations necessary for doing research in Southeast Asian contexts.

Data derived from the interviews was stored in accordance with University of Leeds standards and practices, as approved via ethical reviews. This is discussed in the following subsection.

3.3.e Data Protection

During the research process, data was stored on the University of Leeds M: drive and University of Leeds OneDrive portal for temporary storage, analysis, and reference during travel and the write up process. Interviews were transcribed as soon as possible, immediately following the completion of interviews so that timely follow up could be managed if necessary. These interview transcripts were stored electronically on the M: drive and on OneDrive. Once an interview was completely transcribed, the written notes of the interview were disposed of. During the course of the research, electronic data was stored in both non-proprietary and proprietary formats (such as Microsoft Word) for the convenience of the researcher. OneDrive was also utilised while travelling for ease of access and through secure servers only (i.e., no internet cafes, etc.).

After the conclusion of research, some data will be available on the University of Leeds' Repository. Data will also be saved in open-source formats to ensure long-term accessibility. Types of data to be shared include interview transcripts, statistics, and case study data. All anonymity of subjects will be preserved.

Additional data protection measures have been carried out to ensure protection of the interview subjects, who agreed to participate based upon anonymity. Data collected during the interviews was entered into the research deliverable with no information allowing the identification of the source included. Direct quotes were edited with subject approval so as to remove any identifying features. Interview notes did include the name, position, work place, home country or any other personal data of each respondent. The interview notes, when stored temporarily, were stored in password protected computer files. Coded identification data and pseudonyms was stored in separate password protected files that only the researcher maintains access to. The identity of a participant's workplace was identified only if it was important for the research's

purpose, and this practice was done sparingly. For example, a participant who works for a research organisation may choose not to disclose the identity of his or her workplace but may allow inclusion in the research that he or she is a "development bank representative" or "official in the Ministry of Trade and Industry in Japan," etc. However, participants have remained anonymous unless they explicitly wish to be named in the research. No one but the researcher has access to this research data.

3.4 Methods: Data Collection & Analysis

The following section describes the interconnected data collection process from start to finish, identifying processes used and methods combined. This mixed method approach is reflective of the cross-disciplinary nature of cross-border electricity trade and the need for a multi-level perspective of EMI issues given the local, sub-regional, regional and global actors and institutions involved.

3.4.a Preparing for Data Collection

In preparation for data collection and based on the critical realism epistemological starting point described previously, this research was initiated with an exploratory approach (with the intention of ultimately building an explanation for this unique case) focused on identified research questions. This was done with the aim of identifying any additional theoretical and analytical approaches that may be relevant based on the issues that surround EMI. To begin, the author conducted a thorough review of cross-cutting literature in the fields of IPE, East Asian studies, and sustainability research with a specific focus on electricity market development, expansion, and integration. Literature reviews took place in separate Microsoft Word Documents identified by theme. Key terms and themes were identified across the literature reviewed and were taken into consideration when analysis of interviews began and throughout the thematic analysis process. In some case new themes were identified in the interview analysis, and then reviewed in relation to already consumed literature (i.e., trust appeared in interviews but was not originally identified as a relevant theme in the literature review). Using information gained from the literature review process, research questions were refined and an initial case study design developed. Preliminary public data was identified and ethical approval and risk assessment were attained prior to conducting initial research trips and background interviews.

3.4.b Documentary Data

Primary and secondary documentary data played a vital role in shaping the research design, data collection methods, and results of this research. Documentary data was collected prior to data collection, during interview collection, and following completion of interviews and during data set analysis. Documentary data includes confidential and public government and policy documents, academic literature, personal notes and "insider" reports collected from interview subjects and relevant online resources. These documents supported interview question development, thematic analysis, and background understanding necessary to approach this cross-disciplinary research. In the case of confidential documents additional research snowballed into identified, relevant areas, expanding the scope of understanding used in approaching eventually data analysis. Secondary data was primarily used for electricity market data collection, in the forms of energy data sets publicly available through research and governmental organisation websites; however, in some cases interview subjects did point the researcher towards additional resources for expansion of electricity market data. In a number of cases data sets had to be combined or updated with new information where existing electricity market data was lacking either some indicators and/or using old data (as was the case with interconnection maps developed and utilised in Chapter 4, *Sub-Regional Market Factors).* In such cases source and organisation information has remained protected and confidential.

Analysis of these different documentary data forms assisted application of IPE themes to the cross-disciplinary data collected via interviews and electricity market mapping. Combining IPE themes with electricity market indicators, EMI pre-requisites as identified by Oseni and Pollitt (2014), and interview subject viewpoints opened up the analysis to include the development of the author's own EMI indicators (identified as "O&PCRB EMI Criteria" in Chapter 5, *National Market Factors*). This was vital to the author's understanding of EMI and cross-border electricity trade potential and expansion in Southeast Asia, and indeed resulted in original contributions to this cross-disciplinary area of study.

3.4.c Interview Data

32[48] elite research interviews were conducted with government, business, and academic leaders in areas of energy policy, electricity market integration, variable renewable energy integration, climate change responses, and East Asian energy and climate policy (Dexter, 1970, p. 19). Subjects included representatives from international organisations, senior level corporate representatives, energy experts from Asia, and senior level retired or active government leaders. The author's experience working in the field of energy policy, with a particular focus in the Asia-Pacific, aided in obtaining these interviews and offered a credible advantage to requests for interviews. The risk assessment discussed in Section 3.3.a of this chapter was submitted to the University of Leeds for ethical review and approval prior to the commencement of interviews (See Appendix B).

The number of participants was estimated by taking into account publication and recommendation goals, prior research experience, and the breadth and importance of this research. The author's own investigation into the number of qualitative interviews necessary for rich, complex, and detailed research has shown that quality is more important than quantity. In addition, in order to formulate a well-informed series of conclusions the author deemed high-level, experienced subjects as the goal interview subject audience. Among social science researchers there is no definitive requirement for number of subjects interviewed. Instead, there is a variety of minimum requirement for sample sizes (See: Gerson & Horowits, 2002; Mason, 2010; Bryman, 2012; Emmel, 2013). Sample saturation was instead deemed as the goal and is discussed in more detail in *Reliability & Validity* subsection. An initial target of interviews was estimated (Emmel, 2013), however, saturation was achieved around 32 interviews.

A portion of interview subjects were already identified and/or confirmed their willingness to participate prior to beginning the interview process. Based on discussion with senior level academics from both the United Kingdom and the United States 68 initial interview subjects were broadly identified based on knowledge and relationship with the author; this was narrowed down to 15 interviews based on responses, availability, expected time constraints, and relevance of interview subject expertise. Utilising snowball sampling additional

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[48] A total of 68 interview subjects were initially identified, of which 32 interviews were conducted and only 26 provided useful material. Further details can be found in Appendix A.

interviews were included based on interview subject recommendations (Bhattacherjee, 2012), raising the number to 32. Based on these 32 interviews only 26 provided useful feedback, due to quality, information gleaned, and impact of the interview. This figure was finally settled on, as opposed to adding new interview subjects, due to the theoretical saturation of interview material, in which no new data appeared and all primary concepts had been well-developed and further context was targeted for exploration (Emmel, 2013).

In some cases, multiple sources from the same organisation were utilised based on snowball sampling recommendations. This did offer the opportunity to receive multiple viewpoints from within a single organisation, which were in some cases different. However, this tactic must also be used sparingly so as to avoid moving the results in a biased direction, whereby multiple subjects have the same responses based on their internal bias as a result of organisational ties or organisational stances. Fortunately, inter-organisational recommendations only occurred 4 times.

Ethical dilemmas in conducting personal interviews were considered, as a number of interviews were conducted with former colleagues. Considerations include context, conflicts, and openness, and where possible interviews were conducted in person and over multiple meetings (Woliver, 2002). Interviews were also conducted over a yearlong period in a variety of locations, based on schedules, travel, and the occurrence of conferences or workshops that facilitated meeting in person. This method of fieldwork was chosen both for convenience and finance purposes—funding for attending or speaking at conferences and workshops supplemented author funds and time could be maximised for international trips to multiple locations.

In person interviews were conducted in the United Kingdom (London, Leeds), Germany (Berlin), France (Paris), the United States (Washington, D.C.), the Philippines (Manila), Japan (Tokyo), and South Korea (Seoul). Additional interviews via skype were conducted when travel was not available, including interview subjects in Australia (Melbourne), Indonesia (Jakarta), Singapore, China (Beijing, Shanghai), and the United States (New York).[49] In accordance

[49] Hine (2005) explores methodology in virtual research, including interviews, in her edited edition, *Virtual Methods*, which was useful in considering the challenges unique to online interview relationships. In particular, Joinson (2005) discusses ways in which virtual (online or phone interviews) can differ from in-person interviews in terms of data collection,

with common data collection recommendations (See: Rudestam & Newton, 2007; Yin, 2011), interviews were recorded with subject permission and transcribed by the author within 24 hours of interview completion. Transcriptions were saved on the University of Leeds document cloud in line with data protection procedures outlined in Section 3.3.e. Transcriptions were analysed by the author following completion, whereby supplementary material, including field notes taken during the interview and resources identified as requiring further research or clarification were addressed and also included in document comments. Transcriptions were formatted following NVIVO requirements for seamless coding, including heading styles and font specifications (Adu, 2019). As transcription occurred in a variety of geographical locations, depending on author location, uploading to NVIVO did not occur until following travel return to Leeds.

As is standard in elite interviewing, open-ended questions were primarily utilised (Leech, 2002). Systemic approaches to common methodological issues associated with elite interviewing were employed, including probe notes, a set of decision rules, subject bridges, and a few, optional, probe questions (Berry, 2002; Rudestam & Newton, 2007). Questions included planned prompts and informal prompts and avoided presuming questions (Leech, 2002). Interview questions also progressed "from nonthreatening to threatening" with "non-judgmental, non-threatening wording" as a means to remain sensitive to interview subjects' professional responsibilities and political sensitivities (Leech, 2002, p. 666).

Cultural standards and norms were also considered when interviewing elites in Asia. Professional experience of the author in the Asia-Pacific, as well as educational and personal experiences living in China, lent to credibility and sensitivity with interview subjects. In particular, mutual, influential professional relationships or ties (called *guanxi* 关系 in Chinese) aided in the ability to gain access to and conduct interviews with Chinese or other Asia-Pacific elites (Beijing Foreign Languages Institute, 1979). The concepts (Beijing Foreign Languages Institute, 1979) of favour

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trustworthiness, and honesty (pp. 25-234). In this research interview subjects were, for the most part, not complete strangers; this, coupled with the necessary anonymity agreed upon prior to interviews, did not result in any perception in differences between in-person and virtual interviews. Kivits (2005) discusses the building of rapport and strengthening of relationships via email correspondence and virtual interviews (pp. 35-50), while Orgad (2005) discusses strengthening informant trust with both virtual and in-person relationships (51-66), both of which were considered and observed when engaging with interview subjects.

(*renqing* 人情) and prestige face (*mianzi 面子)* were also considered as a means to return professional favours and provide elite subjects the respect their status and position provides them in Asian culture (Wang, 2014). Where interviews were conducted in a setting with which was unfamiliar, consultation with professional contacts took place for advice on proper etiquette and professional norms. While this research does not touch upon any explicitly controversial or taboo topics, respect and consideration was paid to foreign government views on information sharing and conduct with foreign researchers.

In addition, a detailed interview protocol was provided to each interview subject prior to the commencement of interviews both via email and in person. An overview of this protocol can be seen in Figure 3.3 as well as in more detail in Appendix C:

Figure 3.3 Interview Protocol Overview

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Cross Border Electricity Trade in East Asia: Interview Protocol

Contextual Protocol: Research Objectives

The variability of electricity produced from clean energy resources provides an opportunity for sub-regional and international electricity market expansion and the efficient disposal and purchase of power capacity. Based on the resulting potential for cross border electricity trade, this research examines the expansion of these markets in Asia and opportunities for their further development. A number of issues play a role in this research: including national and sub-regional electricity market development, sub-regional governance, interconnectors, and trade governance. A case study examination of (1) a European Union success in electricity trade and (2) a potential growth market in East Asia will be conducted following informative expert interviews.

Introductory Protocol

You have agreed to take part in a research study entitled 'Cross Border Electricity Trade in the East Asia.' The following information is for your convenience and understanding, but please do not hesitate to ask for clarifications or more details should you need to.

This interview will take between 30-60 minutes. During this time, I have several questions that I would like to cover. Follow up via email may be applicable should we run out of time or be interrupted. I may ask you to provide information, recount events, or describe your experiences and understanding about issues of importance to trade and economy policy, electricity markets or clean energy utilisation. With your permission, the interview will be recorded in digital audio and subsequently transcribed. Once the transcript is finished, the voice recording will be disposed of.

Participants will remain anonymous unless they explicitly wish to be named in the research. If you prefer anonymity, the data will contain no personal information. With your permission, I may include information on your occupation but this requires your explicit approval and the interview does not depend on it. The data collected during this study may be used in presentation at conferences or in publications. However, all anonymity will be preserved.

You have the right to omit or refuse to respond to any question that I may ask. You will be given the right to withdraw at any point up to October 1, 2018. You also have the right to ask that any data you have supplied to me during the interview be withdrawn or destroyed. If you wish to withdraw from this study, let me know by phone or email at any time. My contact information is listed on the release form.

Please sign this release form to demonstrate agreement with these stipulations. This document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time. Thank you in advance for agreeing to participate.

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Background Protocol

1. How long have you been:
   a. Working in your current positions?
   b. At this institution?
   c. Retired?
2. What is your:
   a. Highest degree?
   b. Area of expertise?
   c. Probes: Years of relevant experience? Other relevant qualifications?
3. Briefly describe your role (office, committee, organisation, etc.) as it relates clean energy development / electricity trade / electricity market integration (if appropriate).
   a. Probes How are you involved in policy making/coordination/responses here? How did you get involved? What motivates your organisation?
4. What are some of the current [research] projects you're conducting?

Conversational or Transition Questions: (Pick and choose based on situation)

5. In recent years, we've seen numerous positive trends in policy towards the transition to clean energy. Is the speed of change fast enough to meet the climate and efficiency targets?
6. If we look at the East Asia/ European Union, what have been the most important legislative initiatives in favour of the energy transition?
   a. Probe: Do you know of specific initiatives geared toward electricity market integration or electricity trade expansion?
7. What is the role of trade policy in climate change adaptation?
8. What trade policy and/or theoretical approaches can make the best case for optimising clean energy's contribution in addressing climate change and energy security challenges?

Key Questions: Electricity Markets:

9. What is your understanding of cross-border electricity trade and/or electricity market integration in reaching global emissions reduction targets?
10. What is the role of trade policy in the growth of cross border electricity trade?
11. In what ways can governments incentivize or enable…
    a. Cross border electricity trade?
    b. Interconnector development/expansion?
12. What is changing about international and national policy initiatives in electricity market integration?
    a. *Probe:* What is being accomplished through these initiatives?
13. What kinds of networks do you see developing around electricity market integration and cross border electricity trade?

This protocol was created in line with recommendations by Castillo-Montoya (2016) and primarily served to inform the interviewer of subjects to be covered, questions, and processes related to the interview process (anonymity, data protection, deadline for removal from project, etc.). This protocol was drafted and piloted with the first background interview, *Academic A20* and feedback was solicited from *Former Government Official—Informant 1*.

The following subsection will dive deeper into the analysis process of interview data. This includes identifying the coding process used and the resulting key themes that emerged, shaping the progress of this research and the outcomes to research questions.

3.4.d Data Analysis: Interview Coding

NVIVO interview coding was done primarily as a function of content analysis of interview transcripts. Work of Vaismoradi et al. (2013) informed the author's selection of content analysis for data collected via interviews. Emmel (2013) also discusses the benefits and limits of content analysis, or systematic coding, for analysing large amounts of textual information, recommending NVIVO for word or category frequency and cluster analysis. All of these methods require researcher knowledge and methodical analysis of relationships, contexts, and discourses relevant to the material (Emmel, 2013, p. 190). NVIVO is primarily a content analysis tool, where trends and patterns of words are identified using manual (researcher led) and auto (program led) coding.

Interviews were initially coded using NVIVO's auto code function, by which all interviews are analysed for common words and phrases. Initially more than 600 patterns were found, ranging from 2+ mentions to 19 depending on the interview subject, expertise and questions. Subsequent codes were run via NVIVO programming to refine patterns and manual coding based on themes identified in documentary data collection and literature review were manually completed by the author. This led to a slightly refined 100+ patterns that were then manually narrowed down by the author, resulting in an eventual 68 patterns. This narrowing down process included combining related terms or nesting related terms as "child codes" where relevant, deleting similar terms or mentions that didn't pass a certain threshold (5) and adding new codes or "parent codes" where organisation was lacking and terms could be combined under umbrellas of similarity.

The process of content analysis and interview coding was, while visually interesting, very time intensive. It required reviewing the original code patterns

multiple times, as well as combing through the text of each interview individually, in order to make sure no potential data was ignored. As mentioned in the previous subsection, prior to coding interviews had to be individually formatted to NVIVO specifications in order for the coding process to run seamlessly. This required transcribing each interview, formatting each interview, and uploading each interview into NVIVO manually. All of this detail, while time intensive, did allow the author to thoroughly review each interview multiple times. This meant that deeper attention was paid than had a single NVIVO auto-code been run off of a computer-generated transcript.

This process does pose the risk of human error. However, the author found the NVIVO auto coding process created a number of repetitive codes, which required human analysis to decipher. For example, initial coding resulted in 65 mentions of energy in any form. This included mentions like “energy policy” and “energy policy planning”, among many others. Deciphering which are of these mentions of energy are repeats of the same conversation, which had not been included in the first place, and which were completely separate entries required the author to review each and every mention independently.

In advance of beginning the coding process the author reviewed the NVIVO 11 and NVIVO 12 manuals, consulting both NVIVO resources and University of Leeds IT department resources. In addition, the author became very familiar with the work of Dr. Philip Adu, who utilises NVIVO for his cross-disciplinary social science-based research. In addition to his book *A Step-by-Step Guide to Qualitative Data Coding* (2019), Dr. Adu has created a treasure trove of online videos for students to learn the software. *Qualitative Data Analysis* by Grbich (2013) also provided an introduction to the software and its usefulness in qualitative, social science research. Learning the software, and how to generate codes automatically as well as manually, was itself a very time-consuming process.

Once interview material was narrowed down into smaller and smaller levels of codes analysis could begin. The process of analysing these codes and identifying common themes will be discussed in the following subsection.

3.4.e Data Analysis: Thematic Analysis

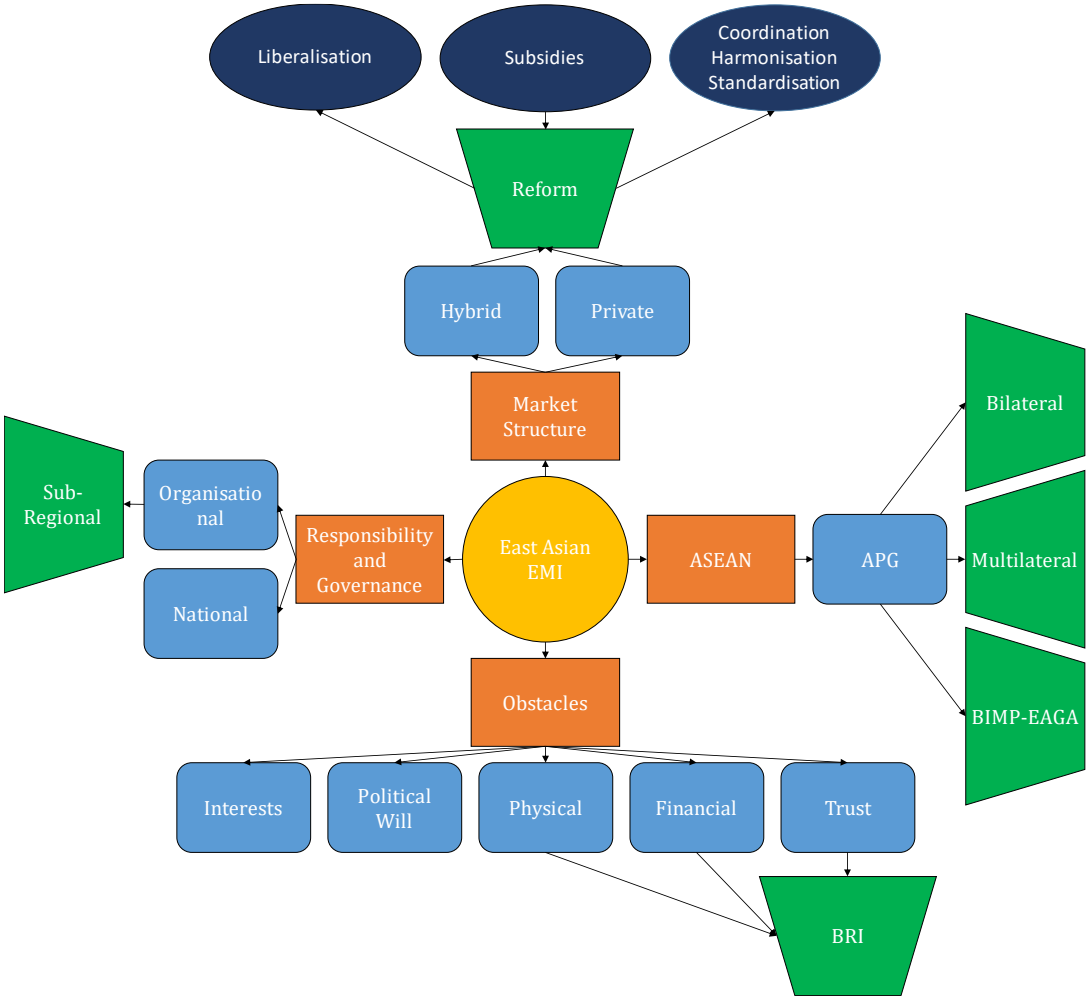
The thematic analysis carried out via NVIVO coding was largely informed by the work of Braun and Clarke (2006), whose work on thematic analysis in a variety of social science fields has informed the author’s addition of this mode of analysis. Vaismoradi et al. (2013) posit that while content analysis is more

widely known and often used interchangeably with thematic analysis, thematic analysis offers some yet unseen and unused opportunities for social science research (p. 400). Braun and Clarke (2006) posit that thematic analysis is a flexible method of analysing data across an entire collective data set (in this case interviews, electricity market data, and literature), and involves the discovery of shared commonalities, or themes, across data types (Braun & Clarke, 2006, p. 6). Themes are not merely waiting to be discovered, as with word frequency in content analysis, but links are made via the knowledge of the data that the researcher possesses (p. 7).

Thematic analysis is also not wed to a particular theoretical framework, so flexibility of the research approach is one additional, key benefit (Braun & Clarke, 2006, p. 8). As such, application of thematic analysis to this research, rooted in the epistemological approach of critical realists but informed by the structures and processes of IPE theory, is a natural fit. As Braun and Clarke say, "thematic analysis can be a method which works both to reflect reality, and to unpick or unravel the surface of 'reality'" (p. 9). In addition, researcher judgment is necessary to identify themes, and prevalence can be determined at varying levels and of varying importance. In this case thematic analysis followed a deductive approach, whereby themes line up with theoretical underpinnings of IPE theory, and analysis occurred at a latent level, where themes needed to be interpreted and theorised and relationships are assumed to be present (p. 13).

From the narrowing down of these themes the original mind map, discussed in Section 3.3.b, *Elite & Stakeholder Interviews*, was narrowed down to the key issues identified in thematic analysis of interviews and electricity market data. It can be seen as follows:

Figure 3.4 Resulting Mind Map



3.5 Positionality of Research

The positionality of this research stems from the author's own personal and professional experience and, despite efforts, has no doubt informed the scope of this project. Bourke (2014) identifies positionality of both the researcher and research participants as having an impact on the research product (p. 1). These impacts stem from the identity of those participating, impacting the methods, processes, and eventual product of the research. The author, a Caucasian female from an American family, with extensive educational and professional experience in Asia, has been influenced greatly by her own positionality in the world, with experiences, values, and even identity prejudicing her own perspectives and reflections on the work described in this chapter. This section seeks to briefly explain the positionality and reflexivity of the author's work, offering perspective on the methodology and methods employed in this research.

Prior to beginning the research described in these pages the author worked energy and trade policy research based out of Washington, D.C. but with responsibilities throughout the Asia-Pacific. In this role the author oversaw research, publications, and conferences for a variety of projects focused on global energy issues. In addition to professional experience the author has personal and educational experience in Asia spanning three decades. The global energy issues this author was exposed to professionally are reflected in the story of cross-border electricity trade and this research narrative— as a result of climate change there is a pending imperative for changes to occur in national, regional and global energy mixes, requiring the integration of renewable energies, and cross-border electricity trade provides one solution to the variability of this integration. Consequent to this prior professional experience and influence on the research in these pages, this research falls broadly under the category of applied research, discussed by White (2009): whereby research questions derive from professional settings rather than academic, they principally address immediate issues rather than broader scientific debate, they are often situated in organisational or institutional contexts, and they are concerned with specific sites or populations (p. 30). Even in crafting the research questions themselves the positionality of the author has played a role.

These professional roles and personal experiences have, combined, influenced the author's approach to academic research. The author recognises her personal bias towards China and preference for approaching issues from a perspective of policy solutions. As such policy remains an ever-present consideration as the author conducts research on the pressing energy and electricity challenges described in these pages.

As a result of their bias towards China the author opted, at the outset of this research, to not include China as the only case study or focus, and instead keep a broader approach (East Asia) that would be naturally narrowed down via interviews and research. As was discussed in the *Data Collection & Analysis* section, China emerged as a common consideration via the Belt and Road Initiative (BRI) and its potential funding avenues for electricity market integration and power sector expansion in Southeast Asia. In the chapter 3 section on *Case Study Design,* analysis included a description of how China actually *wasn't* the natural choice for a case study, and as such was omitted in that regard. The later inclusion of China via the theme of trust was fitting for the author professionally, however, may be viewed as being a result of internal bias

based around the author's own interest and experiences in China, in spite of the best efforts to remove this bias from the research.

Due to these experiences the author has had to, at various points throughout the research process and examine her own positionality. This can be referred to as reflexivity (Attia & Edge, 2017, p. 34-35), in which the author has taken a developmental approach to research by engaging in persistent self-analysis, continually assessing author impact on the research (prospective reflexivity) and research impact on the author (retrospective reflexivity). This has guided the development of this project, as questions are adjusted based on feedback and exposure to the issues, theory is adapted based on understanding and positionality, and methods are combined and/or chosen in order to reach a logical point that the data directs to.

During development fieldwork reflexivity was apparent in both its forms, reflexive and retrospective. First, interviews based around conferences and workshops were chosen, in large part, due to access and funding. However, as new opportunities became available the author needed to add or remove certain fieldwork trips. Similarly, when a fieldwork trip did not produce many interviews the author had to reassess the type of event to build fieldwork around, resulting in what Attia and Edge (2017) refer to as "an evolving research practice (retrospective reflexivity)" (p. 38).

The positionality and reflection of the author have shaped the ways in which this research has played out, in particular the methodological approaches chosen (See also Section 3.2, *Methodological Approach)*.

3.6 Conclusions

The variability of electricity produced from clean energy resources provides an opportunity for regional and international electricity market expansion and the efficient disposal and purchase of power capacity. Based on the resulting potential for cross border electricity trade, this research examines the expansion of these markets in East Asia and opportunities for their further development and does so in the context of neoliberalism and DS. A number of issues play a role in this research: including national and sub-regional electricity market development, regional governance, interconnectors, and trade governance. This chapter has sought to situate the development of this inter-disciplinary research using methodological triangulation. This chapter introduced the exact methods,

techniques, analysis, and viewpoints utilised to explore cross-border electricity trade in East Asia.

First, the author identified research questions, linked these questions to related research objectives, and identified the relevant methodologies needed to answer these questions. Two separate areas of study were identified as being relevant to this IPE research—East Asian studies and sustainability research. As such, the author chose a mixed method approach to compliment the interdisciplinary nature of this research, using a case study research design with multiple methods of data collection to analyse the realities of cross-border electricity trade in East Asia. The separation of this chapter into two distinct sections—methods (the tools / what) and methodology (the justification for use of the tools / why) allowed for a distinction between the two in order to avoid the common academic pitfall of conflating them (Harding, 1987; Clough & Nutbrown, 2012; Schneider, 2014). This also allowed for clearly featuring the epistemological underpinnings of this research, offering a transparent explanation for the methodological approach, theory that informed it, and description of how the research was conducted. Case study choice was narrowed down using documentary analysis and recommendations from initial background interviews. Interview data was explored using content analysis and thematic analysis. In addition, data collection included an examination of electricity market structures in case study countries, providing insight into the needs of countries if they are to engage further in cross-border electricity trade. These two methods shed light on the interrelated nature of cross-border electricity trade and energy market integration (EMI). Subsequent analysis of key themes (chapters 4-6) will introduce EMI more specifically, providing perspective as to its relationship to cross-border electricity trade in the chose case study, BIMP-EAGA.

An exploration of current national policy, sub-regional initiatives, and regional and global energy and climate challenges has provided context to the difficulty and necessity of increasing cross-border electricity trade in East Asia. A qualitative approach of data gathering and analysis was used in the case study design, including an examination of official public and private sector information on electricity market structures in specific case study countries. This information was then contrasted with common recommendations identified in interviews and standard characteristics required in popular research on energy market integration (Oseni & Pollitt, 2014).

The development of the methodological framework, methodology, and methods has resulted in the formulation of additional, sub-questions that will be further examined in chapters 4-6. These sub-questions (Andrews, 2003, p. 33-44) aid in exploration of each primary question, adding context to the issues involved. These sub-question are as follows, identified in bullets under the corresponding primary research questions:

Table 3.4 Sub-Questions

Objective 1: Provide overview of cross-border interconnections and assess market factors in Southeast Asia
RQ1: How do governments understand the IPE of cross-border interconnections in Southeast Asia? **Sub-Questions:** • What are the energy and trade policy incentives for increased cross-border interconnections? • How can sub-regional electricity markets diversify their energy mix and reduce emissions? What Incentive to do so exist? **Resulting Chapter 4 Theme:** Sub-Regional Market Factors
Objective 2: Assess Market factors of Southeast Asian case study selection and identify areas of individual and collective reform needed to reach deeper levels of EMI among BIMP-EAGA economies
RQ2: How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets? **Sub-Questions:** • How does the political and economic structure of national electricity markets impact the expansion of cross-border interconnections in BIMP-EAGA? • Is the structure of national electricity markets conducive to sub-regional and international policy goals in Southeast Asia? **Resulting Chapter 5 Theme:** National Market Factors
Objective 3: Identify and analyse additional governance challenges to deeper EMI and increased electricity interconnections among ASEAN member states and case study selection
RQ3: What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian Development? **Sub-Question:** • What is the political and economic status of the ASEAN Power Grid? **Resulting Chapter 6 Theme:** Governance Challenges

These sub-questions, while not the primary focus of this research, offer insight into analysis that leads to answering the primary research questions from which they are associated. Each sub-question coincides with the associated objectives, themes, and primary research questions, aiding clarity in corresponding data chapters. The following chapters will explore these questions in more detail, starting with Chapter 4: *Sub-Regional Market Factors.*

Chapter 4
Sub-Regional Market Factors

4.1 Introduction

Chapter 4 is the first of three data analysis chapters, built around common themes identified in elite interviews. As discussed in Chapter 3 (*Research Design & Plan of Enquiry)*, interviews were conducted with elites throughout East Asia, Europe and the United States. These interviews resulted in findings that are reflected in data chapters 4-6. Common themes were identified based on analysis of interviews and interview subject recommendations. Three primary themes, (1) sub-regional market factors, (2) national market factors, and (3) governance challenges are each discussed individually in their corresponding data chapter.

This chapter ties the story of this research together by laying the foundation of the first theme, sub-regional market factors. Recalling Research Objective 1, this chapter will provide an overview of cross-border interconnections and market factors Southeast Asia. Of the three primary research questions identified in Chapter 1, this chapter will address Research Question 1 (RQ1): *How do governments understand the IPE of cross-border interconnections in Southeast Asia?* Two sub-questions identified at the end of Chapter 3 will also be addressed: (RQ1a) *What are the energy and trade policy incentives for increased cross-border interconnections?* (RQ1b) *How can sub-regional electricity markets diversify their energy mix and reduce emissions and what incentives to do so exist?*

This chapter will be structured as follows. First, based on insight from semi-structured interviews, Section 4.2 *(Sub-Regional Interconnections: ASEAN)* will examine the current and projected state of interconnections between ASEAN members. This section will emphasise ASEAN's premier energy connectivity project, the ASEAN Power Grid (APG). This data will paint a picture of the IPE of cross-border electricity trade in the sub-region, making links to specific subsystems that have been identified in the APG project. Section 4.3 (*Subsystem Interconnections: BIMP-EAGA)* will similarly paint a picture of the APG and its progress based on an examination of the BIMP-EAGA subsystem.

Section 4.4 (*Discussion)* will present the contradictions identified in this case study analysis, namely the contradictions between national versus sub-regional policy and necessary sub-regional reforms for EMI to flourish. In addition, the role of neo-developmental statism will be used to explain the IPE of cross-border electricity trade in the sub-region. Section 4.5 (*Conclusions*) will summarise the

importance of ASEAN and its EMI projects, linking the challenges posed between the structure of electricity markets in the region and what is needed to achieve full EMI. This chapter will provide initial reform recommendations that will be built upon in subsequent chapters.

This chapter also sets the stage for subsequent data chapters and corresponding themes—*National Market Factors* (Chapter 5), and *Governance Challenges* (Chapter 6). In this chapter the focus on sub-regional market factors in ASEAN will provide context to the largest sub-regional cross-border electricity trade initiative, situating this initiative within the context of sub-regional development and governance challenges all while utilising IPE analysis to explain the different interests at play.

4.2 Sub-Regional Interconnections: ASEAN

In order to determine the status of the APG an analysis of interconnectors is necessary. This is significant to this research for three reasons: (1) in order to assess cross-border electricity trade in Southeast Asia it is necessary to see where interconnections are in place, and which countries require more attention in order to develop sub-regional cross-border electricity trade; (2) mapping current and projected interconnections in Southeast Asia will help answer RQ1 (*How do governments understand the IPE of cross-border interconnections in Southeast Asia?*) and the associated sub-questions, RQ1a (*what are the energy and trade policy incentives for increased cross-border interconnections?*) and RQ1b (*How can sub-regional electricity markets diversify their energy mix and reduce emissions and what incentives to do so exist?*); (3) Answering these questions will go partway to explaining the extent to which climate change has created imperatives for EMI and power sector reform in Southeast Asia.

Chapter 2 (*Cross-Border Electricity Trade: Conceptual Approach & Review of Literature*) introduced the APG and organisational methods for managing the APG, via the HAPUA organisation and their studies via AIMS (ASEAN Interconnection Master Plan Study). An important aspect to understanding the economic, political, and physical dynamics of cross-border electricity trade among ASEAN member economies is the process for increasing interconnections, which have been laid out in the AIMS (ASEAN, 2004). AIMS I identified three primary subsystems within ASEAN that could be realistically targeted for increased interconnections based on geographical location. These identified subsystems have also been adopted in AIMS II (2010) and AIMS III (2018). In the original AIMS I systematic review of these subsystems and the

entire sub-region found that a single, integrated power grid was not economically viable based on an inability of individual ASEAN member states to confirm economic viability of initial interconnection projects (ASEAN, 2004). In 2004 HAPUA was reorganised and the more ambitious AIMS II was subsequently begun.[50] Published in 2010, contrary to AIMS I, AIMS II found that an ASEAN-wide power grid was economically viable but should be reached via bilateral, subsystem, and then sub-regional interconnections, setting a new strategy for the progression of the APG that better reflected the economic and political ability of individual member states to commit to interconnection projects (ASEAN, 2010). AIMS II also utilised a more complex modelling approach than AIMS I, incorporating the formulation of cost generation capacity and transmission estimates, transmission expansion planning of each system, generation capacity and transmission expansion planning of interconnections and overall determination of total cost savings across the sub-region. AIMS II also identified 12 additional interconnections for additional development (as well as the 5 interconnections in place at the time) expanding the scope of the APG project and building off of developments in the energy markets of individual ASEAN member economies and the national market structures already in place. Following on AIMS I's subsystem identification, AIMS II also adopted the same geographic subsystems, which were subsequently incorporated into HAPUA's EMI efforts—the establishment of an integrated approach to increasing sub-regional interconnections (APAEC, 2010). This can be visualised as individual markets, progression to multilateral markets, and eventually the joining of multilateral markets into a sub-regional electricity market, where electricity can

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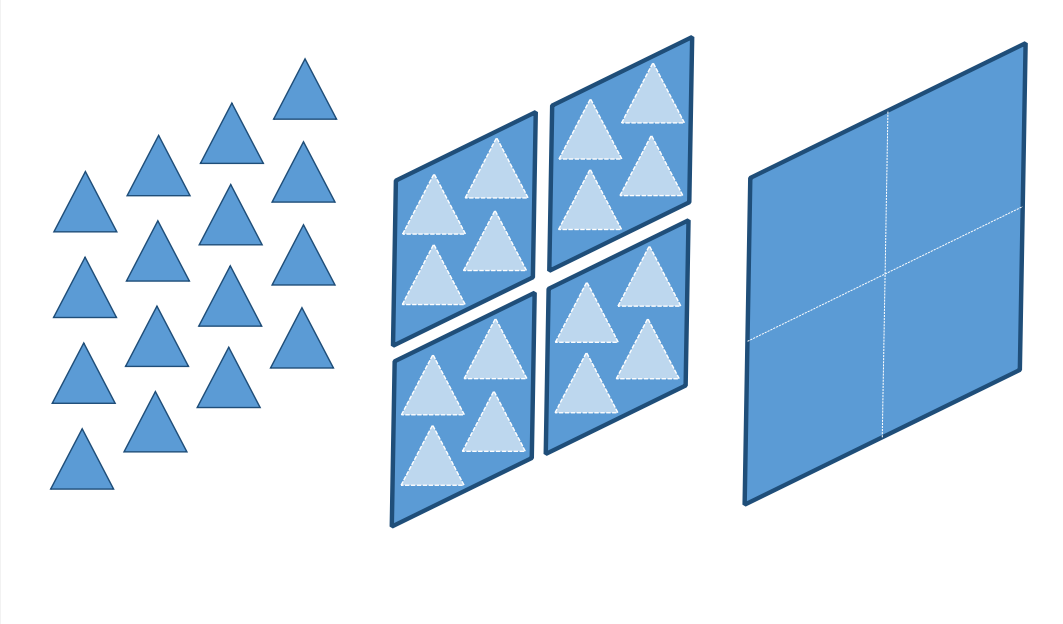
[50] Despite HAPUA's role in the development of the APG via the AIMS, HAPUA does not have enforcement or financial and political obligations to ASEAN member economies (IEA, 2015, p. 66). Similar to other working groups and committees within ASEAN, HAPUA is based on principles of cooperation with no implementation authority and remit only to manage and consolidate utilities and power authorities (p. 67). HAPUA itself has a total of 8 sub-groups and answers to the leadership of ASEAN Energy Ministers and ASEAN Senior Officials (Srisuping, 2013, pp. 6-7). Other organisations and working groups also play a role in the APG behind the scenes, including: ACE (the ASEAN Centre for Energy), which provides overall administration, coordinating and technical consolidation of all ASEAN energy initiatives (Andrews-Speed, 2013, p. 163); AERN (the ASEAN Energy Regulatory Network), which produces research on policy plans related to regulatory and legal frameworks for international and cross-border trade and investment in the APG (IEA, 2015, 66); and the APGCC (the ASEAN Power Grid Consultative Committee), a sub-group of HAPUA designed to facilitate the APG MoU implementation (p. 66). ASEAN's governance limitations are also the limitations of the variety of ASEAN energy groups and committees, and thus no single sub-group has power to hold member states accountable to ASEAN APG commitments or govern the APG process single-handedly; ASEAN's energy initiatives follow the "ASEAN way" of non-interference that can be found across the institution and its issue areas (Porter & Situmeang, 2005, p. 3).

be seamlessly traded among partners and their synchronised and standardised national electricity markets. An example of this EMI progression can be seen below:

Figure 4.1: An integrated approach to EMI in Southeast Asia



Source: Adapted from AIMS II (ASEAN, 2010, pp. 31-32), integrated approaches to interconnection.

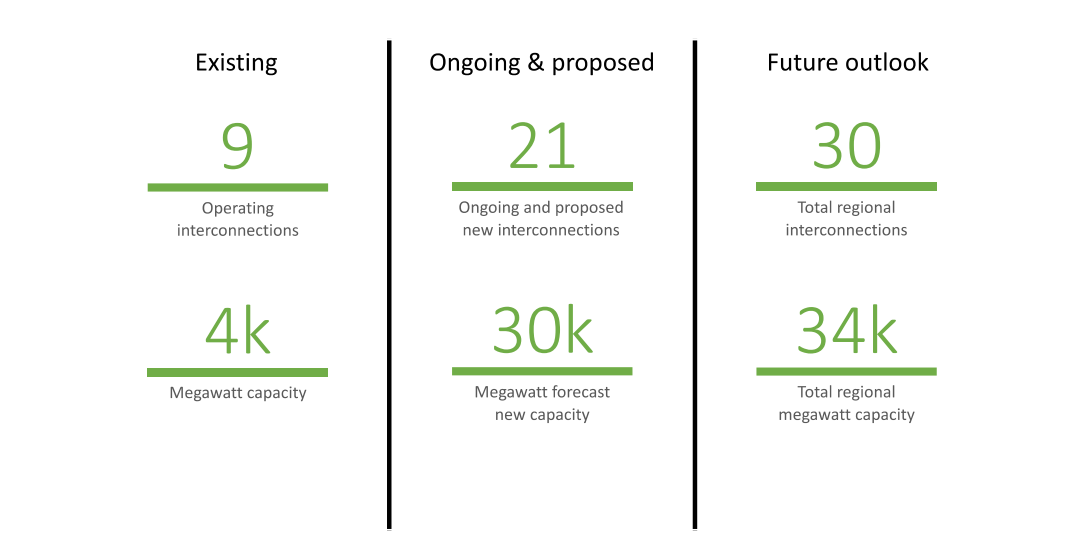
AIMS III (pending release) takes planning a step further than AIMS I and AIMS II. In addition to providing a status overview, AIMS III also sets criteria for assessment of and benchmarks for integrated power system performance (ACE, 2018). The edition of AIMS III will also include a feasibility study (ACE, 2018B) of bilateral and multilateral cross-border electricity trade that incorporates a high rate of renewable energy utilisation (assessing the 23% renewables goal previously mentioned against reliability and identified system needs). According to insight from *Multilateral Organisation—Informant 2* it is also expected that this assessment will include guidelines for policy makers at the highest levels, incorporating sub-regional targets and national capabilities related to an integrated ASEAN Power Market.

Based on data available as of January 2019 projected and planned interconnectors are 30 and 9, respectively (Figure 4.2).[51] Updates are expected

[51] All interconnection data in figures 4.2-4.7 and Table 4.1 is estimated based on a variety of sources: APAEC (2004, pp. 5, 11-12, 31-32; 2010, pp. 8-9, 12-14, 16); Srisuping (2013, pp. 5, 17-20); Andrews-Speed & Hezri (2013, p. 17); Ibrahim (2014, p. 9-11); Shi (2014, pp. 18-20, 124; 2016, pp. 675-676); IEA (2015, p. 17-19, p. 64; 2019, p. 17, 19, 24, 37, 39-43); Hermawanto

when new sub-regional assessments become available; however, this data is standardised and compiled by the author, as most data sets don't include interconnectors since AIMS II was first published. Generating capacity is expected to quadruple, and through sub-regional interconnectors ASEAN hopes to reach 100% electrification.

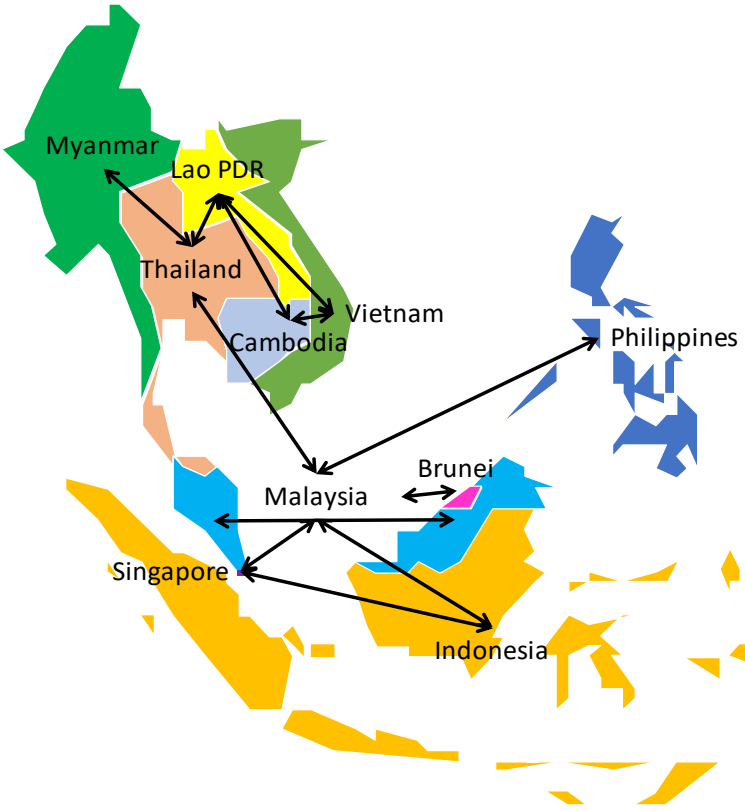
Figure 4.2 ASEAN Interconnections Summary



Current status of the APG is fraught, however, and moving slowly. Multilateral trading is virtually non-existent. A number of bilateral interconnectors have been put in place, but multilateral trading is yet to be realised on the scale APG set out to achieve originally (APAEC, 2010; ASEAN, 2017a,b). Forecast interconnections are set out in each subsystem, with the most advanced interconnections in the GMSR subsystem and the least advanced in the BIMP-EAGA subsystem (Pacudan, 2016; APAEC, 2004; APAEC, 2010).

(2016, pp. 27-29); Li & Kimura (2016, pp. 23, 30, 32-34, 43, 49, 113-114, 121); Takapong (2016); ASEAN (2017); Halawa, et al. (2018, pp. 7, 9-12); IRENA (2018, pp. 72-73); ACE (2018b, p. 5-7, 12); The author is also grateful to interview subjects for their feedback and suggestions.

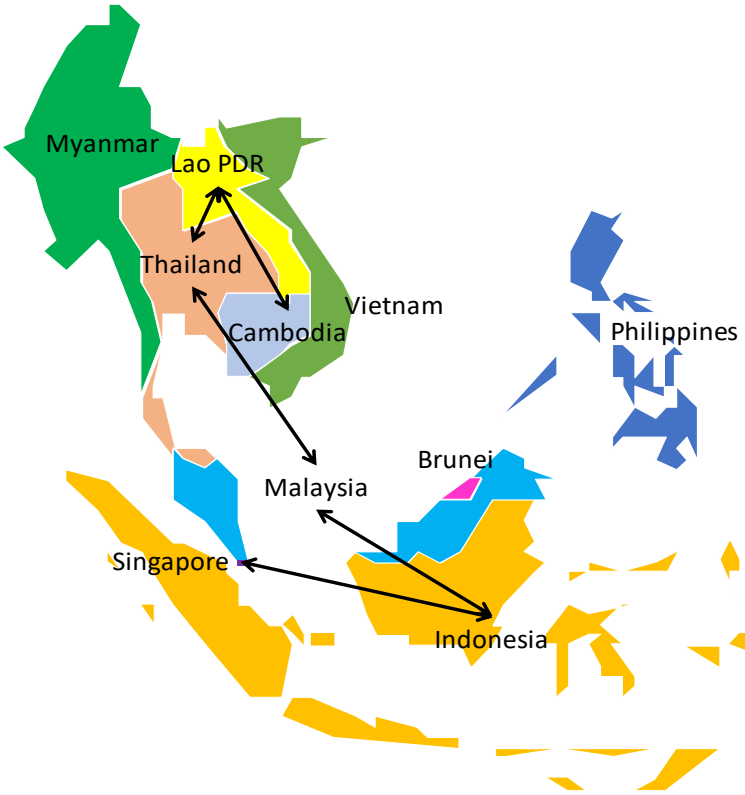
Figure 4.3 Forecast ASEAN Interconnections



Countries	Intercons	Capacity (mw)
Thailand - Malaysia	5	1,080
Thailand - Lao PDR	7	5,848
Thailand - Myanmar	1	14,860
Thailand - Cambodia	1	2,200
Malaysia - Singapore	2	1,050
Malaysia - Malaysia	2	3,300
Malaysia - Indonesia	3	1,050
Malaysia - Philippines	1	500
Malaysia - Brunei	1	200
Indonesia - Singapore	2	1,200
Lao PDR - Vietnam	1	2,410
Lao PDR - Cambodia	3	600
Cambodia - Vietnam	1	170

As of data collection actual ASEAN interconnectors are as follows:

Figure 4.4 Current ASEAN Interconnections



Countries	Intercons	Capacity (mw)
Thailand - Malaysia	3	680
Thailand - Lao PDR	3	2,641
Thailand - Myanmar	-	-
Thailand - Cambodia	-	-
Malaysia - Singapore	1	450
Malaysia - Malaysia	-	-
Malaysia - Indonesia	1	250
Malaysia - Philippines	-	-
Malaysia - Brunei	-	-
Indonesia - Singapore	-	-
Lao PDR - Vietnam	-	-
Lao PDR - Cambodia	1	100
Cambodia - Vietnam	-	-

Interviewees within and outside the sub-region are in consensus that many of the barriers to the APG are related to national versus sub-regional perceptions regarding cost, power system needs, and security of supply (*Former Government—Informant 1; Multilateral Organisation—Informant 2; Multilateral Organisation 18; Academic 21; Academic 26)*. First, a number of power systems in the region require updating that has not happened at the national level, including modernisation of current physical transmission infrastructure, increased transmission infrastructure, increased capacity, growth in rural-urban connections, and efficiency improvements in old systems. This is due in part to high upfront costs and no immediate, short-term need—as well as the perception that high up-front costs associated with the modernisation of power systems are not immediately necessary for security of supply *(Academic 26).* However, for EMI to take place the diverse power systems of the region need to be standardised (Navarro & Sambodo, 2013), a view reflected among the same interview subjects and also high-level policy discussions (*Former Government—Informant 1; Multilateral Organisation—Informant* 2; *Multilateral Organisation 18; Academic 21; Academic 26; Government Conference 12; Government Conference 13; Government Workshop 14*). This includes a harmonisation of transmission standards and procedures, uniformity among regulators, agreement on sub-regional procedures and rules related to dispute settlement (or agreement on incorporation of outside dispute settlement, i.e., the WTO), and agreement on pricing mechanisms (ASEAN, 2017b). Based on interviews these standardisations also need to exist within national level regulations that are complemented by sub-regional coordination. For example, according to *Multilateral organisation 18:*

> *...We look at mostly* [sub-]*regional, then national, coordination in our monitoring* [of interconnection projects], *but we have observed there is some lag between the two. This may impact speed of change needed for further electricity trading. So national level is an important part of study, too.*

HAPUA, and other working groups within ASEAN, cannot force standardisation or reform; these changes must come from the national level despite 8 HAPUA working groups and their studies on integration and reform (APAEC, 2010). Additional barriers to expansion within ASEAN specifically include other aspects of policy making at the national level—transparency within national markets, political will at the national versus sub-regional level, and national priority of perceived energy security concerns over electricity access motivations (*Former Government Official—Informant 1; Multilateral Organisation 18; Academic 21;*

Academic 26). A large portion of the challenges identified in interviews and documentary research also cross over into the 'misinformation' category, whereby understanding at the energy ministerial or other national level is not reflective of policy understanding at the ASEAN governance level. For example, according to *Think Tank 15* there is a fear of energy security being compromised among ministerial level partners:

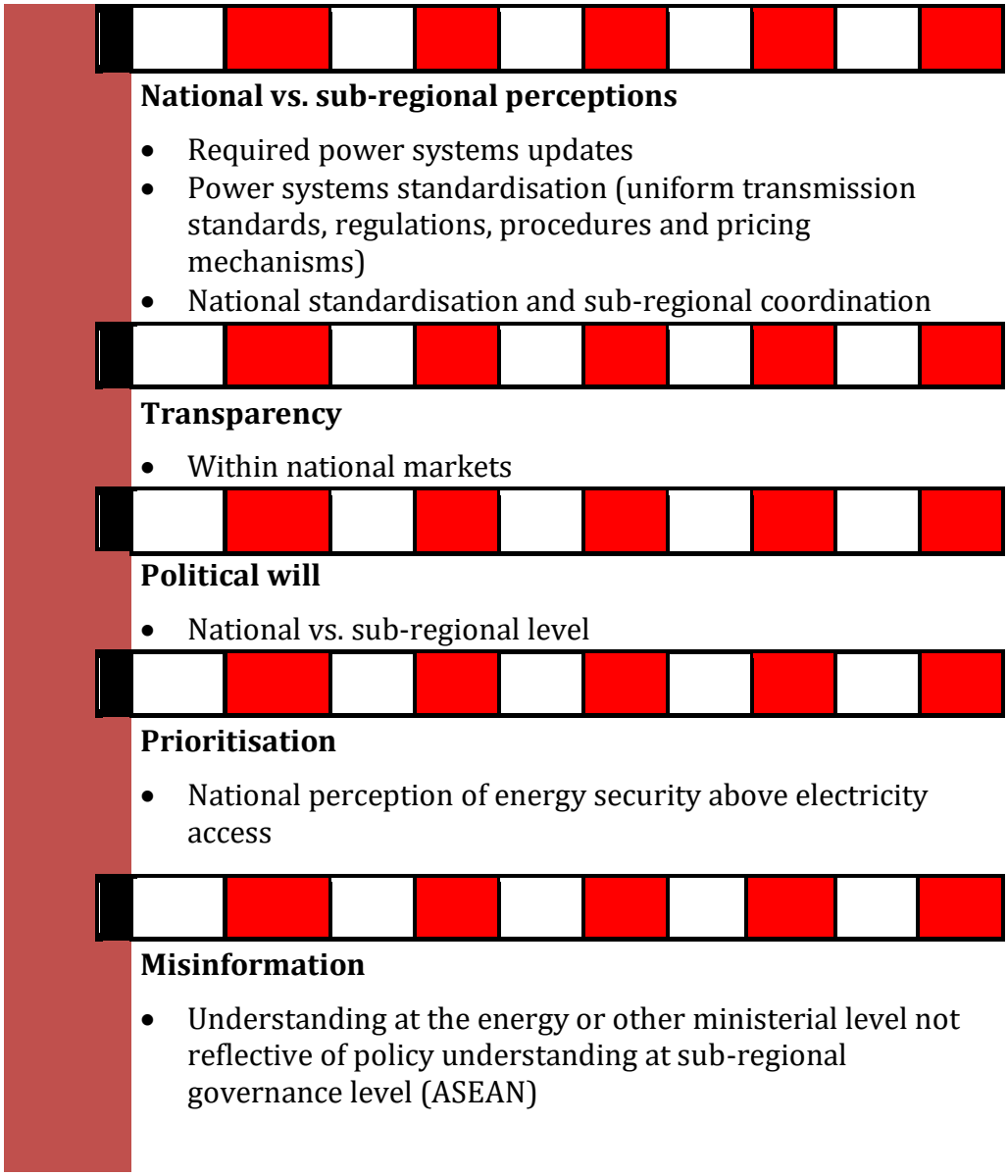
> *We* [think tanks in this area] *focus on increasing energy security and messaging that regional initiatives will increase energy security for all partners… But we do have to fight the misperception that energy security is threatened via the most important regional initiatives.*

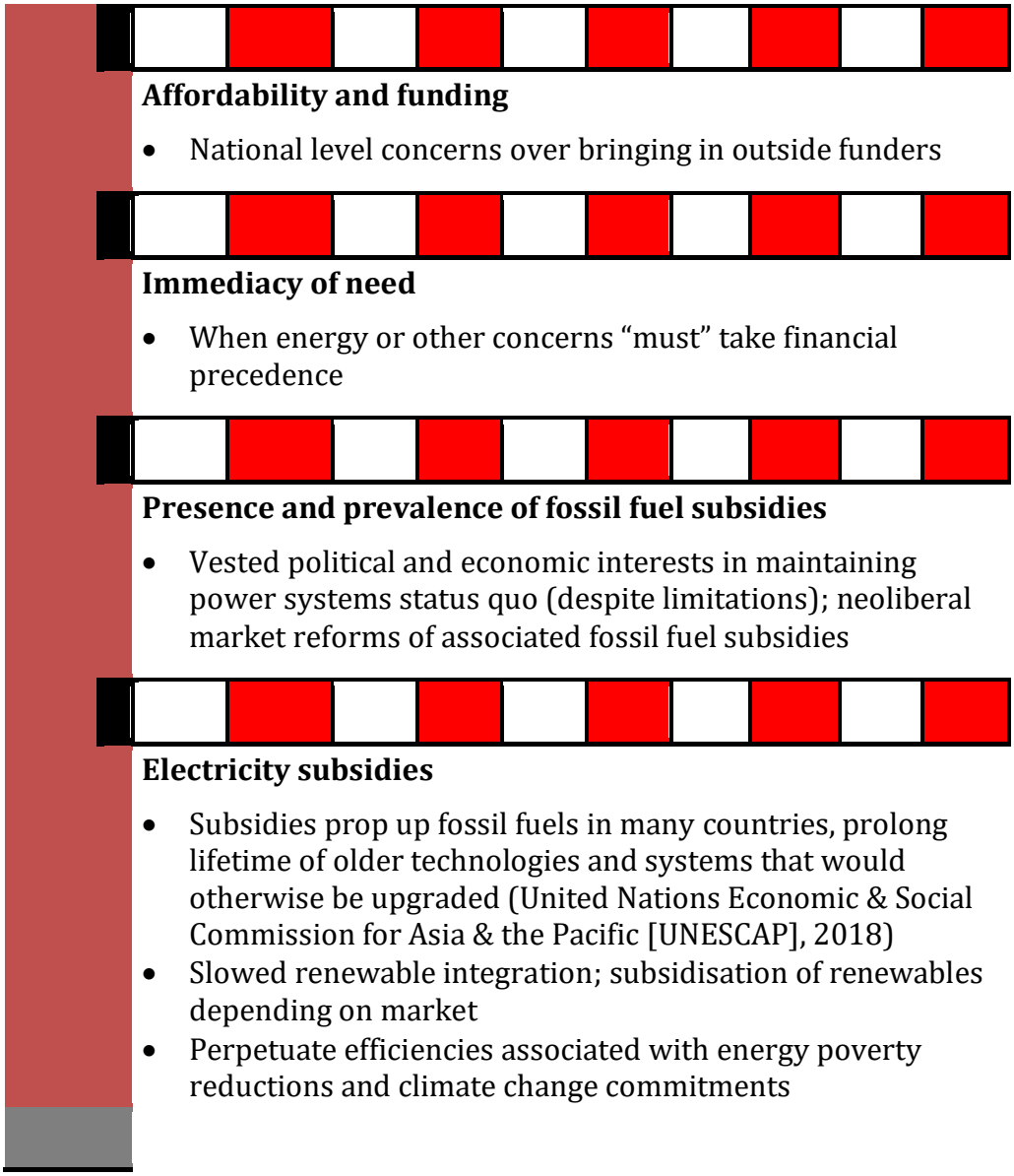
This subject expanded that while initiatives are moving forward within ASEAN, when national level governments become involved hesitations begin to creep into policy making—including concerns regarding trust of neighbours, how unexpected energy supply pressures might impact interconnection contracts that can't be met, and whether or not energy security will be impacted negatively by cross-border electricity trade (*Think Tank 15*). A variety of sources have said these challenges have been continuous over the last 10+ years, and thus, are more difficult to overcome than may be perceived by outsiders (*Former Government Official—Informant 1; Think Tank 15; Multilateral Organisation 18; Academic 21; Academic 23; Academic 26*). Here it appears that national level incentives for engagement are not as strong as sub-regional incentives—in the form of global climate pressure, sub-regional climate commitments, and AEC interconnection goals versus national interests and perceptions regarding trust and security.

Additional APG barriers lie in affordability and funding challenges—national level concerns over bringing in outside funders (to be explored further in relation to one of the major themes identified in interviews, *Chapter 6: Governance Challenges*), questions regarding immediacy of needs when energy or other concerns 'must' (financially) take precedence *(Academic 26; Business 31),* and the presence and prevalence of fossil fuel subsidies and thus "vested political and economic interests" (*Think Tank 15*) in maintaining the status quo of power systems (despite limitations). The IEA (2017a) predicts that investments of $2.7 to $2.9 trillion dollars will be required to meet energy supply and efficiency demands in Southeast Asia by 2040, however, it also identifies fossil fuel subsidies as an obstacle that investors will need to overcome. Similarly, electricity subsidies are also identified by the IEA an obstacle to more efficient energy use, resulting in a potential cumulative cost of $350 billion from

2017-2040 (IEA, 2017a). Subsidies are perceived by many international organisations in the energy policy space as not only propping up fossil fuels in many countries, but also prolonging the life of older technologies and systems that would otherwise be upgraded (REN21, 2019b). Here, subsidies become not just tied to slow moving renewable energy integration but also efficiencies associated with energy poverty reductions and climate change commitments. It should be noted, however, that many subsidy discussions revolve around standard neoliberal market reforms pushed via the dominant global economic system (subsidies arise again in Chapter 5, *National Market Factors*, and will be discussed in more detail in Section 5.4.c.). A summary of these key barriers is as follows:

Figure 4.5 Summary of Key Sub-Regional Barriers





One interview subject (*Academic 26*) insists that for progress to be achieved at the level required for deeper diversification of the region's energy mix and increased interconnection, incentive needs to come from the national level, and be encouraged by ASEAN governance at the sub-regional level. Political commitment, this argument goes, is the most important factor in seeing the development of a transparent and operational sub-regional power system. This feedback is also in line with documentary evidence on APG progress and barriers (Navarro & Sambodo, 2013; Andrews-Speed & Hezri, 2013; Wu, 2019) and will be further analysed in Chapter 6, when the discussion moves to the theme of *Governance Challenges*. What is demonstrated via the identification of sub-regional interconnections and barriers to their further development is that barriers exist at the national level, across all ASEAN member states, despite

member state commitment to the APG. These barriers are different depending on the national market, physical infrastructure, policy commitment and considerations, and the presence of economic tools, such as subsidies. The following subsection explores BIMP-EAGA specific factors in cross-border electricity trade at the subsystem level, whereas Chapter 5 will look at national level factors in cross-border electricity trade expansion and sub-regional energy market integration.

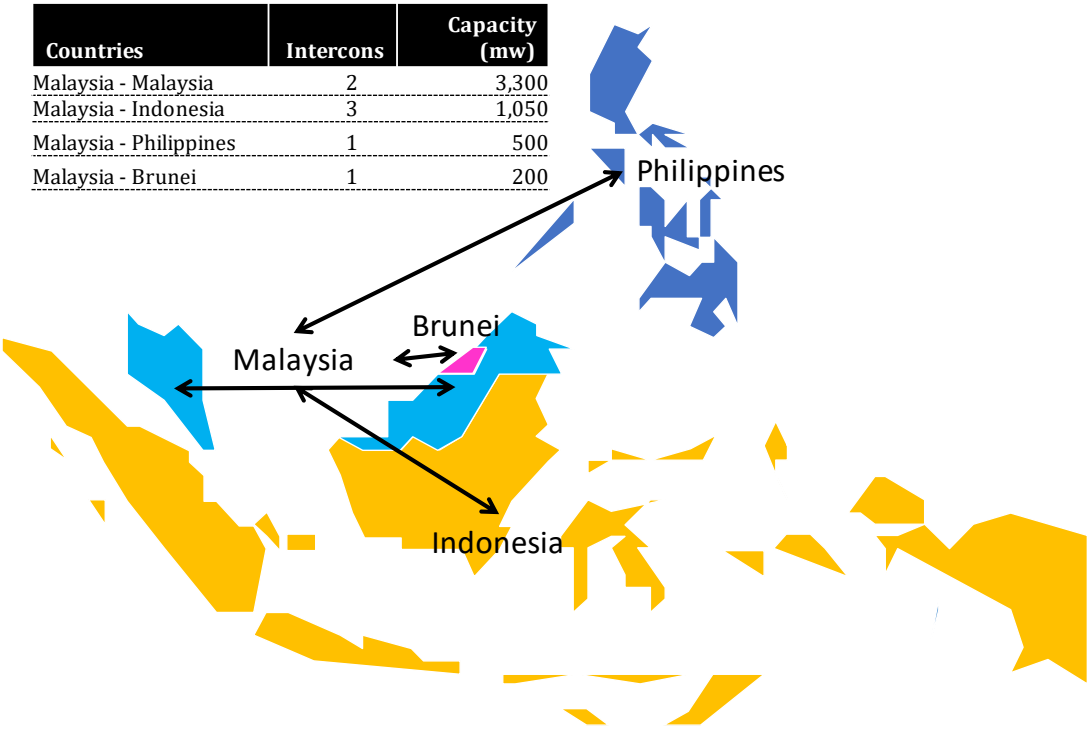
4.3 Subsystem Interconnections: BIMP-EAGA

The BIMP-EAGA subsystem, also known as the east system, is the least advanced of the three subsystems identified by ASEAN's HAPUA AIMS studies (Pacudan, 2016). Made up of Brunei Darussalam, Indonesia, Malaysia and the Philippines, this subsystem is farther behind GMSR, with only one interconnection to date, established as recently as 2016. However, potential for continued expansion of interconnections, integration of renewable energies, development of national electricity markets, and growth in electricity access is quite high in this subsystem. Central to the opportunity of BIMP-EAGA is the island of Borneo, made up of three different BIMP-EAGA countries: Brunei Darussalam, Indonesia, and Malaysia, and is the largest island in ASEAN (ADB, 2014).

HAPUA envisions expansion of the Borneo system will include inter and intra-island electricity trade, expanding the power systems of neighbouring Southeast Asian islands within BIMP-EAGA (ADB, 2014). This would result in interconnections that would include the peninsular Malaysia, the Philippines and northern Indonesian islands, expanding BIMP-EAGA in line with HAPUA goals (ADB, 2014). Planned interconnections are as follows:

Figure 4.6 BIMP-EAGA Planned interconnections

Countries	Intercons	Capacity (mw)
Malaysia - Malaysia	2	3,300
Malaysia - Indonesia	3	1,050
Malaysia - Philippines	1	500
Malaysia - Brunei	1	200



Borneo has quite a large imbalance of electricity supply, with varied infrastructure across the island. Depending on the Borneo country (Brunei Darussalam, Indonesia, or Malaysia), this geographical variation and accompanying infrastructure deficit results in roughly 70-90% electrification ratio, with the exception of Brunei Darussalam, who has a 99% electrification ratio (ADB, 2014). Indonesia and the Philippines have the largest to gain, as they have total populations without electricity reaching 23 million and 11 million respectively (IEA, 2017b,c).

Opportunity within the BIMP-EAGA region is high not just due to the current sub-regional snapshot, but also as a result of national targets. Each nation has a national target for renewable energy integration, and potential for growth in renewable sectors. However, fuel dependency in each nation is currently dominated by fossil fuels, with the majority of countries dependent on coal and oil (IEA, 2017a,c). An overview of this can be seen as follows:

Table 4.1 Sub-Regional Snapshot: BIMP-EAGA Renewable Potential

Country	Actual Intercon.	Planned Intercon.	Mix	Dep-endency	Growth Potential	Power Targets
Brunei	No	Malaysia	Natural Gas & Oil (99%)	Oil	Solar PV	10% by 2035
Indonesia	Malaysia	Singapore	Biofuels, Coal, Natural Gas, Oil	Oil	Geo-thermal, solar potential	26% by 2025
Malaysia	Singapore, Thailand, Indonesia	Brunei, Myanmar	Coal, Natural Gas, Oil	Coal, Natural Gas, Oil	Biomass	20% by 2025
Philippines	No	Malaysia	Coal, Geo-thermal, Hydro, Natural Gas, Oil	Coal (expected to become most coal dependent in region by 2030)	Geo-thermal, Solar	40% by 2020

Sources: IEA, 2017a,c.

In addition to a heavy reliance on fossil fuel and fossil fuel imports, the BIMP-EAGA subsystem is made up of a variety of market structures. Brunei Darussalam's power system is managed by both a department and a management company, Malaysia by independent companies, Indonesia's five separate power systems are managed by individual state-owned branch offices, and Malaysia and the Philippines have a combination of state-run corporations and national grid offices (*Multi-lateral Organisation—Informant 2; Academic 21*). Some of the power systems are vertically integrated with liberalisation efforts under initial development, while others have transmission systems and distribution networks that are closed to outside power producers. This variety of structure is not uncommon and is reflective of the tendency towards a combination of state run and private sector management. Further details on these structures will be examined in Chapter 5, *National Market Factors.*

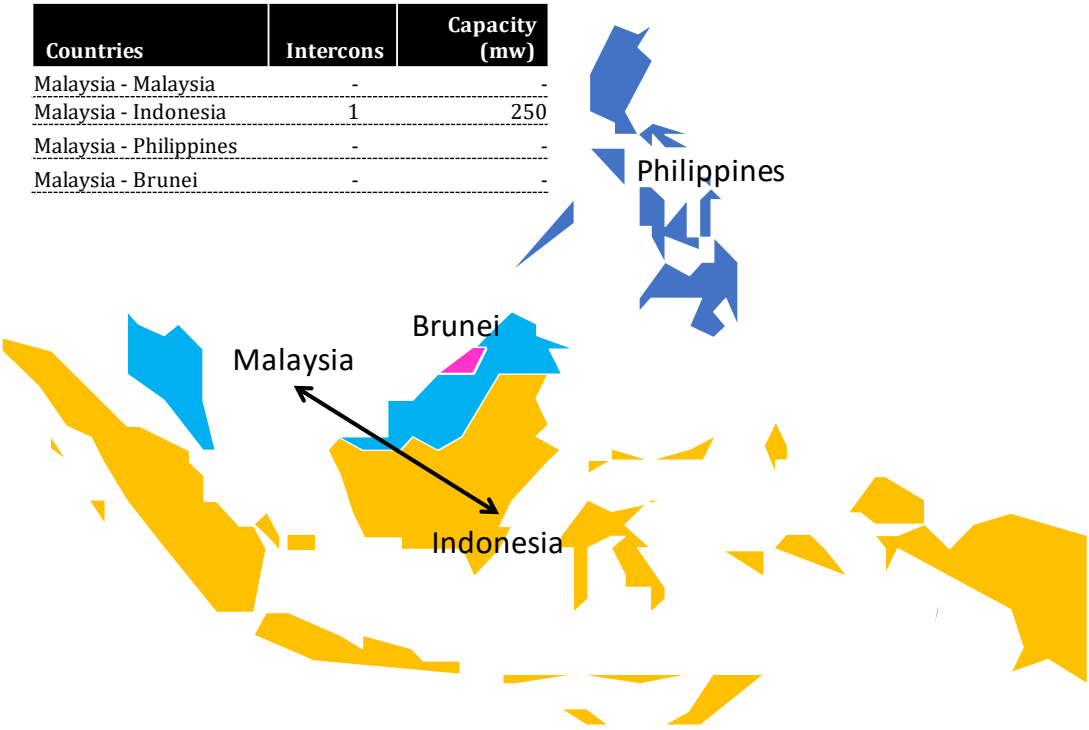
The Philippines offers interesting insight into power sector development in the region, as its structure is quite different from the rest of BIMP-EAGA. It is the only country in the subsystem with market competition and has allowed third party involvement in the transmission of power, as well as an independent regulatory body and independent electricity market operator (Pacudan, 2016). This models global and sub-regional recommendations for development of

power systems (*Academic 21)* and offers a unique example to the remainder of BIMP-EAGA. The Philippines system bodes well for the future coordination of neighbouring BIMP-EAGA systems, as it more feasible to coordinate in a highly diverse international power system than to consolidate (*Academic 21;* IEA, 2014; Pacudan, 2016).

To date a single interconnection exists between Malaysia and Indonesia and is the second smallest current international interconnection in the region, with a capacity of roughly 250MW (Pacudan, 2016; author compilation). This interconnection is seen as a model for future BIMP-EAGA development, with plans for expansion of further interconnections leading out to 2030 (Sarawak Energy, 2017). These are planned for: Malaysia (2), Malaysia-Brunei Darussalam (1), Malaysia-Philippines (1), Malaysia-Indonesia (3), resulting in roughly 5000MW of additional capacity (author compilation). Based on the outlined Borneo interconnection plan, harmonisation of the BIMP-EAGA region will be minimal compared to other subsystems in ASEAN (Pacudan, 2016).

Figure 4.7 BIMP-EAGA Actual Interconnections

Countries	Intercons	Capacity (mw)
Malaysia - Malaysia	-	-
Malaysia - Indonesia	1	250
Malaysia - Philippines	-	-
Malaysia - Brunei	-	-



Progress for the BIMP-EAGA subsystem hinges on a few key similarities with other APG subsystems. These are: first, and foremost, encouragement of national incentives, which are currently lacking. Where ASEAN has made efforts to present and engage member economies in understanding broad incentives for interconnection (increased energy access, the buying and selling of excess

capacity, modernisation of power systems, financial support, knowledge exchange, and higher shares of renewables with likelihood of reaching renewable integration targets) these incentives are not providing enough movement or engagement among national level policy makers (*Think Tank 5; Academic 26; Former Government 27)*. Changes to national power markets and infrastructure must occur before interconnections can be made. These national requirements for sub-regional expansion include infrastructure upgrading, more developed regulatory frameworks, and coordination of operations across subsystem grids at the national level—recommendations that *Former Government—Informant 1, Think Tank 5, Academic 6, Academic 21, Development Bank 25, Academic 26, Former Government 27, Former Government 28, and Workshop 3* all recommended; these recommendations are further supported in the literature on ASEAN EMI (See: Kimura & Shi, 2011; Kimura et al., 2013; Pacudan, 2016; and the breadth of literature from ACE and ASEAN, respectively) and are touched upon previously in Section 4.2 when discussing sub-regional interconnections.

Once national level adjustments have occurred economic exchanges can be developed, third party access can be provided, and multi-buyer, multi-seller market systems can naturally grow (*Think Tank 5; Academic 26)*. National incentives for these changes and increased cross-border interconnections are currently tied closely to the sub-regional imperatives for these changes in the first place—greater energy access and reductions in energy poverty, associated climate and energy gains via reductions in emissions, and associate potential economic gains via continued integration into regional and global economic markets via liberalisation (*Academic 6)*. Interview subject *Business Leader 19,* who works with energy companies and governments throughout the sub-region, further described these incentives as follows:

> *Generally speaking, regulatory reforms are clearly needed, but economic liberalisation is easily the most incentivised reform among major economies [in the region]...liberalisation of the power sector has moved very slowly in emerging economies, and unfortunately there are not many strong example of power sector liberalisation in East Asia, with only a few exceptions.*

Here the question of liberalisation within the BIMP-EAGA subsystem, and the greater APG, resurfaces in importance. Three prominent EMI experts interviewed (*Multilateral Organisation—Informant 2, Academic 21, Academic 26*) all recommended liberalisation within the regional and sub-regional power systems, but all three pointed to a slow-moving process at the national level. In

fact, the majority of literature on EMI in ASEAN (including ASEAN and HAPUA themselves) all advocate for market liberalisation and increased competition within systems dominated by state run utilities and transmission operators, which most of the region's systems are. *Academic 6* further illustrated the need for liberalisation in the sub-region, stating:

> *Overall liberalisation will dramatically improve the regional and sub-region*[al] *energy transition—responding to climate challenges also requires economic mechanisms not possible without access to and engagement in the global market.*

In addition to climate incentives, ASEAN appears to understand the IPE of cross-border electricity trade as part-and-parcel to general market liberalisation practices and expectations of emerging economies. BIMP-EAGA economies similarly understand the IPE of cross-border electricity trade, however, integration remains minimal at this time due to market factors not meeting capacity and infrastructure requirements and national level policies not pushing these changes quickly enough. Analysis of current interconnections and market factors did not, unfortunately, yield any major surprises in BIMP-EAGA, further supporting expert insight that BIMP-EAGA is the weakest of ASEAN's EMI subsystems. The underlying issue recurring here, national versus sub-regional incentives and requirements, repeatedly emerges in the interviews as a hinderance to EMI and resurfaces again and again across subsequent chapters and analysis.

4.4 Discussion

Data analysis and interviews conducted in this research revealed relationships between elite opinions and political and economic realities in the electricity and energy market space. The aim of this chapter was to cast light on the sub-regional market factors related to cross-border electricity interconnections and sub-regional EMI goals, uncovering understanding of and incentives for cross-border interconnections. What interviews uncovered is that sub-regional market factors are directly influenced by national market factors, and reforms are necessary at the national level in order for sub-regional EMI to take place. Identified national reforms include: national power system updating, national prioritisation of power system updating and integration, standardisation and harmonisation across national power systems, national political will, and liberalisation. The necessary reforms for deeper EMI to occur are reflective of cross-border electricity needs regionally but emphasise the need for national political and economic priorities to align with sub-regional goals. In addition,

analysis of sub-regional interconnections exposed that current interconnections are limited and there is room for diversification of national energy mix given the continued predominance of hydrocarbon resources. This poses the consideration of whether or not sub-regional targets align with national priorities—a consideration that recurs in subsequent chapters. In the following subsection national versus sub-regional phenomenon will be discussed in more detail, stressing the multi-level dynamics at play.

4.4.a National vs. Sub-Regional

This chapter reiterated that all of the ASEAN member economies have committed to EMI, ASEAN has merged a number of relevant EMI initiatives into its connectivity agenda, and ASEAN has incorporated EMI into its pledges to reduce emissions and further integrate renewable energy into its power systems, which are reflected in national level targets in BIMP-EAGA. However, in examining the sub-regional market factors it was national issues that kept arising as barriers to sub-regional goals. In addition, what became clear in interviews is that sub-regional policy goals do not necessarily reflect the national level changes required. This finding is also reflected across subsequent data chapters and the themes of national market factors and governance challenges. Without a combination of reforms to the subsystem grouping (BIMP-EAGA) and within the sub-region broadly, increased interconnections and cross-border electricity trade alone will not lower regional CO_2 emissions. Instead, increasing interconnections in current markets, with only modest renewable increases but continued reliance on coal electricity generation as reflected in the sub-regional snapshots, will actually raise regional emissions (*Academic 26;* confirmed via IEA, 2019a, pp. 146-147). However, economies may gain economically via the buying and selling of excess capacity via cross-border trade (IEA, 2019a).

As far as sub-regional factors are concerned, experts interviewed predict that AIMS III will amend previous goals set in AIMS II based on a relatively low level of progress that has been experienced to date across subsystems; this will also include an updated assessment of interconnectors in the region (*Multilateral Organisation—Informant 2; Academic 21, Academic 26*), including those in the BIMP-EAGA snapshot in Section 4.3. In addition, interviews from outside the region in partner country organisations predict a re-assessment of investment programs and financing tools to meet growth in project funding that is surely to be recognised in the AIMS III assessment (*Think Tank* 12). Further sub-regional and regional funding initiatives will be required if sub-regional renewable energy and climate targets are to be achieved given the limits of funding

initiatives and incentives at the national level to make expensive power sector updates (*Multilateral Organisation 4;* confirmed via IEA, 2019a*).*

This underscores the importance of increasing growth in renewables generally and using cross-border electricity trade to augment variability, reliability and flexibility concerns in order to do so. However, national level measures must catch up to sub-regional renewable integration and global energy transition goals. Unfortunately, whereas sub-regional understanding of cross-border interconnections are understood as climate, economic and energy-based, national incentives appear to be centred around liberalisation given the emphasis put on neoliberal market reforms, market liberalisation, and finance needs. While ASEAN's interconnectivity targets are laudable, they do not coincide with the realities of renewable integration and generation at the national level. The prevalence of coal in the energy mix of BIMP-EAGA countries specifically (as seen in the subsystem snapshot, Section 4.3), and ASEAN generally, underscores this disconnect (IEA, 2019d). This is further supported in interviews, including this statement by interview subject *Multilateral Organisation 18* regarding cooperation:

> *cooperation is a tool. But not the most important goal of each member state—national priorities are* [the] *most important goal, regardless of* [ASEAN's] *connectivity agenda.*

While there is sub-regional commitment to a clean energy transition that commitment is not translated at the national level, where ASEAN commitments are non-binding, ASEAN connectivity goals are not yet clear regarding harmonisation and integration for individual grids, and national priorities are deemed greater than sub-regional targets. For example, energy security concerns are a national priority that, according to interviews discussed in Section 4.3, are often deemed more important than fully embracing ASEAN targets (where the measures to achieve those targets are perceived to decrease energy security).

Overall, national level structures and policies must be conducive to the requirements for increased EMI in order for cross-border electricity trade to take place. Many of these requirements coincide with neoliberal political economy narratives about market structure and the common global economic system that were touched upon in Chapter 2 (*Conceptual Approach & Review of Literature*). What the author observed using a critical realist lens during data analysis is that the underlying market needs are not necessarily representative of both sub-regional and national priorities. Sub-regional goals span multiple

countries, and in the case of BIMP-EAGA, impact economic, political and structural requirements for reaching these goals. Internationally, global climate challenges and targeted responses also impact sub-regional and national policies, increasing or decreasing incentives for economic, political and structural change.

Analysis of the market factors in ASEAN, and how they assist in understanding the IPE of cross-border electricity trade in the sub-region, points predominantly to liberalisation and national level limitations in achieving liberalisation. EMI, experts agreed, requires liberalisation of domestic energy markets, increased competition, and standardisation across markets—traditionally neoliberal solutions for already advanced power sectors that are prescribed as an ideal, without being moderated for an East Asian context. Integration into global markets continues to be a major theme across the literature and data collection, and competition and markets the only well understood route for this integration.

There is also a widespread belief that increased trade among partners and trade liberalisation are a key for increased cross-border electricity trade. In fact, Oseni and Pollitt (2014) find it to be one of the most important criteria for EMI to take place, and the presence of trade agreements prior to cross-border electricity trade and power pooling efforts is also considered helpful for continued development in EMI. Interviews further informed the dominant policy recommendation that increased liberalisation is a requirement of EMI and thus increased cross-border electricity trade. In regions where bilateral trade agreements are already present, barriers to trade will have been reduced and trust between partners will already have been established. One trade expert, *Business 22,* pointed to established trust as a major benefit of mutually beneficial trade relationships, and indeed a bi-product of international political economics. ASEAN itself has focused primarily on studies pertaining to broader trade liberalisation and the removal of fossil fuel subsidies; according to expert interviews there is space for examination of liberalisation of domestic energy markets, particularly power sectors, where liberalisation is limited to date (*Academic 6, Business 22, Academic 26)*.

Commitments to free trade, amid centrally planned economies that utilise state directed economy policy, further reflects this author's characterisation of neo-developmental statism and its emerging role in understanding the political economy of cross-border electricity trade. In examining the sub-regional market factors the IPE of cross-border electricity trade emerges as a link between developmental state practices and liberalisation identified by interview subjects

and documentary sources for EMI to advance; liberalisation even emerges as a primary requirement noted among interview subjects. However, it appears that states are 'committed' to free markets and liberalisation in so far as free markets and liberalisation benefit state goals; where those goals fall in the hierarchy of needs is debatable, and, based on market needs identified so far, not always in line with the market factors. The political economy of energy policy development in the sub-region or subsystem can influence the development of policies that respond to broader resource concerns—such as commitments to free trade and market competition.

Higher shares of renewable energy in sub-regional and national energy markets compliments sub-regional climate commitments and targets. Increasing renewable energy's share in a national energy mix has the benefit of reducing emissions via a reduction in hydrocarbons and diversification of a country's reliance on hydrocarbon fuels. However, sub-regional commitments are being made as a performative free trade agenda, particularly in sub-regional efforts where countries are seen to be engaging with liberalisation and contributing to market integration, but also slow the progress of projects due to the complexity of sector reform. In this way neoliberal free trade IPE is being performed at the same time as neo-developmental statism is being practiced—regional governance is disabling reform due to its performative nature and the requirements that must occur at the national level but are not highly enough incentivised to do so.

4.5 Conclusions

This chapter has painted a broad picture of the market factors present in sub-regional and subsystem interconnections among ASEAN members. A defining aspect of this chapter is that analysis was carried out at the sub-regional and subsystem level, but national level analysis emerges to be equally important. Here analysis included a look at projected and actual interconnections, and a snap shot of relevant market factors in the BIMP-EAGA subsystem. It has been illustrated that sub-regional and national governance structures must all respond to the pressure of climate change, but no one is solely responsible where EMI and cross-border electricity is concerned. In ASEAN this has been demonstrated to be true, as national efforts are as important as sub-regional and global ones. This has resulted in the emergence of a key factor in ASEAN cross-border electricity trade—national versus sub-regional policy needs. Here the IPE

of interconnections is focused on market liberalisation and increased competition in BIMP-EAGA and EMI in the wider ASEAN sub-region.

In the case of cross-border electricity trade and EMI, power dynamics, national level reform, political economy options including trade liberalisation, and the linking of issues (climate, energy, energy poverty, electricity reliability, etc.) all directly correlate with barriers to EMI. This chapter sought to examine sub-regional interconnections and the market factors impacting them, however, interestingly the majority of EMI barriers identified in Section 4.2 and 4.3 reflect national level needs.

This chapter has addressed one primary research questions and its associated sub-questions—(RQ1) *How do governments understand the IPE of cross-border interconnections in Southeast Asia?* (RQ1a) *What are the energy and trade policy incentives for increased cross-border interconnections?* And (RQ1b) *How can sub-regional electricity markets diversify their energy mix and reduce emissions and what incentives to do so exist?* The answers are governments are incentivised by climate, economic, and energy imperatives at the sub-regional level to utilise cross-border interconnections and augment VRE challenges while diversifying their energy mix—but progress is intermittent and uneven across ASEAN and in BIMP-EAGA at the national level. In addition, goals are ambitious and national level commitments fall short where actual energy mix and fossil fuel versus renewable energy use is concerned. Instead, it appears that sub-regional institutions of governance (ASEAN) and sub-regional commitments are standing in performatively for concrete action. Where this chapter provided a broad overview of the sub-region, the following chapter will look more specifically at individual national markets in the BIMP-EAGA subsystem, explaining power sectors at a more detailed level.

Chapter 5
National Market Factors

5.1 Introduction

This chapter continues with the pattern began in Chapter 4 of identifying common themes that emerged from expert interviews and data analysis. Chapter 5 will pick up where Chapter 4 left off by examining national market factors and common national EMI reform recommendations. In addition, this chapter will also highlight how electricity is transacted for each nation via the relations between governments and market actors. This chapter aims to achieve Objective 2, assessing market factors of the case study selection, BIMP-EAGA, identifying areas of individual and collective reform needed for deeper EMI levels.

Chapter 5 will address the following research questions: (RQ2) *How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?* In addition, the two sub-questions associate with RQ2 will be addressed: (RQ2a) *How does the political and economic structure of national electricity markets impact the expansion of cross-border interconnections in BIMP-EAGA?* (RQ2b) *Is the structure of national electricity markets conducive to sub-regional and international policy goals in Southeast Asia?* This chapter will add to prior analysis of sub-regional EMI initiatives by comparing and contrasting commonly identified reform recommendations with the realities of these national markets.

To address these questions Chapter 5 will be structured in the following format: Section 5.2 will examine the development of national electricity markets and current market structures, expanding on the BIMP-EAGA details presented in Chapter 4. In Section 5.3 the EMI criteria developed by Oseni and Pollitt (2014) will be applied to BIMP-EAGA specifically. Application of Oseni and Pollitt's EMI criteria will provide a preliminary conclusion regarding APG and market reform progress, stressing further reform recommendations in both the literature and expert interviews. Next, Section 5.4 will discuss the dominant aspects of reform and assessment in national markets, emphasising strengths and weaknesses based on available data. Section 5.5 will analyse the practice of DS in ASEAN energy markets and further probe its contradictions with common market liberalisation reforms. Finally, in section 5.6, *Conclusions,* national market factors examined in this chapter will be summarised, leading into the subsequent analysis in Chapter 6.

5.2 Development of National Electricity Markets

Development of national electricity markets has been identified widely across the literature[52] as a necessary prerequisite of increased multilateral cross-border interconnection, regional power sector development and energy market integration (EMI). This is because national electricity markets require the physical capacity and regulatory frameworks to manage not just domestic energy but imported energy as well (Li et al., 2016, p.50); where multilateral interconnection develops, system capability, efficiency, flexibility, and reliability become even more important than when bilateral connections occurred. National markets have to be physically developed—have the interconnection and the capability to transport—in order for exchange to occur. Development of national markets includes the implementation of regulatory standards, transmission processes, legal requirements, physical requirements, and even local government support (Li et al., 2016). Owen et al. (2017) argue that while physical bilateral or very basic multilateral interconnection can take place in undeveloped markets, any deep integration and meaningful, long-term trade requires alignment of individual markets and their standards, policies, and practices (p. 150). The majority of experts interviewed argued the progress of developing national electricity markets has been slow and is inhibiting EMI development and multilateral cross-border electricity trade (*Former Government—Informant 1, Multilateral Organisation 4, Academic 5, Academic 6, Business 19, Business 22, Former Government 27, Former Government 28, Think Tank 29, Workshop 3*). According to *Multilateral organisation 4* "…of course the speed of state level change can influence cross-border [electricity] trade." The literature also predominantly supports this premise: cross-border electricity trade takes place predominantly among partners with well-established national markets (Wu et al., 2016); where national markets are strengthened then capacity for cross-border trade grows (Wu, 2019). In addition, while there is some ability of stronger partners to augment the weaknesses of less developed partners by relieving the financial and physical burden of renewable energy development (Chang & Li, 2013), and efficiency gains can be felt by both parties in a bilateral agreement (Matsuo & Tsunoda, 2016), any expansion and growth in demand will require further national development. This is what Phoumin and

[52] See for example: Andrews-Speed & Hezri (2014); Oseni & Pollitt (2014); Li & Kimura (2016); Pacudan (2016); Shi et al. (2019).

Kimura (2014) refer to as increased power sector robustness, a positive side effect of increased EMI in ASEAN.

The following subsection will address the development of BIMP-EAGA markets, providing an overview of national market structures in order to assess renewable energy integration and the IPE of sub-regional cross border electricity trade among these national economies. Once the structure of national markets has been established, they will be contrasted with the market requirements established by Oseni and Pollitt (2014) for EMI and increased cross-border electricity trading to occur.

5.2.a Current Market Structures: Overview

Integrated, highly developed national electricity markets have the potential to be a catalyst for growth in EMI among economies wishing to engage in cross-border electricity trade. This is because a modern (reliable and flexible) and integrated (physically connected) power system that can transport electricity from place to place is required for EMI and cross-border interconnections to be developed (IRENA, 2016; Oseni & Pollitt, 2014). If the benefits from EMI and cross-border electricity trade are going to be available to all parts of the market (both rural and urban populations) then modernisation and integration are necessary in order to provide low-cost energy access in an intermittent environment that cross borders (IEA, 2015, p. 20). Analysis of individual power markets in ASEAN shows sector development is varied. As a whole ASEAN energy markets are, like the sub-region itself, highly diverse. Power markets in the sub-region are a mix of public, private, and hybrid forms, with varying levels of state regulation and oversight. The majority of power markets are not unbundled, and indeed development of power markets, including transmission and generation infrastructure, are at varying levels depending on the nation (Wu, 2016, pp. 68-69). Overall ASEAN electricity markets are structured around similar factors: state driven markets with state oversight even in liberalised markets; limited competition generally; a predominance of subsidies; a range of development stages; and varying levels of electrification across the region (See Chapter 2 for more detail on these factors; also Wu, 2019). There is no one-size-fits all recommendation for EMI and electricity market development in ASEAN given the variety across markets, however, there are similar solutions to these limitations across the sub-region. The following section probes these characteristics in more detail.

5.2.b BIMP-EAGA

In Chapter 4 BIMP-EAGA was introduced and the existing and projected interconnections between member economies were discussed. These interconnections were analysed in the context of ASEAN's signature interconnection initiative, the APG. In addition, a summary of the renewable energy integration potential of BIMP-EAGA was provided based on energy mix and identified national targets. Now that overview will be broken down into more detail, providing a comprehensive look at the market structure of BIMP-EAGA economies and give context to the needs of each market.

In BIMP-EAGA the majority of national power markets are on the lower end of development, behind countries like Singapore and Thailand, both of which rank high in terms of grid reliability—with the exception of Brunei, who is just behind them (Huang et al., 2019). Overall the economies of BIMP-EAGA are making physical progress in developing their power sectors; however, market structure is a dominant factor hindering advancement (*Academic 21; Academic 26;* see also: Matsuo & Tsunoda, 2016).

Brunei Darussalam

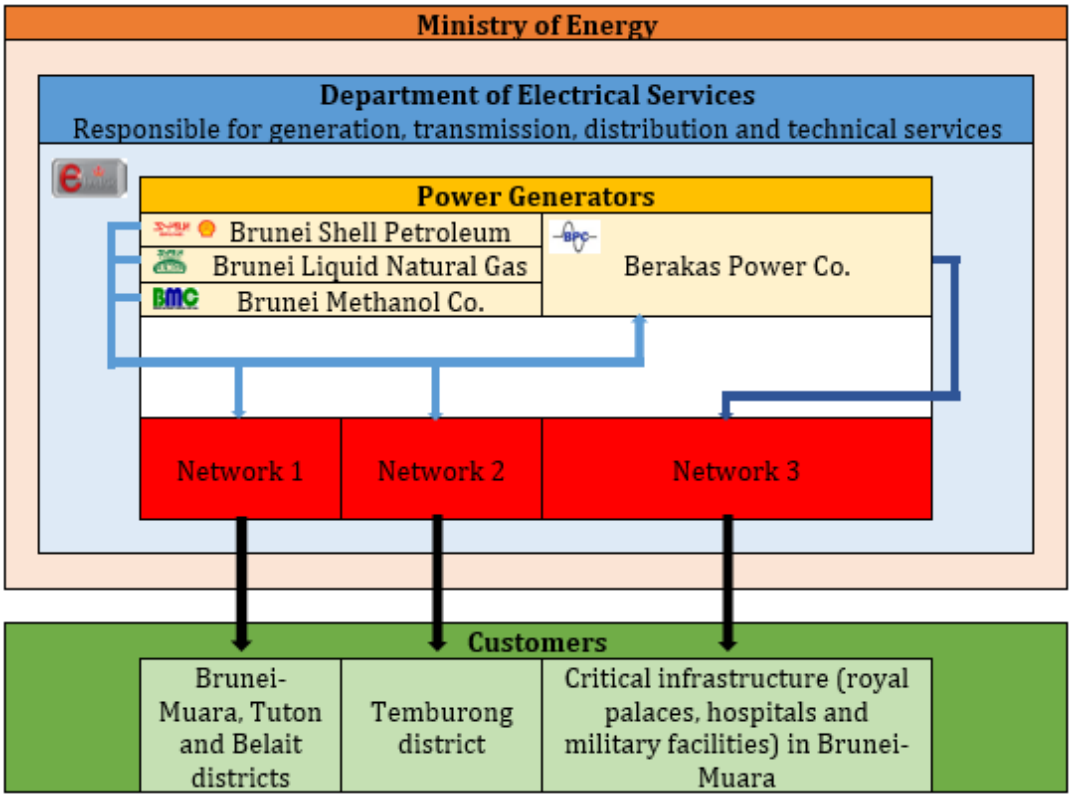
Brunei Darussalam's power market is dominated by fossil fuel interests. The abundance of hydrocarbon resources and heavily subsidised energy and electricity sectors has contributed to a reliance on fossil fuels (Energy and Industry Department of Prime Minister's office, 2016). This overreliance on fossil fuels makes Brunei's economy closely tied to fossil industries, with fossil fuels making up 90% of the country's exports and 44% of its GDP (OECD, 2018b), down from 60% in 2013 (OECD, 2013). Brunei Darussalam's power sector is regulated by a government agency, with separate and unconnected networks for generation, transmission, and distribution (Ahmed & Othman, 2014, p. 156) that operate in a single buyer market that is not open to independent power producers (IPP) (Pacudan, 2016, p. 47). The power sector is still early on in the liberalisation process with restricted private sector participation (*Former Government—Informant 1, Academic 21*) and a reliance on government fossil fuel subsidies (Navarro & Sambodo, 2013).

A 2019 analysis of ASEAN grid flexibility by Huang et al. found Brunei Darussalam ranking relatively well in most areas and tying for second in overall

grid flexibility,[53] posing a positive outlook for future renewable energy integration and cross-border electricity trade. These flexibility measures are important as they predict the ability of a country's grid to respond to changes in demand, supply, and the uncertainty of renewable sources (p. 711). This sort of flexibility is a requirement for EMI and will have positive spill over effects in the country's greater electricity reliability and access as well as lower costs. Among the factors analysed are individual markets' access, reliability, forecasting system, natural gas generation for electricity, and renewable energy diversity (p. 714). For grid reliability Brunei Darussalam is tied for fourth, closely behind one and two, and its natural gas generation for electricity score is the highest among all ASEAN countries. However, Brunei's electricity market access score, ranked based on interconnection capacities "when compared with peak load demands", is quite low, as are the majority of markets in ASEAN (p. 717).

[53] In power system research grid flexibility refers to operational flexibility, or "the ability of a power system to respond to changes in electricity demand and generation…that must be balanced to maintain system stability and reliability" as a result of uncertainty in generation due to variable renewable energy sources (NREL, 2015, p. 1). In Huang et al. (2019) overall grid flexibility takes NREL's (2015) definition further to apply a grid flexibility assessment tool to ASEAN member states' individual grids in order to rank flexibility across the region. "Overall grid flexibility" is identified using six indicators: grid reliability, electricity market access, load profile ramp capacity, quality of forecasting tools, proportion of electricity generation from natural gas, and renewable energy diversity (Huang et al., 2019, p. 715). In section 5.2.b (*BIMP-EAGA*) of this research, the author references Huang et al.'s overall grid flexibility ranking to describe the power systems of ASEAN member states within the BIMP-EAGA subsystem.

Figure 5.1 Brunei Darussalam Electricity Industry Structure



Source: Author's creation using IEA (2017a, pp. 22-27), Yokota & Kutani (2017, pp. 4-8), and interview feedback.

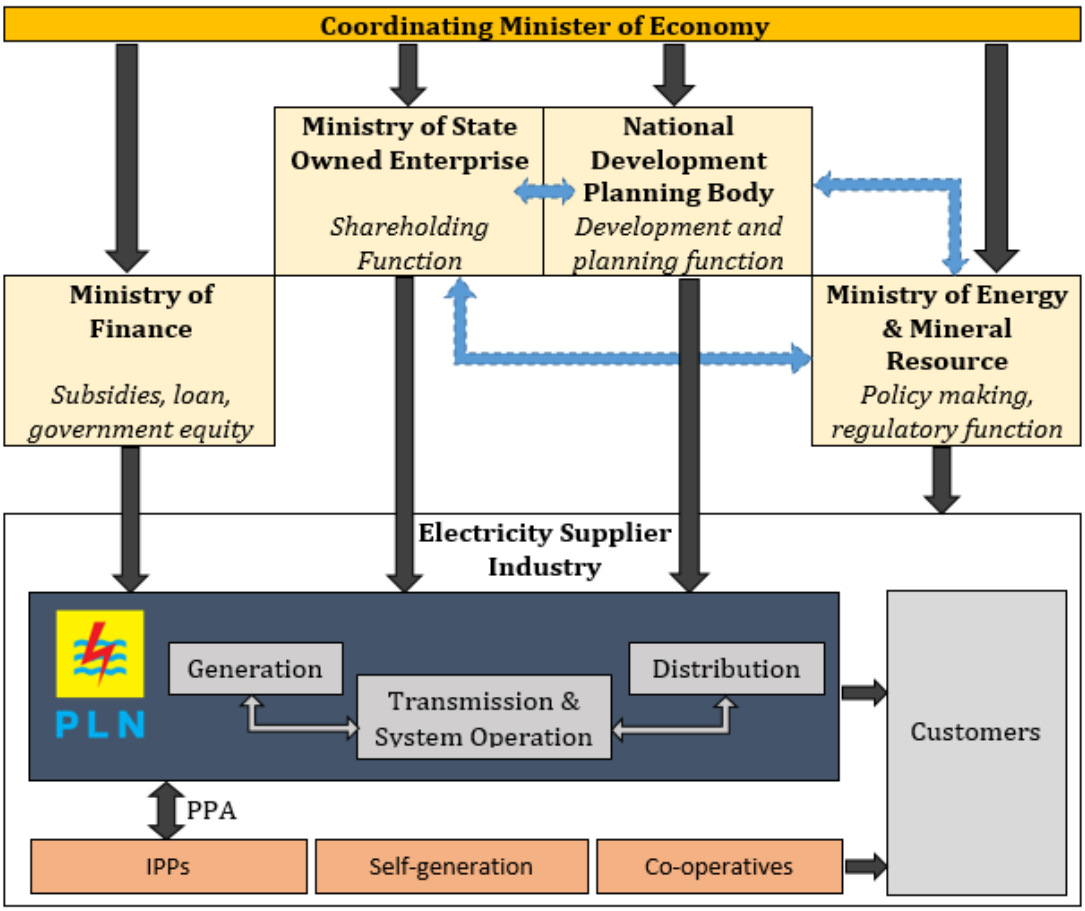
Brunei's electricity industry is vertically integrated and overseen by the Ministry of Energy and the national power company, Berakas Power Company (BPC), with three national oil and gas companies also participating in select generation and sale of excess electricity. There is limited information available on additional deregulation of the power sector, reflected in both the literature (Yokota & Kutani, 2017) and interviews (*Academic 21; Academic 26*). Brunei's power sector is the most heavily regulated of the BIMP-EAGA economies and data the most limited. However, it is also the BIMP-EAGA economy whose electricity industry is most dominated by fossil fuel industries, reflected in the potential for renewable integration (presented in Chapter 4). Brunei produces a surplus of power domestically, roughly 100-106% of annual consumption being covered by domestic production in 2016 (World Meters, 2020).

Indonesia

Indonesia is one of the national markets with discrepancies between policy and action, in part due to the intersection of business and policy interests in Indonesia's energy sector (Navarro & Sambodo, 2013). Government control over

Indonesia's energy industry, particularly oil and gas, lack of government clarity over national energy regulations, close-relationships between illegal energy ventures and government leaders, and tight restrictions on foreign investment top the list of conflicting interests and policy messaging (Dutu, 2016). Multiple periods of reform have influenced the continued removal of fossil fuel subsidies; however, the use of subsidies still exists and is closely tied to economic and political influence (Chelminksi, 2018) and the prevalence of fossil fuels in the country's energy mix. Indonesia is one half of the existing cross-border electricity interconnection with Malaysia, with plans for expansion and assessments underway (Pacudan, 2016). Indonesia ranks number 7 on the grid flexibility score analysed by Huang et al. (2019) and discussed in Chapter 2, due in large part to its very low electricity market access score (zero), low forecasting score (zero), low reliability score, and low natural gas for electricity generation score. Overall Indonesia's power sector is dominated by the national utility PLN (Perusahaan Listrik Negara); Indonesia has a state owned, vertically integrated electricity market with little private sector participation and limited independent power producer (IPP) involvement at just over 20% of total generation (PWC, 2016, p. 58).

Figure 5.2 Indonesia Electricity Industry Structure



Source: Author's recreation of IEA (2017a, pp. 27-28, 99-101), Yokota & Kutani (2017, pp. 4-6, 13-18), and interview feedback.

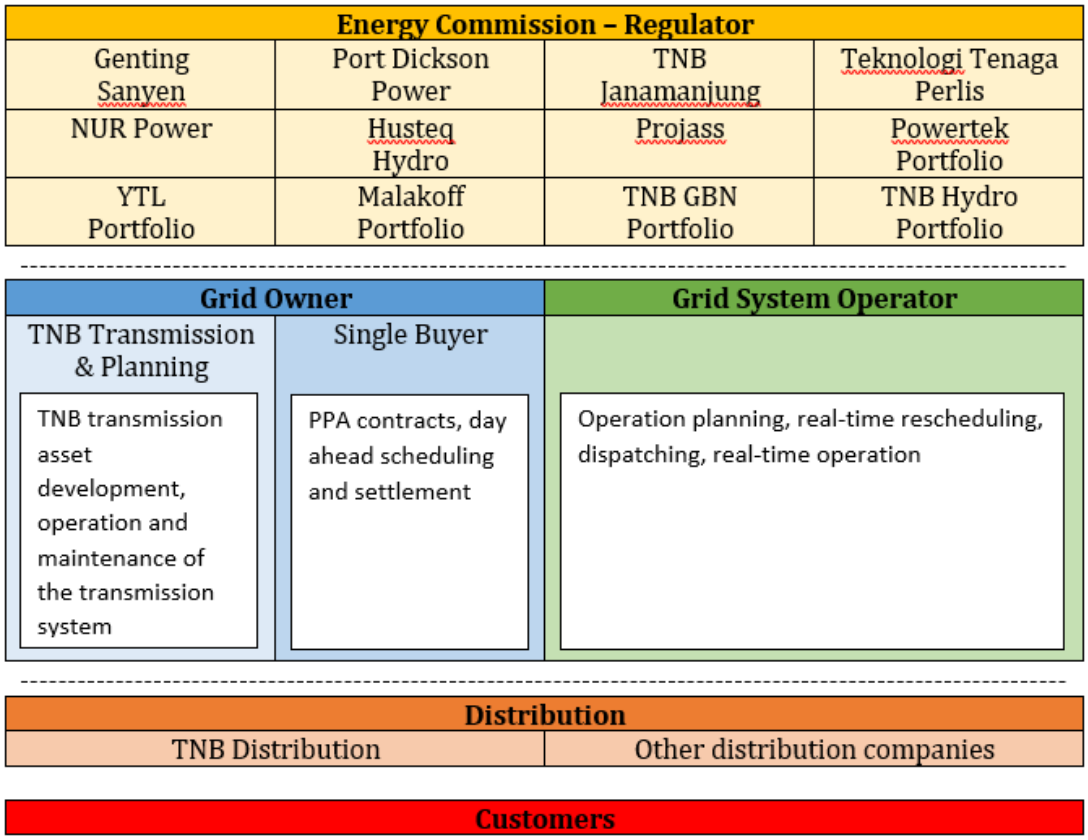
The power sector is regulated by a government agency, the Department of Energy and Mineral Resources. Reforms have been approved, however, delays in implementation have prevented further liberalisation of the national market (Wu, 2019), reflected in the general PLN monopoly and limited IPP involvement. Coal subsidies have encouraged an electricity sector dominated by coal, resulting in high artificial discounts for consumers (Global Subsidies Initiative, 2017), and continued subsidy removal could result in steep government fiscal gains (Burke & Kurniawati, 2018). Indonesia produced 110% of its annual electricity consumption via domestic generation in 2016 (World Meters, 2020).

Malaysia

Malaysia makes up the second half of the existing cross-border electricity interconnection, with plans for expansion. Similar to the electricity markets of Brunei and Indonesia Malaysia's market is not fully liberalised, vertically integrated, and allows limited IPP involvement (Yokota & Kutani, 2017). Malaysia is the third most flexible electricity market in the BIMP-EAGA

subsystem, with a high grid reliability score but low electricity market access score, very low forecasting score (zero), with some natural gas use for electricity generation and some renewable energy integration (Huang et al., 2019). Electricity market regulation is overseen by an independent regulatory body, unlike Brunei and Indonesia. Malaysia also has vertically integrated transmission and distribution, operated by either Tenaga Nasional Berhard (TNB) or Sarawak Energy Berhard (SEB), depending on the region within the country (Samsudin et al., 2016; A21). Malaysia has significant government funded petroleum subsidies in place (Han & Kimura, 2015). Malaysia also produces more than 100% of its annual consumption needs, with 108% annual consumption generated domestically in 2016 (World Meters, 2020).

Figure 5.3 Malaysia Electricity Industry Structure



Source: Author recreation of TNB (2020, p. 1), Yokota & Kutani (2017, pp. 4-6, 24-28), and interview feedback.

Philippines

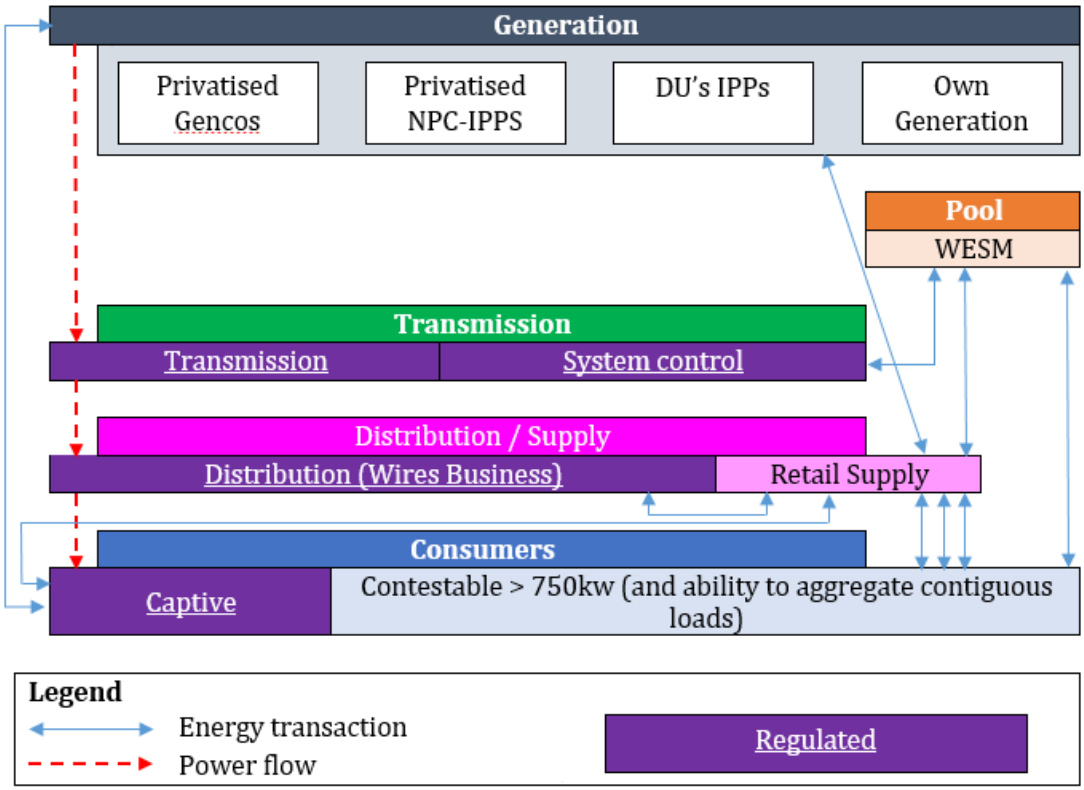
The Philippines power sector is perhaps the most advanced in the subsystem, as it is farthest along in the liberalisation process. The Philippines market is regulated by an independent body just as Malaysia, but the Philippines has also introduced some competition into the market. Pacudan (2016) describes the

Philippines market as the only subsystem market with "a competitive wholesale electricity market and partial retail market competition" (p. 46), which has resulted in a hybrid public-private model and the only of its kind in the BIMP-EAGA subsystem. However, the Philippines market still only remains partially competitive (Hall & Nguyen, 2017). While the Philippines was one of the first Southeast Asian economies to introduce IPPs into the market, the majority of power is still produced by NAPOCOR, the National Power Corporation, who in 2001 produced more than 50% of the nation's electricity (Wu, 2019, p. 13). Wu (2019) argues that despite a strong national privatisation agenda on record the market is not actually fully competitive, as multiple efforts to privatise have failed or been delayed. Hall & Nguyen (2017) describe these delays as a result of government focus being primarily on security of supply, not competition or equitable access (p. 107). In addition to initial liberalisation practices, the Philippine market also has the most advanced forecasting capabilities among BIMP-EAGA economies (Huang et al., 2019). Domestically the Philippines generated 111% of its total electricity consumption needs in 2018 (DOE, 2019). Among interview subjects the Philippines has been held up as the most advanced of the BIMP-EAGA economies. One subject, *Multilateral Organisation—Informant 2*, also spoke to the Philippines role in sub-regional power sector development:

> [the Philippines] *has made efforts behind the scene*[s] *to support regional power sector trading among ASEAN members, but also set an example for other nations—competition was introduced in the Philippines* [power] *market, and it is also made policy objective to include trade considerations in its climate and energy policy; this includes tax considerations and additional subsidies for clean energy integration.*

Here the electricity industry structure of the Philippines is further illustrated:

Figure 5.4 Philippines Electricity Industry Structure



Source: Author recreation of Navarro et al. (2016, p. 11), Yokota & Kutani (2017, pp. 31-34), and interview feedback.

This subsection has identified the market structures of ASEAN electricity markets, analysing the electricity markets of ASEAN broadly and BIMP-EAGA specifically. This has included identifying the broad limitations of current market structures based on research into grid flexibility and renewable energy integration, as well as identifying the level of domestic production achieved in each country, point to self-sufficiency of current electricity sectors across the subsystem. In the following subsection subsystem limitations will be contrasted with the dominant research into EMI and combined with the author's own insight based on interviews and additional documentary research, further shedding light on national market factors and the potential impacts on sub-regional renewable energy growth and development of cross-border interconnections.

5.3 Oseni & Pollitt Criteria

The structure of electricity markets in ASEAN explains, in part, the difficulty of developing multilateral cross-border electricity trade, increasing market integration across borders, and establishing a region-wide power grid (APG). It

has been established that cross-border electricity trade is happening in Southeast Asia among ASEAN members on a primarily bilateral scale. However, the goal of increasing cross-border electricity trade beyond bilateral trades requires increased EMI, the process of liberalisation and harmonisation of national electricity markets in order to facilitate electricity cooperation (Grossi et al., 2018; Oseni & Pollitt, 2014). As a result of the harmonisation of structures and processes, and the removal of barriers to trade, countries are able to engage in cross-border electricity trade and, as a result, cooperate on development and modernisation of national and regional electricity markets (Oseni & Pollitt, 2014).

Keys to cross-border electricity trade and power pooling, according to multi-country research by Oseni and Pollitt (2014) for the World Bank, include: (1) the development of national electricity transmission systems; (2) efficient market design (which can include the separation of system operators and transmission ownership, as well as the specific creation of independent institutions responsible for operation); (3) transmission capacity (via physical interconnection of cross-border transmission lines or interconnectors and congestion management); (4) governance support for the building and utilisation of transmission capacity across borders. In addition, (5) "jurisdictional issues" must be thoroughly considered (including energy industry subsidies, transit states); and (6) distributional impacts need to be managed (price impacts or the dispersal of energy intensive industries between two countries based on supply reliability and price increases, for example), and most importantly, (7) "a broader pre-commitment to free trade" (pg. 23).

Oseni and Pollitt's requirements are of relevance to this research due to their alignment with common recommendations for power sector reform and the essentials necessary for increased cross-border electricity trade. Referring back to the interview theme this chapter represents, national market factors, the Oseni and Pollitt EMI criteria reflect factors needed in national markets in order for cross-border electricity trade to expand and greater EMI to take place in the sub-region. The support for these recommendations by interview subjects further solidifies the relevance of Oseni and Pollitt's work and application to EMI and cross-border electricity trade in a variety of regions. The recommendations by Oseni and Pollitt (2016, pp. 23-27) are summed up below with author commentary and specifications included in the column titled 'Author Commentary', including interview subjects that supported these specifications.

Table 5.1 O&P EMI Criteria

Requirements	Author Commentary
Commitment to free trade	In the form of trade agreements (bilateral or multilateral), removal of barriers to trade, and WTO membership (*Former Government—Informant 1; Multilateral Organisation—Informant 2; Multilateral Organisation 4; Academic 6; Think Tank 11; Former Government 16; Former Government 17; Academic 21; Business 22; Development Bank 25; Former Government 27; Former Government 28; Development Bank Conference 4; Policy Conference 7; Policy Conference 9; Academic Conference 11; Government Conference 12)*;
Efficient market design	Could include separation of system operators and transmission ownership or creation of independent institutions responsible for operation; here the role of "strong, efficient and independent institutions" (p. 25) cannot be overemphasised. See chapter 4 for more discussion on this (*Multilateral Organisation—Informant 2; Think Tank 7; Development Bank 8; Think Tank 12; Think Tank 15; Academic 21; Policy Conference 9; Government Conference 12*);
Governance support	For building and utilisation of capacity across borders; for flexibility in regulation in order to respond to global problems (Navarro, 2013, p. 9; *Former Government—Informant 1; Development Bank 25; Academic 26; Former Government 27; Former Government 28; Development Bank Conference 4; Policy Conference 9; Academic Conference 11; Government Conference 12; Government Workshop 14*);
Jurisdictional considerations / management	Including energy industry subsidies, transit states, etc. (*Former Government—Informant 1; Think Tank 12; Academic 26; Former Government 27; Think Tank 29; Policy Conference 9; Government Workshop 14*);
Transmission capacity	Via physical cross-border interconnections, transmission lines, congestion management (*Multilateral Organisation—Informant 2; Think Tank 5; Think Tank 12; Academic 26; Policy Conference 9; Academic Conference 11; Government Workshop 14*);

(Continued from previous)

Requirements	Author Commentary
National electricity transmission systems	Development of or strengthening; harmonisation of rules and standards (*Multilateral Organisation—Informant 2; Think Tank 5; Academic 10; Think Tank 12; Multilateral Organisation 18; Former Government—Informant 1; Development Bank 25; Academic 26; Policy Conference 9; Academic Conference 11; Government Conference 13)*;
Management of distributional effects	Including the dispersal of energy intensive industries between two countries based on reliability of supply and price increases (*Think Tank 5; Academic 6; Development Bank 5; Think Tank 12; Academic 21; Think Tank 22; Development Bank 25; Academic 26; Policy Conference 9; Government Conference 12; Government Workshop 14)*.

These recommendations are consistently reiterated across the literature on cross-border electricity trade generally and in East and Southeast Asia specifically (Antweiller et al., 2001; Pritchard, 2003; Wu, 2012; IEA, 2015; Andrews-Speed, 2016; Li & Kimura, 2016; Pollitt, et al., 2017; Grossi et al., 2018). Experts interviewed largely second these recommendations, however, *Academic 26* reiterated them exactly. This is significant in that this expert is not only a leader in energy policy research in East Asia, but active within two sub-regional institutions responsible for energy policy making. They have written on this topic extensively and referenced the Oseni and Pollitt recommendations specifically. An additional expert, *Former Government Official—Informant 1*, with expertise in East Asian energy policy but no prior work on Southeast Asian EMI (though on South Asian EMI) broadly reiterated the major Oseni and Pollitt criteria, particularly pts 1-5. Similar agreements from other interview subjects abound (*Multilateral Organisation—Informant 2, Think Tank 5, Multilateral Organisation 18, Business 19, Academic 21, Development Bank 25, Former Government Official 27,* and *Think Tank 28*), representing either partial or all of Oseni and Pollitt's criteria. This author also noted that development bank representatives and former government officials interviewed largely reflected all governance-oriented criteria and free trade recommendations—a point that will be further analysed in Section 5.6, *Discussion.*

Oseni and Pollitt's criteria, while representing specific recommendations with wide-spread support, are only applied in their 2014 research to six specific case

studies in various stages of development—the Sothern African Power Pool, the West African Power Pool, and the Central American Power Pool, the United States, the Single Electricity Market in Ireland, and the South East Europe Market. Application of these criteria to Southeast Asia or the APG does not occur in their research and is original to this Ph.D. dissertation.

In an effort to apply Oseni and Pollitt's criteria to cross-border electricity trade in Southeast Asia the author has created a 'scorecard' of BIMP-EAGA countries applied to O&P's original criteria. This scorecard reflects three rankings—(1) yes, where the country has implemented necessary criteria; (2) partial, where criteria implementation is underway, with political support and/or active initiatives towards criteria; and (3) no, where implementation is limited or non-existent. These rankings are also visualised in the heat map below (Figure 5.2), whereby green, yellow and red are applied to yes, partial and no answers respectively, drawing attention to areas requiring additional political and economic attention for advancement; the brighter the heat (red) the more help is needed; the cooler the heat (green), the less help. Answers were determined based on the author's review of Oseni and Pollitt's research, documentary research, and interviews. This heat ranking gives a preliminary view of the extent to which cross-border interconnections and related sub-regional energy policy goals are being achieved (RQ2, RQ2a, RQ2b).

Table 5.2: BIMP-EAGA Scorecard

Requirements	Brunei	Indonesia	Malaysia	Philippines
Commitment to free trade[54]	yes	yes	yes	yes
Efficient market design	partial	partial	partial	partial
Governance support	partial	partial	partial	partial
Jurisdictional considerations / management	partial	partial	partial	partial
Transmission capacity	no	partial	partial	partial
National electricity transmission systems[55]	partial	partial	no	no
Management of distributional effects[56]	no	no	no	no

The scorecard of each BIMP-EAGA member economy tells us a few important things related to market structure and limitations in BIMP-EAGA. First, Brunei is

[54] Each BIMP-EAGA economy is fully committed to free trade given their own trade agreements, membership in the WTO, (majority) attempts at liberalisation, and embracing of neoliberal trade policies in the global market (Huang et al., 2019).

[55] According to Oseni & Pollitt (2014) nearly all countries have some issue in this area. The development of national transmission systems, transmission capacity, and jurisidictional considerations / management are linked as well due to practical and political problems across markets (physical barriers, governance limitations across jurisdictions, governance capacity, power sector modernisation, etc.). Malaysia and the Philippines are farther away in this regard than their subsystem neighbours, in part because of the presence of multiple unconnected grids (whereas Indonesia has separate island systems that connect multiple power systems within a geographical area [Pacudan, 2016]).

[56] All countries scored NO with regards to commitment to the management of distributional effects because of limited associated economic and energy policies, prevalence of energy and fuel poverty, limited access, limits to transport affordability, and lack of climate change policies and instruments at the national level (all of which contribute to management of distributional effects [REN21, 2019a]). Preventing or managing distributional effect in the global transition to a low-carbon economy have proved difficult (McInnes, 2017); Southeast Asia is no different, where affordability of electricity and energy access remain a key challenge across each country in the region but is amplified among the least developed economies in the sub-region.(ACE, 2017).

the least transparent of the BIMP-EAGA countries, and in part its scorecard suffers as a result. While Brunei does have a commitment to free trade, its efficient market design is scored partial as a result of its single buyer model that is dominated by fossil fuel interests and limited private sector involvement (Lawrey & Pillarisetti, 2017); Governance support in Brunei scores a partial as well, due to close government ties for the status quo energy system and lack of transparency (Pacudan, 2016); Jurisdiction considerations and management are similarly partial due to limitations in information (Pacudan, 2016); transmission capacity in the country is low, with no cross-border arrangements or interconnections (Kimura & Shi, 2019); and the national electricity transmission system itself is a work in progress (Energy and Industry Department of Prime Minister's Office, 2016); Similar to other countries on the list Brunei has little to no management of distributional effects beyond surface level climate commitments and requires the development of further sustainable development targets (Kimura & Shi, 2019).

Indonesia scores much better. Indonesia scores partial on efficient market design due to its efforts at liberalisation, reform, and increased competition (which has never fully taken off); Similarly Indonesia has partial commitment to efficient market design (although multiple periods of reform have failed to fully implement); governance support is evident via the nations reform policies; jurisdictional considerations/management, transmission capacity, and national electricity transmission systems are all evident, in part because geographical requirements require a coordinated national market that consists of a number of interconnected systems. Indonesia has what appears to be one of the best scorecards, as it has at least partial in all but one requirement due to government commitment to reforms, but lack of follow through prevents full implementation of many of the requirements. Interestingly, Indonesia also has the highest rate of subsidisation across the BIMP-EAGA subsystem, which limits its commitment to the necessary liberalisation and reform targets. Indonesia does not score higher than partial in many categories as a result of limitations to full implementation.

Malaysia is also partial in the majority of categories, including efficient market design, governance support, jurisidictional considerations and management, and transmission capacity. This partial score is a result of failure to fully implement policies across the market, with some liberalisation but limited IPP involvement (even though a few IPPs are licensed to operate across the country), and the prevalence of monopolies. Malaysia has a very limited national

electricity transmission systems and requires significant development of a nationally connected system to progress subsystem interconnection.

The Philippines represents the most liberalised of the BIMP-EAGA economies, with a partial commitment across four requirements: efficient market design, governance support, jurisdictional consideration/management, and transmission capacity (Kimura & Shi, 2019). This partial score is a result of the national liberalisation and reform efforts, including competition and third party access—however, these scores are not green/yes due to the continued monopolies and delayed liberalisation and partial privatisation (Pacudan, 2016).

The O&P BIMP-EAGA score card shows that the majority of criteria are being considered in the majority of countries. However, two areas stand out across all countries—commitment to free trade has a positive score in each BIMP-EAGA economy, and management of distributional effects has a negative score in each BIMP-EAGA economy. This coincides with expert consideration of these criteria (*Think Tank 5; Academic 6; Development Bank 5; Think Tank 12; Academic 21; Think Tank 22; Development Bank 25; Academic 26; Academic Conference 1; Academic Workshop 6)* and ASEAN review of BIMP-EAGA progress (APAEC, 2010). As evidenced by the table above, the red areas are clustered around physical assets and their impacts which leads this author to posit that physical asset management is one area of weakness within BIMP-EAGA; however, physical costs require large up-front costs which are reflected in a major barrier to cross-border interconnection—investment required as a result of national infrastructure and system improvements that must take place in order for trade to occur (Pacudan, 2016; Owen et al., 2017). According to expert *Multilateral Organisation—Informant 2*, EMI commercial and regulatory issues are largely centred around investment challenges in Southeast Asia, raising sub-regional questions regarding the establishment of long-term investment guidelines and support from regional and sub-regional financial institutions. This expert posited that the largest immediate barrier to EMI is investment.

Oseni and Pollitt's criteria, while extensive, does not entirely reflect the breadth of recommendations proposed in ASEAN specific literature or interviews. Where interviews and research exposed additional criteria required for EMI this author has added these points into an expansion of Oseni and Pollitt's original criteria. These are represented in italics in the criteria framework now called '*O&PCRB EMI Criteria'.* In addition, the author has added a type distinction to each

commitment, discerning what type of commitment needed—political, physical,[57] relational, or hybrid. This is done in an effort to make additional scoring of these criteria more thorough, as well as allow for expansion of criteria to meet limitations. These type distinctions are indicated by blue shaded cells in the table below, as are any new requirements:

Table 5.3: O&PCRB EMI Criteria

Requirements	Type	Author Commentary
Commitment to free trade	Policy	In the form of trade agreements (bilateral or multilateral), removal of barriers to trade, and WTO membership;
Market liberalisation efforts	Policy	Including but not limited to free trade commitments; Business buy-in;
Efficient market design	Policy	Could include separation of system operators and transmission ownership or creation of independent institutions responsible for operation; here the role of "strong, efficient and independent institutions" (p. 25) cannot be overemphasised. See chapter 4 for more discussion on this;
Development of multi-buyer and multi-seller market	Policy	According to Pacudan (2016, p. 52) this would occur at a later stage, after a significant number of agreements have been reached (p. 56). This can include the development of an independent, cross-market operator;
Governance support	Hybrid	For building and utilisation of capacity across borders; for flexibility in regulation in order to respond to global problems (Navarro & Sambodo, 2013, p. 9);
Jurisdictional considerations / management	Hybrid	Including energy industry subsidies, transit states, etc.;

[57] The author has noted that physical barriers often require large up-front investments, a view that is reflected among some interviews. However, the author views investment and finance issues as cross-type and therefore they are not distinguished independently in the O&PCRB EMI Criteria.

Requirements	Type	Author Commentary
Development of transition plans by national power utilities (ASEAN Specific)	Hybrid	Including a road map for development (Navarro & Sambodo, 2013, p. 18) that includes very specific steps and targets--more specific than those currently outlined and incorporating business case for development;
Enhance Capacity for Energy Policy and Planning (ASEAN Specific)	Hybrid	Financial and organisational support for ASEAN and country specific goals, including information sharing, capacity building, etc (Andrews-Speed, 2016, p. 4);
Commitment to incremental development	Hybrid	Participation in bilateral agreements, followed by multilateral and eventually sub-regional (Pacudan, 2016, p. 54-56);
Transmission capacity	Physical	Via physical cross-border interconnections, transmission lines, congestion management;
National electricity transmission systems	Physical	Development of or strengthening; harmonisation of rules and standards;
Management of distributional effects	Policy	Including the dispersal of energy intensive industries between two countries based on reliability of supply and price increases;
Presence of trusting or prior relationship	Relational	Including strong bilateral or multilateral relations in the form of agreements, joint initiatives, etc. (Shi et al, 2019, p. 54);

In some cases, the additions to Oseni and Pollitt's criteria are expansions of their ideas but applied directly to ASEAN EMI, providing more detail specific to ASEAN cases. In all cases these recommendations fall under one of four dominant categories (Physical, Policy, relational or hybrid). While it can be argued that each criteria requires some form of governance support, these categories are meant to represent the dominant requirement. There is a roughly even distribution of the four categories, with the exception of relational, of which only trusting relationships is identified (this will be expanded in the following chapter, Chapter 6).

Given the disparate industry structures within BIMP-EAGA (identified in subsection 5.1) what does the application of O&PCRB demonstrate about RQ2a,

how does the political and economic structure of national electricity markets impact the expansion of cross-border interconnections in BIMP-EAGA? And RQ2b, *Is the structure of national markets conducive to sub-regional and international policy goals in Southeast Asia?* When these expanded criteria are applied to the BIMP-EAGA subsystem, the heat map appears different, and a few outliers begin to emerge. This is depicted in the following expansion of O&PCRB BIMP-EAGA Scorecard, as follows:

Table 5.4 O&PCRB BIMP-EAGA Scorecard

Requirements	Type	Brunei	Indonesia	Malaysia	Philippines
Commitment to free trade	Policy	yes	yes	yes	yes
Market liberalisation efforts	Policy	partial	partial	partial	partial
Efficient market design	Policy	partial	partial	partial	partial
Development of multi-buyer and multi-seller market (Pacudan, 2016)[58]	Policy	n/a	n/a	n/a	partial
Governance support	Hybrid	partial	partial	partial	partial
Jurisdictional considerations / management	Hybrid	partial	partial	partial	partial
Development of transition plans by national power utilities (ASEAN Specific)[59]	Hybrid	unknown	unknown	unknown	partial

[58] While development of a multi-buyer, multi-seller market has not occurred anywhere except the Philippines, progression to this market model across the other BIMP-EAGA markets is an expected next step in the integration process across BIMP-EAGA (Pacudan, 2016, pp. 52-53), although not applicable given the current market structures in Brunei, Indonesia and Malaysia.

[59] Only the Philippines has record of a transition plan by its utilities; the author has found no record of additional transition plans across the subsystem.

(Continued from Previous)

Requirements	Type	Brunei	Indonesia	Malaysia	Philippines
Enhance Capacity for Energy Policy & Planning (ASEAN Specific)(Andrews-Speed, 2016)[60]	Hybrid	partial	partial	partial	partial
Commitment to incremental development[61]	Hybrid	no	partial	partial	yes
Transmission capacity	Physical	no	partial	partial	partial
National electricity transmission systems	Physical	partial	partial	no	no
Management of distributional effects	Policy	no	no	no	no
Presence of trusting or prior relationship[62]	Relational	partial	partial	partial	partial

[60] According to Andrews-Speed (2016) enhancing capacity via cooperation and planning is necessary for sub-regional and regional interconnectivity, including "coherent and effective national and collaborative energy policy and planning" with "the support of a region-wide cadre of energy professionals in government, research institutes, think-tanks and universities" (p. 4). This recommendation is also supported via interviews (*Former Government— Informant 1; Multilateral Organisation—Informant 2)*, where recommendations regarding information sharing and continued study centered on expert coordination in both policy and academic spheres.

[61] Commitment to incremental development is present across the sub-region with the exception of Brunei, where national policies and transmission development do not reflect an immediate commitment to bilateral development; there is hope via the upgrading of Brunei's transmission capacity, however, this is in progress and currently limited, requiring further harmonisation of Brunei's power systems and national policy commitment to structural changes. The Philippines presents the most committed to incremental development, offering leadership for sub-regional development projects and the most developed subsystem power sector (Pacudan, 2016).

[62] Membership in ASEAN and subsystem cooperation via ASEAN initiatives (see Chapter 2 discussion on ASEAN membership and sub-regional cooperation) presents evidence of existing trusting relationships among ASEAN members; however, challenges of trusting energy resources

While the majority of BIMP-EAGA economies are in the partial category for progress in implementing criteria, the Philippines is farthest along (albeit not by much). Brunei is in the red more than any other economy, indicating the least progress in implementing the O&PCRB EMI Criteria. Based on the score card criteria that fall under the policy type are slightly more dominant, but for the most part there is an even spread across type. As reflected in the table above, the weakest areas remain with physical assets and their impacts.

Overall the BIMP-EAGA subsystem is making progress in reaching criteria, but is nowhere near complete, and as a result EMI progress is limited. The only criteria that all four economies have firmly established is a commitment to free trade—one of the priorities of ASEAN's own economic goals (i.e. the AEC), and thus achieved with ASEAN support and via ASEAN economic initiatives. While the level of commitment to free trade varies, focus here is on broad criteria performance. In this case neo-developmental statism offers a lens from which to view this commitment—some commitment is all that matters, and therefore EMI criteria is being met via participation in global and region markets, engagement in free trade via WTO membership, trade agreements, and ASEAN free trade initiatives, all while prioritising state directed economic policy making domestically. Therefore, while EMI criteria is technically being met, free and open markets and commitment to neoliberal economic ideals may not be fully reflected in the national policy making apparatus; as a result, full EMI might be difficult to achieve based on the primacy of free trade and market liberalisation efforts in the EMI criteria above.

Of consistent importance among interview subjects and research are four particular points: commitment to free trade / market liberalisation; harmonisation of rules and procedures; transmission capacity, and policy or governance support. Additional points are often recommended as well, however, these four are consistent across both Oseni and Pollitt's work, the broader literature, and expert interviews conducted for this research. These four criteria evenly fall into the categories of physical or policy requirements.

In analysing the criteria established by Oseni and Pollitt and expanded into O&PCRB EMI Criteria, the author did discover that an actual score card with a number range would be beneficial for additional analysis. With a minimally

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with one another prevents a higher score across BIMP-EAGA economies. Trust is discussed in more detail in Chapter 6.

sufficient quantity of requirements under each type, each country and the sub-region's performance across the four core proposed requirement types could be more accurately measured and thus enable easier identification of weak areas. With a heat map, gradients of success or failure can be more easily identified with a more impactful narrative. Due to data limitations the author chose not to expand this analysis, an issue discussed in more detail later in Chapter 7, *Conclusions*.

The criteria established by Oseni and Pollitt and expanded in the O&PCRB EMI Criteria also coincide with reform recommendations first introduced in Chapter 4. These are expanded upon in the following section, *Reform & Assessment,* with a focus on application to BIMP-EAGA specifically and the reform needs of national markets based on the O&PCRB EMI Criteria covered previously.

5.4 Reform & Assessment

This chapter seeks to address Research Question 2 and two associated sub-questions: (RQ2) *How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?* (RQ2a) *How does the political and economic structure of national electricity markets impact the expansion of cross-border interconnections in BIMP-EAGA?* (RQ2b) *Is the structure of national electricity markets conducive to sub-regional and international policy goals in Southeast Asia?* Based on sub-regional market factors discussed in Chapter 4 it has been demonstrated that there is potential for renewable expansion based on a) energy mix and b) renewable targets. However, Chapter 4 also exposed national level changes are necessary for sub-regional level EMI. Based on the O&PCRB EMI Criteria discussed in Section 5.3, there are EMI limitations based on current national market factors; of relevance to renewable integration is efficient market design and governance support. In assessing the sub-region's opportunities for renewable energy to participate in national markets it should also be considered that EMI itself provides an incentive for deeper renewable integration—excess production has the potential to be bought and sold among EMI partners, contributing to economic gains, energy poverty reductions, and sub-regional and national climate targets. Since sub-regional and national market factors point to limits in national government commitment, this leads to a consideration of the necessary reforms and assessment of national needs for greater EMI and renewable energy integration across the BIMP-EAGA subsystem. Where the market structures are not currently conducive to BIMP-EAGA interconnection expansion (RQ2a) and

sub-regional and international policy goals (RQ2b), exploring potential reforms and assessments of these issues will help highlight how these market structures can be improved in order to realise ASEAN power sector connectivity goals and renewable integration targets (if at all).

Reform and assessment of current market structures is a priority among the research already assessing ASEAN EMI and the progress of the APG (Navarro & Sambodo, 2013; Andrews-speed, 2016; Pacudan, 2016; among many others). Interviews also highlighted the need for structural and policy changes in national electricity markets, pointing to the need for continued reform and also assessments of these reforms as EMI becomes deeper and cross-border electricity trade grows (*Multilateral Organisation 4, Academic 10, and Academic 26)*. *Multilateral Organisation 4*, an expert interviewed in the Philippines during an international policy conference, works on energy market integration in South and Southeast Asia, assessing programs in one sub-region and their applicability in another. This expert spoke passionately about the requirement of continued appraisal of progress in order to deepen physical integration but also align political goals as the environment for EMI and renewable energy integration becomes more welcoming. This is an important overarching point regarding EMI and cross-border electricity trade—reform is not static, but continuous, just as energy policy adapts to technical, physical, and political changes, so, too, should ASEAN's EMI efforts.

Reforms are quite often associated with costs—political, business, and financial. However, there is agreement that the costs of electricity market reform are met by gains in productivity, efficiency, trade and "far outweigh the costs" (Porter & Situmeang, 2005, p.2). ASEAN itself has acknowledged these gains, and as such EMI and the required reforms needed remain a signature of connectivity and economic development plans introduced in Chapter 4 (See APAEC, 1999, 2004, and 2010, for example). Expert interview *Think Tank 25* acknowledges that costs associated with sector reforms are generally accepted as necessary by governments, but often resisted among businesses interests and suppliers. *Multilateral Organisation—Informant 2* echoes this point in ASEAN specifically:

> *Energy policy reforms are resisted at some points, such as reluctance from the utilities or based on the nature of* [the] *national system… The awareness of stakeholders and* [their] *participation level can also be a point of resistance for us* [organisation]*, especially in promoting renewable energy and the use of more efficient technologies in national power systems.*

Common reforms proposed include those highlighted in the prior section within both O&P's criteria as well as the author's expansion of this criteria in the O&PCRB EMI Criteria framework. These can be grouped under economic reforms (market design, liberalisation, management of distribution impacts, etc.), physical reforms (transmission expansion across borders, adjustment to rules and standards across trade partners for harmonisation) and political reforms (capacity building among leadership, policy commitments, development and implementation of policy plans for transitions among utilities); Similarly, barriers to these reforms are also economic (sunk costs in current inefficient or ineffective systems; high upfront costs, and also lack of investor confidence), physical barriers (capacity deficits, infrastructure limits, and transmission capability), and political barriers (capacity deficits, entrenched interests in the status quo, power dynamics). In some cases, individual nations are ripe and ready for increased EMI and cross-border electricity trade (Singapore), some economies are already making progress (the Philippines and Thailand), and others are lagging behind (Myanmar and Cambodia). In the case of BIMP-EAGA all of the O&PCRB EMI Criteria need to be further addressed, with the exception of commitments to free trade, which are largely underway or already in place but require continued political support. Free trade commitments are also tied up with market liberalisation reforms and reflected in some of the language used surrounding this issue (see ADB, 2014 for example).

Regardless of the type of reform needed in BIMP-EAGA or ASEAN each O&PCRB EMI Criteria will benefit national and sub-regional electricity markets. In particular, reform to meet these criteria will expand national electricity access, increase modernisation (operational efficiency, reliability, and flexibility of power systems) and technical updates to existing infrastructure (generation and transmission capacity, development of national grid infrastructure including domestic interconnected grid networks), strengthen national commitments to diversification of energy resources and electricity production from non-fossil fuel resources, encourage technology sharing and increase investment from regional, sub-regional and international partners (Shi, et al., 2019, p. 452). Interview subjects questioned about limitations of EMI and cross-border electricity trade in ASEAN unanimously cited financial concerns and upfront costs, perhaps the largest perceived cross-sector limitation to sub-region EMI reforms. Interview subject *Academic 26*, among the top 5 experts immersed in this topic globally, had this to say about financial concerns: "Investment problems, those never leave. They are always there. Instead, making progress and finding solutions should be [the] focus."

Additional relevant EMI reforms can be grouped into three key areas: (1) market liberalisation, (2) coordination, harmonisation and standardisation of markets and infrastructure, and (3) removal of subsidies. These three reforms issues each have political-economy linkages and have controversial reception among experts interviewed. In the following subsections these three reform issues will be explored in more detail, highlighting their relevance to ASEAN and BIMP-EAGA, as well as incorporating previous analysis of O&PCRB EMI Criteria for increased EMI. Analysing the legitimacy of these reforms in individual markets, and their likelihood in being implemented fully, is beyond the scope of this study; however, a broad overview will provide context to the needs of ASEAN for greater cross-border electricity trade and increased EMI. This will further aid in addressing RQ2a and RQ2b—how does the political and economic structure of national electricity markets impact the expansion of cross-border interconnections in BIMP-EAGA and is the structure of national electricity markets conducive to sub-regional and international policy goals in Southeast Asia?

5.4.a Market Liberalisation

In Chapter 2 (*Cross-Border Electricity Trade: Conceptual Approach & Review of Literature*) international trade was introduced, explaining the common, perceived benefits gained from liberalisation and increased trade among neighbours. Under this line of thinking, increased competition results in market efficiency, which benefits the economy, lowering costs and thus prices for consumers (Jamasb & Pollitt, 2005). Electricity markets are no different, as the wider global experience and literature (Han & Kimura, 2015; IEA, 2015) reflects recommendations for liberalisation of electricity markets in order to foster what Jamasb and Pollitt (2005) refer to as a "well-functioning, market-oriented industry"(p. 2). Similar to recommendations for reform, in order to achieve EMI the necessary liberalisation reforms for an open market are interrelated and interconnected, including one or more of the following:

> …sector restructuring, introduction of competition in wholesale generation and retail supply, incentive regulation of transmission and distribution networks, establishing an independent regulator, and privatisation (Jamasb, 2002; Joskow, 1998; Newbery, 2002; cited in Jamasb & Pollitt, 2005, p. 2).

These reforms, of course, reflect a neoliberal way of thinking about trade, where policies focus on economic efficiency with few market barriers and the "…greatest creation of wealth at the lowest possible cost" (Strange, 1988, p. 179).

In the case of electricity markets this means well-functioning regulation and oversight, strong infrastructure and transmission networks, and market competition in order to provide the lowest costs to both power sector businesses and consumers of electricity. This also reflects the implementation of neoliberalism in theory versus in practice. Chapter 2 discussed ways in which liberalisation in electricity markets is not always reflected as it is theorised—losers emerge and, in some cases, prices actually increase and reform is halted in favour of more state intervention and state support of private investment (Hall & Nguyen, 2017, p. 114).

Regardless of critical power sector liberalisation research (Anderson, 2009; Hall & Nguyen, 2017; Aris et al., 2020) the assertion by Oseni and Pollitt (2014) that national commitments to trade liberalisation are required for cross-border electricity trading is also consistent with the literature on power sector reform in ASEAN (Porter & Situmeang, 2005; Wu, 2012; Sheng & Shi, 2013; Shi, 2014; IEA, 2015; Pacudan, 2016; among many more) and expert interviews and feedback (*Former Government—Informant 1; Multilateral Organisation—Informant 2; Multilateral Organisation 4; Academic 6; Academic 10; Think Tank 11; Former Government 16; Former Government 17; Academic 21; Business 22; Development Bank 25; Academic 26; Former Government 27; Former Government 28; Academic Workshop 6; Policy Conference 9; Government Workshop 14*) and among international institutions (World Bank, 2008; IEA, 2014, 2015; IRENA, 2018a). According to Oseni and Pollitt:

> greater trade openness leads to more cross-border trade in electricity, even keeping the potential gains from trade constant (p. 23).

The presence of regional trade agreements prior to cross-border electricity trade and power pooling efforts is also viewed as helpful for continued development in EMI. In regions where bilateral trade agreements are already present, barriers to trade will have been reduced and trust between partners will already have been established. Experts interviewed on this topic unanimously called for increased market liberalisation, further regional trade integration, and alignment of national markets. Interview subject *Academic 6* even went so far as to assert that free trade and engagement in trade agreements is good not just for EMI but for renewable integration specifically:

> *trade liberalisation will help scale up clean technology use in the region, and renewable utilisation…through demand-side effects.*

Following the logic of neoliberal reform recommendations, ASEAN's present commitments to free trade, via the AEC and other initiatives, is one step in

further EMI and cross-border electricity trade, boding well for the development of further market integration and continued trust among parties (trust will be further explored in Chapter 6).

In the case of electricity market liberalisation, reform suggestions are not only referring to removing barriers to trade, although that is the dominant refrain (see *Academic 6,* above). There is also the matter of increasing competition in national electricity markets by opening markets up to third parties or IPPs (Hall & Nguyen, 2017). The majority of BIMP-EAGA nations have bundled transmission and distribution, as opposed to TSOs and independent distribution (see Section 5.2 for more on individual markets). This can also include the separation of distribution and transmission costs, resulting in increased investor and customer confidence, encourage competition, and safeguard "non-discriminatory network access" (Jamasb & Pollitt, 2005, p. 3). Similarly, formal rules and regulations can maintain investor confidence and encouraging uniformity across ASEAN's national power sectors. (Porter & Situmeang, 2005, p. 2). *Think Tank 15* discussed at great length the dominance of bundled distribution and transmission in the sub-region, and the prevalence of state-owned monopolies as a major obstacle to "any significant integration and modernisation" in the sub-region. This particular trait of national markets does not appear conducive to expansion of cross-border interconnections or sub-regional and international energy policy and climate goals (RQ2a, RQ2b).

While the majority of interview subjects (*Former Government—Informant 1; Multilateral Organisation—Informant 2; Multilateral Organisation 4; Academic 6; Academic 10; Think Tank 11; Former Government 16; Former Government 17; Academic 21; Business 22; Development Bank 25; Academic 26; Former Government 27; Former Government 28; Development Bank Conference 4; Policy Conference 7; Policy Conference 9; Academic Conference 11; Government Conference 12*) and literature on the issue reflects liberalisation recommendations, Porter and Situmeang (2005) preface their recommendations with a qualifier that reflects the common 'ASEAN way' of non-interference: the structure of power sectors "is a matter for national policy in each sovereign [ASEAN] country" (pg. 3). *Multilateral Organisation—Informant 2* spoke of anti-competition policy at the national level as a major barrier to ASEAN governance measures in the EMI space:

> *Anti-competition is the largest obstacle at national level. ASEAN recognizes that it is part of the national policy of individual countries to not allow foreign competition or maintain a monopoly structure in its* [national] *electricity supply industry.*

The complex nature of electricity markets and interconnections means that each country must make the necessary decisions on their own, based on what is best for national industries and citizens.

Following the development of a modernised national electricity market multiple experts (Bacon & Beasant-Jones, 2001; Porter & Situmeang, 2005; Kimura & Shi, 2011; Wu, 2019) argue that reform almost always includes the introduction of competition and liberalisation of traditionally state-controlled power sectors (*Think Tank 12; Think Tank 15; Academic 26)*. These reforms often lead to improvements in supply security, overall electricity access, and price impacts. *Think Tank 15* repeatedly referenced the positive price impacts liberalisation would have on sub-regional electricity markets, as well as the broader East Asian region should liberalisation of power sectors be uniformly embraced. The majority of experts interviewed echoed these recommendations, and indeed cited some of these authors (For example: Pacudan, 2016; Shi, 2014) as support. There are some discrepancies among ASEAN-based experts as to the speed of liberalisation reforms considering various national economic and political structures.

Research shows that while neoliberal power sector reforms are meant to benefit consumers via price reductions and efficiency gains, reforms actually create a constellation of winners and losers (Anderson, 2009). Hall & Nguyen (2017) demonstrate how reforms are traditionally sought for economic and efficiency gains, but in some cases reforms later require more reforms, with a tendency towards developing economies reverting back to state involvement in power sectors (pp. 112-114). Where reforms may create dis-benefits in the short term, such as through price increases, there are also long-term benefits via investment or access for those who can pay (Anderson, 2009, p. 70-72). Reform is both positive and negative, with winners and losers depending on the market, government, and level of restructuring.

These reform and deregulation recommendations are in line with status quo recommendations for overall market liberalisation and are indeed supported by the majority of international development organisations as well. This does raise the question of how unbiased liberalisation recommendations are, and whether or not they are actually conducive to structures and systems at the national level, or whether these recommendations are reflecting an international system that favours predominantly western, neoliberal policy and economic reforms. This dichotomy will be explored in more detail in section 5.6, *Discussion.*

5.4.b Coordination, Harmonisation & Standardisation

Coordination, harmonisation and standardisation of power sectors are tightly intertwined policy recommendations in the ASEAN region. Here these recommendations will be explained, including interview support for the inclusion of these reform and assessment procedures in order to optimise sub-regional and regional power sector connectivity.

Previously in this chapter two different methods of energy market integration were introduced—consolidation and coordination. In the case of ASEAN, where power sector development is happening at varying rates within different system structures, coordination is recommended (*Academic 21)* followed by a hybrid combination of the two as markets develop (*Multilateral Organisation—Informant 2)*. Consolidation, whereby a single body controls power systems in a particular area, merges systems; coordination requires organisation to optimise and harmonise electricity trade among neighbours (Pacudan, 2016, p. 50). Coordination allows markets that are not already integrated to trade and expand their market access, although it still requires close cooperation (*Government Conference 12; Government Conference 13; Government Workshop 14)*. Coordinating system operators and distributors requires the standardisation of practices utilised and a harmonisation of regulation, planning, costs, networks, and monitoring associated with electricity production and distribution (Pacudan, 2016, p. 41). Here the role of ASEAN is key, as working under guidelines for specific coordinating rules would benefit the reform and development of integrated markets, as well as potentially expand national markets in a manner that would benefit customers and electricity access, a key goal of ASEAN as discussed in Chapter 4. *Multilateral Organisation—Informant 2* stressed the importance of coordination in "facilitating the integration of energy strategies", the development of national markets and systems, and the broader "harmonisation and standardisation required for APG" and sub-regional EMI. Coordination is important across the reform process.

Pacudan (2016) identified 5 coordinating arrangements relevant to ASEAN broadly and BIMP-EAGA specifically (pp. 51-52). A combination of coordinating arrangements could be employed given different market structures, including unidirectional trade, bidirectional trade, power purchase from an IPP (already common in the GMSR subsystem, whereby neighbouring IPPs can sell to a national level utility), third party access (where already existing infrastructure could be utilised to link two different markets) and a multi-buyer, multi seller market (allowing trading between utilities under a variety of power sector

structures). These coordination arrangements take advantage of current market structures, utilise liberalisation and modernisation efforts of individual countries, and have the potential to be applicable across ASEAN. In addition, as coordination arrangements develop, integration would increase, and the wider APG grow, moving from coordination to a hybrid coordination-consolidation model, and eventual consolidation arrangement (p. 53). This type of progression is a useful by-product of market reforms, potentially facilitating ASEAN subsystem development as markets develop (*Multilateral Organisation—Informant 2).* "More regional and bilateral agreements in power trades" will be possible as coordination arrangements are coupled with "harmonised rules" among ASEAN members (*Multilateral Organisation—Informant 2)*.

This is also reflected in the model of bilateral interconnection, limited network interconnection, and multilateral, full system interconnection discussed in Chapter 4. Similarly, *Academic 21* advocate for transitional development whereby a hybrid collection of arrangements can be used to the benefit of ASEAN economies with different institutional and structural arrangements. The type of development, regulations, or arrangements pursued can be tailored to the countries wishing to engage with each other and organised around BIMP-EAGA interconnection goals. This was echoed in interviews with those close to ASEAN EMI policymaking, including *Academic 26,* who suggested this sort of coordination would suit the variety of market factors found in ASEAN. This is backed up in the literature, whereby incremental development of infrastructure, coordination arrangements, technical standards, and trade arrangements are discussed as suiting a variety of development needs (Porter & Situmeang, 2005; IEA, 2019a,d; Wu, 2019).

Harmonisation refers to the synchronisation of protocols and principles related to: consumer protection, contracts, legal structures, licensing, safety requirements, tariff-setting, tax issues, third party access, and trading systems all related to the transmission of electricity across borders and between markets (Andrews-Speed, 2016; Pacudan, 2016; Huang et al., 2019; Wu, 2019). Developing infrastructure based around transmission needs along borders, coordinating resources for domestic and cross-border power sectors, and utilising existing infrastructure are all a part of coordinating and harmonising not only market structures but also power sector development plans at the national level that would benefit sub-regional power sector goals (*Multilateral Organisation—Informant 2; Think Tank 5*). Information sharing and synchronisation of investments and planning would also benefit sub-regional

and national goals (*Government Conference 12; Government Conference 13; Government Workshop 14)*.

Technical harmonisation in BIMP-EAGA and ASEAN are perceived as less complicated than in fully liberalised and competitive markets elsewhere in the world, due in part to simplicity of procedures, and lack of established processes and standards (*Academic 16*). However, this does not mean that harmonisation of regulations and standards is not important; quite the contrary, many experts argue that harmonisation is a requirement if eventual consolidation is to occur (Porter & Situmeang, 2005; Andrews-Speed, 2016; Pacudan, 2016; Huang et al., 2019; Wu, 2019). By harmonising best practices across the region ASEAN members will assist one-another in power system and energy policy development across the region (*Multilateral Organisation 26)*, and eventually "catch up" with global best practices (Wu, 2019, p. 17)—perhaps one day "providing aspirational EMI targets" outside the region (*Former Government—Informant 1)*. The need for harmonisation or regulations and standards was the topic of an East Asian-based conference attended by the author, where they spoke on the challenges of grid-code harmonisation among ASEAN members (*Government Conference 12)*. In this setting multiple experts who agreed to be quoted advocated for the prioritisation of harmonisation—however, the author did find discussion to be quite high-level, with few micro-level, tangible recommendations beyond cooperation and communication across power systems.

According to a 2014 report by the ADB on EMI in ASEAN, significant harmonisation problems do not exist in the BIMP-EAGA subsystem; voltage and stability are less a problem than elsewhere in ASEAN. Like other island areas long-distance transmission lines do pose technical problems (*Multilateral Organisation—Informant 2; Academic 16; Academic 26)*, however, these can be overcome given some of the proposed coordination arrangements discussed above, including multi-buyer, multi-seller markets. Selective harmonisation and coordination can be employed, making incremental progress as markets develop, and incorporating solutions to harmonisation problems as they arise. This approach is reflective of ASEAN's broader energy and environmental policy making strategies (*Former Government 27).*

Coordination, harmonisation and standardisation of practices are not to be approached as independent issues, but as one expert put it "interdependent recommendations" (*Think Tank 5)*. In their widely cited 2005 report Porter and Situmeang argue that "transmission, interconnection, regulation and pricing

rules need to be considered as a package" (p. 5). Given the focus of this research the role of ASEAN is not to be overlooked, as coordination and consolidation of energy and electricity development plans is a key role the institution can play. This is reflected in the many committees and initiatives ASEAN has that were outlined in Chapter 2, as well as subsequent author recommendations for strengthening or coordinating mechanisms (Section 5.2 and Section 5.3). While these changes are primarily national level there is also room for sub-regional collaboration and oversight as well as uniform ASEAN policies pertaining to EMI and APG coordination, harmonisation, and standardisation (*Think Tank 15).* To be clear, coordination, harmonisation, and standardisation are not the major barriers to sub-regional EMI and cross-border interconnections, but their absence does hinder the development of national electricity markets. In this regard coordination, harmonisation, and standardisation needs to be embraced across ASEAN member economies simultaneously and approached in tandem with other power sector reforms.

5.4.c Subsidies

The challenge of subsidies, and need for subsidy reform, was not one the author expected to be as prevalent across interviews as it was (*Former Government—Informant 1; Think Tank 5; Development Bank 8; Academic 10; Think Tank 15; Former Government 17; Development Bank 25; Academic 26; Government Conference 12; Government Conference 13).*[63] However, subsidy reform was an additional area that came highly discussed—and controversially so—among respondents.

The role of subsidies in energy markets is a common area of debate across regions. Often subsidies are considered in relation to fossil fuels, drawing attention to the unbalanced competition between cheaper fossil fuels or abundant hydrocarbon resources and more expensive renewables (Ren21, 2019a). The persistence of fossil fuel subsidies is recognised by neoliberal, Western-led multilateral organisations as one barrier to renewable energy integration in Southeast Asia; and, as a result, an additional barrier to increased shares of renewable energy in a country's energy mix (ADB, 2016a). When it comes to cross-border electricity trade the role of renewables has been

[63] Here it is interesting to note that each of these respondents works either (1) primarily in development banks or (2) has prior work experience in development banks. For example, *Think Tank 15* is currently affiliated with a think tank but gained early career experience working in a development bank setting.

discussed at great length throughout this research—but it is not a requirement for cross-border electricity trade. However, in order to realise efficiency gains, cost reductions and CO_2 emissions reductions gained from increased renewable energy integration and the management of variability, flexibility and uncertainty associated with cross-border electricity trade, the role of renewables is necessary for diversified national energy markets.

In the matter of electricity markets in Southeast Asian subsidies play two roles. 1) supply subsidies: in this instance subsidies are applied to energy resources to keep costs below production and thus cheaper for producers and consumers. These can be subsidies on fossil fuels (the overwhelming majority),[64] or subsidies on renewable resources (although the latter is debated as one potential solution to limited growth in renewable energy integration, according to interviews *Former Government 17* and *Former Government 27* and literature such as Whitley 2013a; Whitley 2013b; Lockwood, 2015a; Phoumin & Kimura, 2015; among other). The other relevant role subsidies play in Southeast Asia is 2) electricity subsidies: whereby the cost of electricity is reduced via government funding, IPP involvement, and with higher rates of utility debt.[65] These electricity subsidies are often aimed at the poor or those with the lowest access to energy (ADB, 2016a), although in many countries the most populous regions actually gain the most (For example, in the case of Indonesia 70% of the population benefits from subsidies and in the national sub-region with the highest population density. See: Global Subsidies Initiative, 2017). Whether the subsidies benefit supply or electricity the two are intertwined as coal, gas or oil subsidies often reduce electricity prices for consumers, propping up a reliance on fossil fuels for energy

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[64] In the case of fossil fuel subsidies, the economic and environmental costs (in the form of CO_2 emissions) are widely acknowledge and studied. See Lockwood (2015) for an overview of fossil fuel subsidies and impacts on developing economies; Svogaard and Van Asselt (2018) for analysis of the global fight against fossil fuel subsidies; Whitley (2013a, 2013b) for research on the intersection of fossil fuel subsidies and climate change.

[65] Subsidies and debt are highly intertwined within the power sectors of ASEAN economies. Across the sub-region deregulation has been motivated by a desire to raise capital investment in order to keep up with electricity demand growth (IEA, 2015, p. 33). As the sub-region experienced an economic boom in the 1980s and 1990s, ASEAN economies took on extensive debt to drive public spending programmes (IEA, 2015, p. 33). Governments were similarly unable to keep up with power sector developments, and as such allowed IPP involvement in national markets; however, as discussed in Chapters 4 & 5, much of these effort were scrapped between 1993 and 2012 as a result of poor regulatory oversight, and the Philippines remains the only (nearly) independent power market in the BIMP-EAGA subsystem (IEA, 2015, p. 33-36). As a result of increasing debt utilities have had to either raise prices or renegotiate power production agreements (PPAs), which has upset consumers and reduced investor confidence, respectively (IEA, 2015, p. 36).

consumption, encouraging inefficient electricity use, continuing higher emissions, and perpetuating systems that are not compatible with clean climate development (Burke & Kurniawati, 2018; Whitley, 2013a). 2020 subsidies among BIMP-EAGA economies are not insignificant.

Table 5.5: BIMP-EAGA Total Subsidies, 2020

Country	Total* Subsidies in 2020
Brunei	$186.2 million USD
Indonesia	$19, 217.7 million USD
Malaysia	$1,811.6 million USD
Philippines**	n/a

*Including Coal, Electricity, Gas, and Oil subsidies;

**Philippines data not included by IEA as a result of its very low subsidy ranking internationally and progress in subsidy reform.

Source: IEA, 2020, no pagination.

In part as a result of high costs and financial limitations, subsidy reform in ASEAN remains an important and contentious issue (Phoumin & Kimura, 2015), with implications for growth in renewables and the sub-region's energy transition. Previous perceptions regarding energy subsidies favouring the poor are actually being rebuked by many studies (ADB, 2016a; International Institute for Sustainable Development [IISD], 2014; Phoumin & Kimura, 2015), with an array of winners and losers being created as a result of energy subsidies throughout the region (APEC, 2012). In 2012 estimates of total Southeast Asian fossil fuel subsidies equaled roughly $51 billion USD—a cost that is much higher if environmental and health cost are included (Phoumin & Kimura, 2015, p. viii). In 2011, the share of after- tax fossil fuel subsidies to GDP were roughly 8.41% in Brunei Darussalam, 7.21 % in Malaysia, 5.36 % in Indonesia (IEA, 2012b, p. 3) and only 0.7% in the Philippines (IISD, 2014, p. 62; also 2011 data). Over half of the subsidies in each country are attributed to low-priced petroleum products, with total subsidization strongly believed to be higher than estimates, reflecting calls for transparency among global institutions (ADB, 2016a, p. 2).

For the majority of ASEAN members removing or even just reducing energy subsidies would have positive impacts on growth, poverty alleviation, equity of access, and environmental impacts as a result of continued fossil fuel (IEA, 2012b). Of the many unilateral political commitments to lower subsidies across

the world, a 2016 ADB study found that of those in Asia, Indonesia, Malaysia and the Philippines had significant commitments on paper (ADB, 2016a, p. 2). Subsidy policies differ from nation to nation in southeast Asia, much like the other reforms identified. The majority of ASEAN economies and BIMP-EAGA countries have supply subsidies in place, increasing reliance on hydrocarbons (IMF, 2013). Three of the 4 BIMP-EAGA countries have considerable subsidy reforms to undertake—Brunei Darussalam, Indonesia and Malaysia. The Philippines is the only country to have actually undergone subsidy reform (IISD, 2014, pp. 60-62), with primarily oil subsidies remaining. Data from Brunei Darussalam remains limited, but recommendations regarding subsidy reform largely hinge on reducing distortions that might limit energy mix diversification, with concerns regarding transparency from Indonesia and Malaysia as well (ADB, 2016a). Previously unsuccessful reforms in Indonesia and Malaysia (as a result of high prices for consumers and government that resulted in protests, riots, and in the case of Malaysia, threats of military intervention) look posed for second and third attempts (APEC, 2012).

In the case of the majority of Southeast Asia, with the exception of Singapore and Malaysia in BIMP-EAGA, the removal of supply subsidies would increase costs in the short term; in Malaysia's case removing government petroleum subsidies would positively impact GDP and increase economic efficiency in the short term (Phoumin & Kimura, 2015, pp. viii-ix). In the case of sub-region wide-implementation, while there may be short-term costs, alterations of fossil fuel subsidies are believed to have the potential to reduce ASEAN member economies' budget deficits and improve economic efficiency in the medium and long-term (ADB, 2016a, p. 17). Augmenting short term costs in order to achieve long term gains associated with the removal of supply subsidies would require targeting policies for those who are poor or already lack energy access (*Development Bank 25*), government transparency (*Multilateral Organisation—Informant 2; Academic 26*), consistency in programming and messaging (*Academic 10*), and policy support at both the national and subnational levels, as well as ASEAN support and incentivisation measures (*Think Tank 5, Academic 10; Former Government 17; Academic 26*). The gradual phase out of subsidies is expected to remain a priority if renewable commitments are to be achieved (REN21, 2020).

The role of fossil fuel subsidies in preventing renewable energy growth globally, within the East Asian region, and in the Southeast Asian sub-region is agreed upon by experts and international organisations (See: IMF, 2013; ADB, 2016a;

IRENA, 2016; Global Subsidies Initiative, 2017; REN21, 2019a, 2019b), as well as interview subjects (*Former Government—Informant 1; Think Tank 5; Development Bank 8; Academic 10; Think Tank 15; Former Government 17; Development Bank 25; Academic 26; Conference Event 6; Workshop 1*). In addition, the difficulty in removing subsidies is equally represented in interviews and cited as one area where considerable political will is needed in order to make any changes. The uniformity of these recommendations and observations will be discussed in more detail in the discussion section of this chapter, however, it is worth noting many of the organisations and individuals represented here come from a similar neoliberal viewpoint.

One particular interview subject who works on power sector reform in developing economies in the global south, *Development Bank 25*, spoke at great length about the positive progression of power sector subsidies when developing electricity markets in poor communities:

> *I also see a role for power sector reform in fiscally deficit countries to move from first, providing subsidies for access, to then more sustainable prices for power generation…this must be managed, but it could provide relief where* [energy poverty] *is a concern…the high upfront costs of transmission lines and interconnections could also be augmented by subsidies for poor consumers.*

Among reform targets proposed by a variety of authors (Navarro & Sambodo, 2013; Han & Kimura, 2015; IRENA, 2016), the removal of supply subsidies is described as a necessary prerequisite for an integrated ASEAN electricity market (*Academic 10; Academic 26*). In this regard ASEAN has a role to play in improving the messaging regarding the efficacy of supply subsidies, their ineffectiveness in reducing energy poverty, and their long-term contribution to sub-regional, regional, and global CO_2 emissions. Reform of subsidies is also closely linked to other reform recommendations, particularly liberalisation recommendations. According to *Academic 10*:

> *ASEAN EMI relies in part on market-based pricing and regional market liberalisation practices so as to fully integrate. But the subsidy policy of ASEAN economies contradicts these mechanisms. False pricing, high consumption, monopolies can be a result of these subsidy practices. SO, EMI goals must also phase-out subsidies.*

Work by the IMF (2013), ADB (2016a), IEA (2016), IRENA (2018), Skovgaard and Van Asselt (2018), and REN21 (2019) point to the difficulty removing subsidies in societies where fossil fuels, subsidisation, and (in some cases)

energy poverty are prevalent. Without national and sub-/regional incentives subsidy reform will be very difficult to incorporate at the level necessary for a fully integrated ASEAN energy market and the APG (*Academic 10)*. If ASEAN is indeed serious about the APG this issue will have to be tackled more seriously, and with more serious repercussions than it has been to date (*Academic 26)*. According to *Academic 10,* the challenge here is the 'ASEAN way' and the practice of non-interference that is prevalent across ASEAN initiatives (a challenge which was also present in other reform recommendations). At this point in time subsidy removal and ASEAN enforcement are in direct competition with each other, which does not bode well for ASEAN EMI in the long term.

Expert interviews shared three dominant reform recommendations in order for EMI to take place: (1) market liberalisation; (2) coordination, harmonisation and standardisation of markets and practices; and (3) the removal of subsidies. These reform recommendations do not replace O&PCRB EMI Criteria but support the largely neoliberal criteria in aiding the physical, policy, and relational market requirements in order for EMI to flourish in BIMP-EAGA and Southeast Asia. The following section, *Discussion,* will examine the common national market factors and how the previously discussed EMI criteria and reform proposals fit within the market dynamics of BIMP-EAGA, providing context to EMI and electricity market reform and expansion within the sub-region.

5.5 Discussion

The aim of this chapter is to address RQ2 and its relevant sub-questions: (RQ2) *How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?* (RQ2a) *how does the political and economic structure of national electricity markets impact the expansion of cross-border interconnections in BIMP-EAGA?* (RQ2b) *is the structure of national electricity markets conducive to sub-regional and international policy goals in Southeast Asia?* So far this chapter has revealed that the variety of economic and political structures present in BIMP-EAGA are not currently conducive to increased cross-border electricity trade based on policy, physical, and relational requirements for EMI to flourish (RQ2a). In addition, current structures of national electricity markets are not conducive to sub-regional and international policy goals related to energy and climate targets given a continued reliance on subsidies, dominance of fossil fuels in sub-regional and subsystem energy mixes, and the market structure of national electricity

systems, whereby there is a reliance on bundled systems, lack of competition, and varied capacity (RQ2b). This section will further expand on these answers, and address Research Question 2 by discussing two specific points related to the theme and title of this chapter, *National Market Factors*. First, the primacy of national priorities, and second, the usefulness of neo-developmental statism to explain these priorities and the associated challenges in EMI and cross-border electricity trade growth in the sub-region and BIMP-EAGA subsystem.

5.5.a National Priorities

In Chapter 5 (*National Market Factors)* a number of necessary requirements were introduced using the Oseni and Pollitt (2014) criteria coupled with results from author interviews and a review of the literature on electricity market integration. This combined list of requirements was subsequently named O&PCRB EMI Criteria and contrasted with market factors of individual BIMP-EAGA nations, highlighting the requirements that are missing in order for increased EMI to take place within this ASEAN subsystem. Examining the O&PCRB BIMP-EAGA Scorecard, as it was named in Section 5.3, against national versus sub-regional level requirements, highlights the importance of national requirements. The majority of proposed criteria are, in fact, national level needs or a hybrid of both national and sub-regional—further supporting the findings in Chapter 4 that sub-regional targets cannot be achieved without national level initiatives and prioritisation of national level reform. In the table that follows national and sub-regional criteria have been designated, highlighting this point further.

Table 5.6 O&PCRB BIMP-EAGA Scorecard with Reform Level

Requirements	Type	Level
Commitment to free trade	Policy	Hybrid
Market liberalisation efforts	Policy	National
Efficient market design	Policy	National
Development of multi-buyer and multi-seller market (Pacudan, 2016)	Policy	National
Governance support	Hybrid	Hybrid
Jurisdictional considerations / management	Hybrid	Hybrid
Development of transition plans by national power utilities (ASEAN Specific)	Hybrid	Hybrid
Enhance Capacity for Energy Policy and Planning (ASEAN Specific) (Andrews-Speed, 2016)	Hybrid	Hybrid

Commitment to incremental development	Hybrid	Hybrid
Transmission capacity	Physical	National
National electricity transmission systems	Physical	National
Management of distributional effects	Policy	Hybrid
Presence of trusting or prior relationship	Relational	Hybrid

Based on these designations, this table demonstrates that national level power sector requirements make up the majority of EMI criteria, followed by incremental sub-regional integration, leading to eventual EMI in designated ASEAN subsystems—subsystems that could eventually look different from those originally drawn by ASEAN and HAPUA. The conclusion the author has drawn here, based on feedback and prior analysis, is that some nations may be left behind if their national power sector policies do not move with the speed of their neighbours and make the necessary requirements for deeper EMI and eventual cross-border interconnections.

Power grids are, currently, confined by national level boundaries, therefore reinforcement or growth of power grids needs to first happen at the national level. However, political will and governance strength are required for this buttressing to occur. Where state owned utilities dominate the power sector (Indonesia and Brunei, for example, as discussed in Section 5.2*)* there may be difficulty in expanding renewable energy options within the national energy mix; for example, the prevalence of fossil fuel subsidies and the nationalised companies that benefit from their continued use is one barrier in such a system (Shi, 2016, p. 674). In addition, power dynamics, in the form of dominant national economic actors, influence political will. *Former Government 27* highlighted this in describing these power dynamics among ASEAN members:

> *Their* [ASEAN members] *interests are not the same across the board, because corporate powers have a vested interest in some of these systems—political, economic or energy. It's hard to say how that will play out in the connectivity agenda, just like it's hard to say how it will play out in the South China Sea. Add outside actors to the mix and its' even harder to predict how power will make policy move.*

Here *Former Government 27* is making the link between national level concerns and sub-regional power considerations, using the influence of China over the

territorial South China Sea dispute[66] with ASEAN members as an effective illustration. This link is an interesting exemplification because China is similarly involved in power plays throughout Southeast Asia through its BRI initiatives and connectivity agenda in ASEAN, all of which have contributed to issues of trust between ASEAN actors and Chinese. These Chinese dynamics will be explored in Chapter 6 (*Governance Challenges)* and contribute to national hesitancies in taking Chinese investment for power sectors. However, a number of countries in Southeast Asia (Cambodia, Lao PDR, Myanmar, Vietnam) have already allowed Chinese corporations to not just invest in but also build national power grids (Shi et al., 2019).[67] The author has observed that, given the development competencies, geographical location (China's closest neighbours), and electrification needs that these four economies have independently weighed the relative gains from Chinese involvement in their domestic markets as greater than the losses; among these considerations are naturally going to be energy security and supply concerns. Seemingly, if nations can individually decide to accept Chinese involvement in increasing electrification and power grid development, the region as a whole can similarly agree (Although likely not without some ASEAN leadership among those countries that have already made the decision to include China in their domestic power sector development).

National governments are quite tied up; there are multiple vested interests informing policy makers and multiple factors pushing policy many different directions. It is no wonder that connectivity is not fully clarified and imagined yet in ASEAN. Two interviews (*Think Tank 5* and *Academic A26)* pointed the author towards an example of ASEAN failure that has, they believe, been largely due to similar national energy security priorities: the abandoning of the Malaysia-Brunei interconnection that was meant to deliver hydropower from Malaysia to Brunei (Shi, 2016). This line, formally named the Sabah-Brunei line, was removed from the APG plan over Brunei's concerns of security of supply

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[66] The South China Sea dispute refers to the years-long territorial dispute over competing and overlapping territorial claims in the South China Sea between China, Taiwan, the Philippines, Brunei, Malaysia and Vietnam. The disputed area has estimated oil and natural gas reserves and falls within an important area for fishing and transport, making it valuable economically and politically. Within ASEAN the South China Sea dispute has been a topic of contention, both in terms of overlapping claims among members and with regards to ASEAN's policy of non-intervention (Angela, 2020).

[67] It should be noted that these four economies, commonly referred to as the CLMV countries, are among the least economically advanced in Southeast Asia but also considered to be quickly growing (Ambashi, 2017).

from Malaysia (p.676). Details regarding Brunei's concerns are limited, and to the author's knowledge no academic literature has expanded on Brunei's motivations behind the removal (ADB, 2014; Shi, 2014, 2016; IEA, 2015).[68] *Think Tank 5* believes this demonstrates the prioritisation of energy security concerns over sub-regional projects and targets, a sentiment echoed by *Academic A26.* Ultimately this doesn't bode well for renewable integration—if energy security concerns take precedence, and national governments perceive energy security to be most strongly guaranteed through domestic hydrocarbon supplies, integration of renewables may continue to take a back seat.

Energy security concerns emerged as a primary national level worry—national ministries, regardless of subject focus, have perceived domestic energy security as independent from sub-regional energy security cooperation. In fact, it appears that national ministries perceive energy security to be zero-sum—if your neighbour has it you don't. In addition, some ministries have different incentives when it comes to reform of market structure generally. This was echoed in *Government Conference 12* where the following remark was made by a representative of a global multilateral institution:

> *We have policy barriers when it comes to* [energy] *transition issues and different ministries; there are silos of communication among ministries within the same government, with different issues being prioritised with no regard for long-term regional and global energy goals…we have issues of decoupling and liberalisation, for example, where two different ministries may be playing a role in the power sector but refusing to coordinate necessary reforms.*

In the same meeting (*Government Conference 12)* another expert from an East Asian based think tank echoed the challenge of national level coordination and action where a ministry perceives the reform as negative yet sub-regional institutions, such as ASEAN, perceive reform as positive:

> *The challenge is to combine national with regional and local level initiatives; we need to bring them together for cooperation, otherwise we run the risk of sectors directing the game…national*

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[68] This is reflective of a repeated challenge with interconnection research—access to information on motives is limited, and, in the case of Brunei, transparency of data and information is lacking (ADB, 2014, p. xiii). Sabah has experienced supply shortages as a result of rising demand and aging power systems (IEA, 2015, p. 18), however, these are not explicitly cited as cause of security of supply concerns in Brunei.

> *and* [sub-]*regional competencies could be better utilised, combining practical experiences with* [sub-]*regional initiatives.*

How these vested interests and multiple levels of power at play (sub-regional and national) interact within the sub-regional political economy of cross-border electricity trade has impacts on the ability of renewable energy to participate in national markets—where sub-regional and national level targets point towards room for growth (and commitment to growth) in renewables, national measures and national market factors point to continued reliance on the status-quo. Where sub-regional and national level targets point to growth in cross-border interconnections, national level measures point to hesitancy in making the necessary political and economic changes in order for renewable-dominant EMI to flourish. The data on national market factors also points to a startling undercurrent—excess energy, in the form of hydrocarbons, can also be traded across subsystem and sub-regional interconnections; if national measures are not committed to renewable integration, but instead have the ability to continue to operate as-is via energy consumption and also gain from trading excess capacity, perhaps the echoes of climate change commitments are not the real impetus behind increased interconnections. Instead, economic gain via trade in excess capacity to neighbours may be the actual motivating factor.

Neo-developmental statism offers an additional explanation from which to understand these dynamics—and uncertain motivations and potential outcomes. The following section will bring this explanatory tool into the discussion of national market factors, adding additional insight to this multi-faceted political and economic phenomenon in Southeast Asia.

5.5.b Neo-Developmental Statism & National Market Factors

The development story of East Asia is one that is quite familiar to political economists due to the expanse of its use, resulting in extreme & sustained economic growth, and global repercussions of the development practices utilised in the region. This developmental model can be summed up as a competition between the dynamics of state-led and market oriented economic policies; this includes employing developmental state growth practices such as state-led economic development programs targeted at specific industries, encouraging public-private partnerships, and utilising export-led industrialisation practices (World Bank, 1993). This balanced state-led market approach has been utilised to varying degrees of success and with varying levels of state or market dominance in East Asia (White and Wade, 1988), challenging

western economic and political beliefs that economic development comes at a cost—picking more distinctly between one and the other.

For the most part the traditional developmental state model is reflected in the electricity markets of Southeast Asia today. State run, the presence of strong transnational corporations, undergoing various stages of restructuring around IPPs or increased (although limited or in very early stages) competition. Close relationships between business and government are not unique to developmental states—however, they are one of the key characteristics of East Asian developmental states, including those found in the sub-region of Southeast Asia. State-business relationships in Southeast Asia are not as clear cut as those found among the Northeast Asian tigers—instead, state-business relationships in Southeast Asia are strongly "influenced by inter-ethnic distributive pressures and the resulting need to manage challenging political and economic issues at the same time" (Kasahara, 2013, p. 7). Criticism that southeast Asian states are not 'developmental' because of corruption or rent-seeking is a point of contention in developmental state literature (see, for example, Woo-Cummings, 1999). Nonetheless, this thesis concurs with Hayashi (2010) that Southeast Asian nations possess the characteristics of plan-rational economies (p. 52) and exhibit a variety of nuanced, developmental state characteristics that are in and of themselves unique in degree and application to developmental statism in Southeast Asia. Where DS is reflected throughout individual ASEAN economies, it is also reflected in the economic and structural institutions of the sub-region as well.

While the reform recommendations laid out in Section 5.4 make sense in the context of electricity access and grid integration of variable renewable energy resources, they don't necessarily make sense in terms of the broader, underlying issues of economic development, continued industrialisation, and energy intensity that have moved the region to a place that calls for increased renewables in the first place. If global climate goals, specifically emissions reductions, are to be met, capitalistic, neoliberal systems that encourage development-as-is do not appear conducive to long term changes to the global political economy. "Neoliberal market restructuring", whereby neoliberal norms are placed not just on a market, in this case electricity in nature, but trickle down into society and all aspects of management and socialisation (Wiegratz, 2016), is clearly visible in the reform practices proposed.

One particular voice of opposition to standard reform proposals presented among interview subjects comes in the work of Andrews-Speed (2016) on

lessons from the Nord Pool countries (discussed in Chapter 1, section 1.2). Andrews-Speed's critique can be examined with BIMP-EAGA in mind, providing political and economic ways forward that don't require liberalisation or removal of subsidies. Andrews-Speed uses the example of SAPP (previously discussed in Chapter 1), which trades electricity between 12 southern African economies with electricity systems that are vertically integrated, state dominated, and have limited liberalisation (p. 3). Andrews-Speed examines how the Southern African Power Pool has integrated Nord Pool lessons, and how these might shed light on a way forward for ASEAN—without the removal of subsidies and complete liberalisation. The SAPP is an interesting juxtaposition to standard neoliberal power sector recommendations—here, the 12 member nations defy the common economic model and trade via national power companies that act as single buyers and sellers, with continued subsidies to consumers and only some IPP involvement (IEA, 2019d, p. 61). SAPP economies also only trade excess power, after national needs have been met (IEA, 2019d, p. 62), thus limiting potential concerns over security of domestic supply. Both differences in SAPP power trading offer hope for ASEAN. To the author's knowledge comparison of these two different markets (SAPP and ASEAN) has not been expanded on further than the work of Andrews-Speed (2016) and a brief comparison by the IEA (2019d); additional comparison of SAPP in future ASEAN EMI studies could add further nuance to the neo-developmental statism explanation of competing market factors in the BIMP-EAGA subsystem.

An additional point to make regarding an alternative approach to reform is the issue of subsidy removal. This author would like to note that the removal of fossil fuel subsidies in Section 5.4.c is largely advocated by neoliberal economic and governance institutions (ADB, IMF, etc.) and many of the interview subjects are associated with similar organisational and political views on neoliberal economic policy making. In this sense, the uniform recommendations are no surprise and reflective of a global economic and energy policy trend to advocate for the complete removal of subsidies along with other liberalisation efforts. This standard, blanket approach to subsidy removal is often approached with little concern for hybrid models of subsidisation, the role of subsidies in developing economy policy making, within corrupt political systems, or in communities where trust in transition policies is lacking (See Lockwood, 2013, 2015a). The power dynamics at play within the Southeast Asian communities where subsidies are most dominant, notably throughout BIMP-EAGA at varying levels, is indicative of the balance needed between policy making, climate compatible

development, and economic interests in hybrid, centrally planned, market economies.

One option for reconciling reform proposals and state-led economic practices, based on this author's understanding, is a hybrid developmental state model. In a hybrid developmental state model a combination of state-run and minimal liberalisation efforts are employed in order to integrate markets and maintain order under current, slowly adjusting, national political and economic systems. Work on a hybrid developmental state model in various forms has been done by Bishop et al. (2018c), Chikozho and Mapedza (2017), Chowdhury (1999), Gainsborough (2009), Radice (2008) among many others, but this research is not applied to the power sectors specifically and does not include BIMP-EAGA in their application. Much of this prior research posits that instead of focusing on the developmental state as an advocate of industrialisation and state supported industries, hybrid, 'new' models of DS instead focus on states picking the free-market mechanisms that work for them (See: Bishop et al., 2018, for Northeast Asian examples of growth in this area generally). Based on this research and the authors understanding this can also be applied to electricity markets, EMI, and the structural needs for cross-border electricity trade to flourish in Southeast Asia, with some specifications tailored to the ASEAN experience and market structures. A revised, hybrid model of DS, such as neo-developmental statism, illustrates the challenges between free market and developmental state policies. Neo-developmental statism, for example, explains that choices between free market and developmental state policies are made based on the political and economic realities of the particular nation or sub-region, and can result in a hybrid model, such as those BIMP-EAGA economies described earlier; they are committed to free trade and liberalisation as far as market participation is concerned, but they also favour state dominated electricity systems with limited competition. This suggests there is no one-size fits all model, and also that dominant pressures within a state system will often have influence on the outcome of subsequent governance models.

It is the author's premise here that hybrid developmental state practices could be not just tailored to individual states, but to national electricity markets, their goals, and the overall goals of ASEAN. States and sub-regional institutions could, under this line of thinking, prioritize semi-liberalisation, reduce subsidies, increase actual competition, and focus on sustainable development practices that complement sub-regional EMI goals and national electrification priorities. This would allow for the continued drive of policy and economic function from

states but open up a higher prioritisation of liberalisation if it aims to meet power sector needs. Under this hybrid model, however, some liberalisation needs may need to be more realistically adjusted—and, in fact, this could be better for sustainable development goals overall.

Take for example, the case of Brunei and Malaysia, where there is limited private sector involvement, the earliest signs of liberalisation, and heavily subsidised energy and electricity sectors (Pacudan, 2016, pp. 43-44, p. 46; See section 5.2.a for more details on individual BIMP-EAGA economies). In Brunei, a primary focus on subsidy removal, balanced with improving transparent regulation and transmission capacity might be the best combination of policy priorities, rather than say, regional and global calls for more market liberalisation and increased competition in the Brunei power sector. In Malaysia, a focus on subsidy removal and jurisdictional management may be more realistic than development of a national electricity transmission system. In the case of Brunei this author believes it is not realistic to prioritise market liberalisation and increased competition given the deep integration of hydrocarbon companies into the electricity and energy sectors. Similarly, in the case of Malaysia, where geographical constraints limit the development of national electricity transmission systems, this may not be a realistic priority. These two examples offer illustrations of hybrid models of developmental statism, in this case identified as neo-developmental statism, where the reforms most realistic to the individual market are prioritised.

Further, neo-developmental statism and hybrid state practices also offer explanations for the imperatives pushing cross-border interconnection in the sub-region and renewable energy's ability to participate in national markets: while there is incentive for renewable energy integration as a result of international and sub-regional climate initiatives and energy poverty targets, states could choose instead to focus on the economic gains of selling current excess capacity, thus the continued dominance of hydrocarbons and hydrocarbon power structures in national markets. States are, again, picking and choosing the developmental state practices that best serve them at this point in time. For some that means actual growth in renewables, for others that means immediate economic gain and slow or gradual growth in renewables as it is seen to benefit or when it makes economic and political sense to prioritise.

How hybrid-models shape out will be dependent on national and sub-regional governance institutions and the relationships between interconnection partners. Analysis of this will be expanded upon in Chapter 7, incorporating the

forthcoming arguments in Chapter 6, where trust will be brought into this discussion.

5.6 Conclusions

While the initial goal of this research was to provide context to the use of trade as a tool for growth in renewable energy use, and in the case of East Asia, growth in renewable energy use through electricity market integration, the proposed reforms needed to make this growth possible pose a number of theoretical questions relating to the political economy of electricity markets in the broader East Asian region, the sub-region of Southeast Asia, and the microcosm of BIMP-EAGA. This chapter has sought to answer Research Question 2 (RQ2) and its relevant sub-questions: (RQ2) *How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?* (RQ2a) *How does the political and economic structure of national electricity markets impact the expansion of cross-border interconnections in BIMP-EAGA?* And (RQ2b) *Is the structure of national electricity markets conducive to sub-regional and international policy goals in Southeast Asia?* This chapter has disclosed that the variety of economic and political structures present in BIMP-EAGA are not currently conducive to increased cross-border electricity trade based on requirements for EMI to flourish. In addition, the present structures of national electricity markets are not conducive to sub-regional and international policy goals related to energy and climate targets given a continued reliance on subsidies, dominance of fossil fuels in sub-regional and subsystem energy mixes, and the market structure of national electricity systems. In addition, the IPE of these national market factors and sub-regional interconnections have exposed that while there is room for growth in renewables, countries do not have an electricity deficit, and therefore the impetus for increasing renewable integration as a means to trade surplus electricity is not actually present. As a result, based on RQ2, renewable energy has potential for participation in national markets, however, current market factors point to limits in its ability given the present national power systems.

Strengthened EMI and increased cross-border electricity trade are two sides of the same coin in power sector reform and renewable energy integration. This chapter has discussed the national market factors of BIMP-EAGA nations, how these two tools (EMI and cross-border electricity trade) can be achieved in BIMP-EAGA, and the reforms necessary for their growth in Southeast Asia. Major reforms have been grouped in three categories: (1) market liberalisation, (2)

coordination, harmonisation, and standardisation; and (3) subsidies. Analysis of the market factors in the BIMP-EAGA subsystem, reforms needed, and national level challenges to implementation of reforms, has probed whether or not renewable energy and climate target incentives are really pushing cross-border interconnections and sub-regional EMI forward. Instead, the author posits, economic gains via trade in surplus energy (renewable or not), may be behind the regional and sub-regional interest as well as national measures.

This chapter has contrasted identified necessary and common reform proposals against the market structures of the region as a whole. This has resulted in the use of a hybrid form of DS—neo-developmental statism—as a means to understand the power sector needs of the region within the context of the East Asian developmental story.

Chapter 6
Governance Challenges

6.1 Introduction

This chapter continues where the previous two chapters (Chapter 4, *Sub-Regional Market Factors* and Chapter 5, *National Market Factors)* left off: picking up on the final theme that emerged from expert interviews and data analysis, governance challenges. Chapter 6 will address Research Question 3 and its associated sub-question: (RQ3) *What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian Development?* and (RQ3a) *What is the political and economic status of the ASEAN Power Grid?* This chapter will build on the narrative of what political and economic policy options exist to further cross-border electricity trade by addressing Objective 3, identifying and analysing additional governance challenges to deeper EMI and increased electricity interconnections among ASEAN member states.

Stakeholder interviews conducted with current and past government, business, and academic leaders throughout East Asia inform the governance challenges outlined in the following sections. These governance challenges have been grouped by the author into three inter-related categories that all fall under the broad umbrella of governance: (1) sub-regional versus national interests, (2) trust among ASEAN members; (3) trust of outsiders. According to elite interviews, there is a serious perception challenge as it relates to the need for examination of domestic energy market and sub-regional governance shortcomings and the interests that drive these decisions. The challenge of national perceptions repeatedly arose in interviews—ASEAN economies perceive there to be security of supply risks at the national level if they are dependent on imported electricity from their neighbours. However, this perception is, in fact, not based on experience—there are no known instances of electricity being withheld among existing ASEAN trading partners as a result of political (or other) conflict. In fact, ASEAN as a whole is reliant on fossil fuel imports and numerous energy trading relationships already exist across the sub-region (IEA, 2019a). Regardless, the perception that imported electricity will pose a supply risk is prevalent. It is the author's interpretation based on interviews that this perception is reflective of the challenge of trust among ASEAN member states, and not actually preventative of future electricity trading relationships.

In addition, the challenge of political will, coupled with questions of trust, have created an environment where progress is limited in scope and impact but ASEAN targets remain high. This chapter also represents the most surprising and also potentially interesting interdisciplinary and topical cross-over of this research, China's Belt and Road Initiative (BRI) and its impacts on sub-regional trust and power sector development via investment and financing.

Chapter 6 will be structured as follows: first, Section 6.2 will explore the different sub-regional versus national level interests embedded within ASEAN's EMI and cross-border electricity trade initiatives. This section will highlight the conflicting sub-regional and national expectations and EMI considerations. This will include sub-regional and national perceptions of energy poverty versus energy security, drawing attention to a mismatch in sub-regional and national goals and policy maker perceptions on how to manage priorities that may conflict depending on the predominance of renewable energy integration in national energy policies (i.e. renewable energy integration vs. hydrocarbons for electricity access). In Section 6.3 trust within ASEAN will be described, analysing how trust relates to cross-border electricity trade and EMI in Southeast Asia and among ASEAN members. Mistrust among actors will be examined, relating trust and mistrust in regional relations and the use of bilateral and multilateral electricity trading in trusting relationships. Section 6.4 will cover the issue of trust of outsiders, including an overview of China's BRI, what it means for energy sector investment in Southeast Asia, and general concerns with the Chinese initiative and Chinese driven financing. Section 6.5 will survey the status of APG to date, making links between ASEAN EMI projects, national interests, and trust. Section 6.6 will bring these points together in the discussion, making links between governance challenges and the economic and political realities that have emerged from analysis of the data and the use of neo-developmental statism as an explanatory tool. Finally, section 6.7 will reiterate the main points of each section, tying these key issues together in the framework of understanding, evaluating, and progressing cross-border electricity trade and EMI in East Asia and answering research questions 3 and 3a.

6.2 Sub-Regional versus National Interests

Among interview subjects with an expertise in regional governance the role of ASEAN was discussed quite extensively. Nearly all respondents noted the governance limitations of ASEAN in ensuring cooperation with non-binding measures, managing expectations and interests of multiple parties with similar

but different interests, and the challenges of working within the ASEAN bureaucracy. However, all also noted the power of ASEAN's sub-regional grouping, and the impact it has had on regional cooperation and policy cohesion. In short, the general opinion is as a governance institution ASEAN has flaws (such as the governance limits of non-binding measures, difficulty managing expectations, multiple competing interests, and institutional bureaucracy), but the overall strengths of cooperation, coordination, and cohesion outweigh the weaknesses and the sub-region is better off for its existence (*Former Government—Informant 1; Academic 26; Former Government 27; Workshop 1; see also section 2.3.c for further discussion on ASEAN governance limitations)*. This viewpoint is also reflected in the academic literature on ASEAN (Kivimaki, 2009; Kurlantzick, 2012).

In Chapter 2 key governance limitations of ASEAN were highlighted, mainly related to the potential governance of sub-regional EMI within ASEAN, including the practice of non-interventionism, non-binding agreements, polite non-interference, voluntary compliance, and a lack of legality within the organisation itself. Here, the discussion moves to a different governance challenge within ASEAN, sub-regional versus national interests. Chapter 4, *Sub-Regional Market Factors*, disclosed that sub-regional targets require national level changes; Chapter 5, *National Market Factors*, expanded on this finding by focusing on national-level electricity systems and the needs at the BIMP-EAGA subsystem level. Here analysis will more deeply examine the balance between national and regional interests and the corresponding differing expectations, as well as how these challenges are being incorporated into the IPE of cross-border interconnections in the sub-region.

6.2.a Sub-Regional Interests

An interesting point made by interview subjects was the issue of trust and communication breakdown at the national and sub-regional levels. On the one hand, ASEAN has made sub-regional interconnection a key component of its regional connectivity agenda (see prior reference to the AEC in Chapter 4; APAEC 1999, 2004, 2010) and energy policy initiatives. Regional targets, commitments, and forward-looking programs are all peppered with mention of the importance of EMI in ASEAN's growth (ASEAN, 1997; ASEAN, 2016). However, as previously demonstrated (Chapters 4-5) national level adjustments are required in order to realise sub-regional EMI and cross-border electricity trade. These adjustments include standardisation of practices and rules, modernisation of infrastructure including increased grid capacity, expansion of national grid interconnections,

institutional strengthening, capacity building within relevant institutions (government or otherwise), and in some cases a review of current energy subsidies. Unfortunately, no manner of ASEAN pledges can push national governments to make changes if reforms are perceived to be against national interests.

On the surface, increased access to electricity is a priority of governments around the world, and indeed of significance to ASEAN and its member economies. According to three primary interview subjects (*Former Government—Informant 1; Multilateral Organisation—Informant 2; Academic 26*) while electricity access is a priority, other concerns, financial or policy, make take precedence at the national level, contradicting ASEAN targets. National governments have expectations that pledges to ASEAN initiatives will result in improvements and financial support that would be otherwise difficult to realise without ASEAN assistance; all while maintaining primacy as an independent actor with national needs that "must be met and take precedence over regional policy making" (*Academic 26)*. In addition, regional recommendations for trade and economic liberalisation are not always met with support at the national level, and indeed become entrenched with other economic interests and incentivisation limits at the national level. For example, the introduction of competition into national electricity markets has been quite challenging among BIMP-EAGA economies (with the exception of the Philippines) and East Asian examples, such as Japan and China, show hybrid public-private power system models remain limited.

Infant industry arguments are among the most popular protectionist policies used among ASEAN members (Chandra, 2016) and countering liberalisation recommendations *(Academic 6).* Infant industry arguments are employed among ASEAN members, as well as strategic industry arguments geared towards protecting particular, strategic industries (See also Chapter 2 for brief discussion on this phenomenon in the context of the developmental state model of economic development). In the case of EMI and power sector integration, resistance at the national level is sometimes attributed to protection of strategic industries, notably those related to energy (*Academic 6; Academic 10)*. 2018 Electricity tariffs in Indonesia, for example, are the most competitive for consumers (just behind Malaysia) among BIMP-EAGA economies and the single most competitive for industries, with Malaysia closely behind (Digital Energy Asia, 2018). 2018 prices in the Philippines are the highest for both consumers and industries (Yokota & Kutani, 2018) among BIMP-EAGA economies. In

countries like Indonesia and Brunei, where the links between industry and government are very strong and opaque, such arguments are more widely visible in current power sector structures. In addition, protection of national subsidies and resistance to fully liberalise the power sector can also be naturally linked to industry protections and economic nationalism.

Protectionism and economic nationalism have limited the success of the AEC and other sub-regional community building initiatives (See: Chandra, 2016; Hutt, 2017; Jones, 2016). This has been explored by experts in a variety of topical areas, but is quite obvious in sub-regional energy initiatives, including the APG and TAGP *(Academic 6).* A number of experts from the Murdoch School[69] of critical political economy note how ASEAN reforms can redistribute and potentially disrupt established power structures and are thus met with opposition domestically (Rodan et al., 2006; Chandra, 2016; Jones, 2016; among many others)—this author has viewed these same dynamics via interviews and market factor analysis introduced in chapters 4-5. As a result, it appears that shielding of established power structures can compromise ASEAN initiatives, leading to protectionist domestic policies. According to *Academic 6:*

> *this opposition nationally has spill over effects that impact both regional and national liberalisation, market reforms, EMI, and the progress on the APG.*

Proposed reforms to national power sectors and economic structures pose similar potential challenges to established power structures within domestic economies (*Academic 21; Academic 26*), thus impacting sub-regional policy making priorities.

The preponderance of economic nationalism among ASEAN member economies, and close relations between business and government, aligns with the common East Asian developmental state practices outlined in Chapter 2 and Chapter 5. The East Asian developmental practices of state-led development programmes and export-led industrialisation are complimented by public-private partnerships, many of which are still around in Southeast Asia today (Indonesia, Malaysia, Philippines, and Singapore are among the most well-known Southeast

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[69] The Murdoch School is named for the critical political economy tradition that developed from the Asia Research Centre at Murdoch University in Australia. This school of thought argues that institutions are highly influenced by power and resources that are present within both state and civil society and that as a result certain interests are preserved within institutions, closely aligning with political and social ideologies and agendas of those in power (Hewison et al., 1993; Jones, 2016). This school of thought has been widely used to critique development and progress in Southeast Asia.

Asian examples due to the suspected role of corporate-political relationships and oversight in their experience and response to the 1997 East Asian Financial Crisis).[70] Chapter 2 discussed how developmental state practices created political environments agreeable to non-state actors and therefore solidified strong state-business relationships Jones (2016); these strong relations have in turn nurtured lasting interdependent relationships that are widely present today in national energy markets in BIMP-EAGA and similarly reflected in the BIMP-EAGA EMI Scorecard in section 5.3. This author posits that these competing interests are in part to be blamed for APG progress, a sentiment echoed by Shi (2015, 2016), and reflected in Brunei Darussalam and Indonesia, where interdependent business-political relationships in the energy sector encourage business-as-usual. Just as ASEAN members have slowly progressed the AEC, so too have they slowly progressed the APG (Jones, 2016) and subsystem EMI development. This is not because there are no incentives, as has been demonstrated, but because competing national interests and protectionism have presented road blocks to national reform.

The challenge of national interests does not just impact protectionist economic policies but also perceptions about energy security and thus prioritisation of interests. This issue crosses over into the follow subsection and will also be discussed in the discussion section of this chapter, however it is worth noting here ASEAN's ability to respond to this challenge. There may be room for ASEAN to play a role in education at the national level—according to three interviews (*Former Government—Informant 1, Former Government 17, Academic 26*) there is pushback at the ministerial level to enact reforms that are perceived to go against national energy security interests, and ASEAN has the unique opportunity to provide increased education for ministers and government offices where delays may be taking place at the national level.

As a result of the national level EMI barriers analysed throughout this research, sub-regional considerations of national interests and motivations must, therefore, include regard for the various forms of power at play within individual ASEAN member states. The author discussed with *Former Government—Informant 1,* at great lengths whether the UNFCCC concept of CBDR (first introduced in Chapter 1) might be a relevant solution to regional and sub-

[70] For further discussion on the intricacies of policy responses to the 1997 East Asian Financial Crisis see Drysdale (2000), which covers the relationship between the state and corporate sectors in East Asia with a number of relevant Southeast Asian examples.

regional market considerations. CBDR differentiates climate responsibility based on the acceptance that different countries have different capabilities in their responses to pressures on the global climate system (Pauw, et al., 2014). *Former Government—Informant 1,* posited that a similar method could be proposed for power sector reform across ASEAN EMI projects. Following this line of thinking, subsystems identified by ASEAN as priorities areas, such as BIMP-EAGA where conflicting national interests are at play, will require more development and capacity support in order for the required reforms to occur. This sort of CBDR-EMI approach, as this author has dubbed it, could aid in subsystem development via incremental progression of sub-regional interconnections and complement practices already in place.

One option for addressing the challenge of ASEAN EMI governance considering these national versus sub-regional dynamics is to dispense with the ASEAN practice of consensus-based decision making for majority voting (*Former Government—Informant 1;* supported by the work of Albert, 2017). This is different from a two-speed or multi-speed approach among ASEAN member states, whereby a sub-grouping of ASEAN economies proceeds with reforms, while other sub-groupings don't. In this example, the subsystem approach to electricity market integration, whereby interconnections take place among a smaller group of countries, progressing to larger groupings gradually until the entire system is included (refer to Figures 2.1 and 4.1), could also be utilised in the reform process. This could include progression to other reforms as well and would allow subsystem to move at their own speeds.

Additionally, strengthening the ASEAN secretariat and leadership within it would further organisational progress and encourage adaptation to political and diplomatic changes regionally and sub-regionally (*Multilateral Organisation—Informant 2*). Grouping ASEAN issues in security vs territoriality decision making would simplify some of these issues (*Former Government—Informant 1).* This specification would come with the stipulation that consensus is required for type 1, while majority vote is used for type 2. This would in effect remove the challenge of domestic autonomy to mutually shared problems such as climate change but maintain a reverence for independence and non-intervention when it comes to sovereignty issues. According to *Former Government—Informant 1* and *Multilateral Organisation—Informant 2* this practice would be achievable based on their own experiences with ASEAN governance, and indeed could be complemented by current ASEAN issue clustering.

Additional expert interviews echoed similar reform suggestions, particularly in reference to consensus building and lack of movement on energy and environmental issues within ASEAN (*Think Tank 15; Former Government 17; Academic 27).* In particular, *Former Government 17* advocated for a restructuring of ASEAN participation, in which countries who are keen engage and act on certain issues, while non-interested or unable member economies participate when they are ready. This recommendation is also reflected in the literature, and historically was practiced behind the scenes among ASEAN members (Albert, 2017; Nair, 2016). In the case of climate and energy policy this recommendation reflects previously mentioned CBDR practices and is therefore complimentary to current global policy expectations for developing economies.

These ASEAN-wide governance challenges are commonly debated across the field of East Asian studies and across the literature (ADB, 2008; Etsy and Ivanova, 2002; Guan, 2004; Heilmann, 2015;), however, their prior application to real-world observations about power sector development and sub-regional and regional EMI are unique to the interviews carried out in this research. Additional governance challenges, particularly at the national level of governance making, are discussed in the following sub-section, contrasting regional versus national level interests in the context of sub-regional EMI and increased interconnections.

6.2.b National Interests

As national political environments become more complicated, so too do the decision-making processes by ASEAN member states. According to Bilahari Kausikan (2017), former permanent secretary of Singapore's Ministry of Foreign Affairs, sub-regional and national concerns are constantly evaluated in decision making processes among ASEAN members, and "calculations of interests" are constantly being weighed (pg. 5). This supports expert interviews and the observation that energy security receives much different consideration than environmental security (*Former Government—Informant* 1, *Former Government 17, Former Government 27, Former Government 28*). It should be noted here that each expert interview who echoed that sentiment is a former government representative.

In addition to national perceptions regarding energy security considerations, another example is the financial crush felt by many developing economies and the need to allocate resources carefully (*Academic 21*). In the case of Indonesia, for example, *Development Bank 25* questioned whether or not cross-border interconnection measures should be taken when simple household electrification and off-grid measures could be employed to bring electricity to

the remaining 23 million people without access (supported by IEA, 2017a). This expert also pointed out that reliable access should be of higher focus of national governments, thus preventing intermittency and strengthening reliability of those who do have access. Further, if a national government perceives the strengthening or expansion of access as an 'either or choice', national concerns inevitably win out (*Development Bank 25)*. Long term, net costs savings of sub-regional power sector integration are estimated at 20.9 billion USD (3.0%) for 20% of demand met by trade and 29.0 billion USD (3.9%), if 50% of demand was met by trade (Wu et al., 2012, p. 4). However, as is similar in other investment scenarios, if upfront costs are perceived to be prohibitive, investment will not occur or take much longer than cheaper options (*Business 31*).

Additional investment concerns colour priorities at the national level. One interview subject *Business 31*, with experience on large- and small-scale investment projects (energy and non-energy), spoke to contradictions in the national business environment as an illustration of the push and pull that is present in many infrastructure projects in emerging and developed economies alike. This expert argued that the national business environment must be enhanced in order for some emerging economies to be an attractive investment environment. Competing powers in these markets, for example state-business relations in Indonesia, can make additional foreign investments in the energy sector difficult where financial risk is perceived to be too high given uncertainty over agreements that may not serve prevailing political or national business interests. Unfortunately, results vary depending on global markets and geopolitics, among other, national issues, and predictions of outcomes for improving investment environments tend to vary in accuracy (*Business 31)*.

There is some contradiction between interview subjects and the literature on economic factors' influence on national level governance of EMI. According to Wu (2016), in addition to economic factors, political factors remain the largest driver of EU power sector integration, and a limit that ASEAN must come to terms with. Here Wu argues that political will, coupled with energy security concerns, can lead to policy solutions that coincide with and include climate change commitments, hence pushing EMI. However, this is slightly contradictory with a very specific piece of feedback from interview subjects (*Academic 26, Think Tank 12*). If the national level governments perceive energy security concerns to exist separate from power sector integration, energy security will win out in terms of policy focus. As a result, national measures required for international power sector integration will take a back seat to national measures

that are perceived to be more relevant to increasing energy security. For example, if an argument was made by national level public and private actors that oil and gas subsidies are necessary in order to provide secure, independent energy resources, those subsidies may not be removed in favour of market liberalisation and subsidy support for clean energy integration. Another example would be the importance placed on energy poverty versus energy security. *Academic 26* argues that if a national government perceives that coal, a cheaper resource cost upfront, is able to provide affordable access to electricity now, while renewables require a higher cost upfront, and further development in order to integrate into a national grid, then coal may be given priority.[71]

This is not to say that Wu's point isn't correct, clearly, as a leading scholar and researcher in this area Wu's analysis of EU lessons for ASEAN holds ground (and are explored in more detail in Chapter 2, *Cross-Border Electricity Trade: Conceptual Approach & Review of Literature*) when global examples of EMI are introduced. In this case the need and circumstances within ASEAN at the national level has altered the environment just enough that notions of strengthening political will are not enough. Jones (2016) notes that political will is often a buzzword used to represent slow moving ASEAN processes like the AEC and, in the case of this research, relevant to the APG as well. In fact, political will is an issue because regional agreements are driven by political not economic incentives, therefore members engage or join because they don't want to miss out on strengthened alliances, increased sub-regional or regional power, or perceptions of being left behind (Jones, 2016). *Academic 26* echoed these concerns about political will at the national level, noting that progress is not slow within ASEAN itself, but within national electricity markets and the necessary regulatory changes that must be enacted in power sectors.

In Chapter 5 analysis of market factors confirmed that coordination, harmonisation and standardisation are important reforms needed in order to achieve the O&PCRB EMI Criteria. According to *Multilateral Organisation—Informant 2* and feedback received at *Government Conference 12*, these standardised practices can be better coordination between the national governments and ASEAN, streamlining national reforms so that they coincide or support ASEAN APG goals. In addition to this coordination, it is the author's

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[71] This example is supported in IEA literature and research, whereby coal is projected to remain the dominant fuel source in Southeast Asia despite cost reductions to renewables (IEA, 2017a, 2019). In a 2019 report produced by REN21 similar conclusions were reached for select Southeast Asian Countries.

position that better messaging and education at the national level must also occur, otherwise these reforms may never occur in the first place. Building political will through education, messaging, and financing is preferable to empty agreements.

An additional unique theme that emerged from interview subjects that work directly with ASEAN was the intersection of energy security and trust in cross-border electricity trade groupings (This was briefly mentioned in the prior section in relation to ASEAN support for ministerial level education. It should also be noted that trust will be more specifically explored in the following section, however, here the focus is on national level concerns regarding energy security). *Former Government 27* spoke of a general perception by outsiders that within organisations of voluntary membership issues of trust would be limited. However, this interview subject has found that instead, behind the scenes there are questions of trust among and between ASEAN members as a result of national energy security concerns; *Former Government—Informant 1* echoed these remarks about behind the scenes challenges, as did *Former Government 17*. Based on interviews the author has concluded that a common EMI concern among ASEAN members is whether or not they can trust their electricity access to a neighbour, and whether or not they are seceding control over their energy access to another actor who may later hold that energy for ransom. This poses the challenge of whether or not voluntary compliance—a staple of ASEAN membership—outweighs national governance concerns, and if not, what alternative do ASEAN members have. There is no evidence that these perceptions are valid in ASEAN, as there are no examples of electricity services being withheld from transit neighbours in the sub-region (Shi, 2014).

According to *Multilateral Organisation 18* and *Academic 13* power imbalances in the electricity sector are a concern for participating EMI economies. There are varying levels of grid preparedness (ability of current grids to integrate and adaptation of current infrastructure for further renewable energy integration into the existing grid) and flexibility in current power systems within the region. This means some economies, such as the Philippines and Brunei Darussalam, will have a stronger ability to integrate their grids, but may be reticent to integrate with neighbours who have very low grid reliability, such as Indonesia. Additional imbalances include access to resources, presence of national policies that enforce investment and logistical rules, adherence to climate policy, and availability of natural resources (*Academic 13)*. As discussed in Chapter 5, where bilateral cooperation already exists EMI agreements will be easier to develop,

and so integration with strong partners may be favoured. Ultimately, countries like Myanmar and Cambodia, who have the most undeveloped power sectors and lowest electrification rates in the sub-region (*Multilateral Organisation 18)*, may struggle to integrate at the same level as a result of some of these imbalances—impacting the progress of the APG and subsystem development.

In this section sub-regional vs national level dynamics been discussed, drawing attention to EMI challenges that fall within either national or sub-regional governance interests and perceptions. What the prior two subsections have exposed is that trust further complicates national versus sub-regional interests in ASEAN EMI efforts. These complications include expectations, conflicts between sub-regional and national governance concerns, finance challenges, and perceptions of energy security. The following section will pick up on the challenge of trust, examine this issue among ASEAN members, expanding on where institutional membership is supposed to help reduce trust and uncertainty, and where sub-regional and national dynamics may impact the outcome for the APG and wider East Asian power sector development.

6.3 Trust Among ASEAN Members

In analysis of interview data it became clear that perceptions of trust are a major factor in cross-border electricity trade and EMI, not just in East Asia or the sub-region of Southeast Asia, but also globally. Even under the guise of a sub-regional, voluntary organisation perceptions of trust colour agreements and alliances. Past trust concerns can impact future agreements, and issues of trust can persist for years. In some cases, trust falls along lines of shared histories, territorial or colonial occupation, language, or development status; in other cases, trust stems from global, regional and national perceptions of trustworthiness based on multiple factors. In interviews with one former US government official, *Former Government—Informant 1,* who played a role in ASEAN energy policy development over a 30+ year career, trust was explored as a challenge between national perceptions and ASEAN goals. A different organisational leader turned academic, *Academic 10*, whose views are widely represented in the literature, echoed these concerns, but was troubled more specifically with energy security perceptions and dispute settlements in cross-border interconnections. Once identified these views jumped out among other interviewers as common barriers to EMI progress in ASEAN (*Think Tank 5, Think Tank 7, Think Tank 11, Think Tank 12, Multilateral organisation 23)*.

A second related issue that emerged is how ASEAN has addressed perceptions of trust in EMI relationships, notably by engaging in cross-border electricity trading relationships on a bilateral versus multilateral scale. The topic of bilateral relationships was first introduced in Chapter 4, illustrating the development of APG interconnections and their gradual progression. In this section that same topic will be explored in relation to its role as a tool to overcome trust barriers and engage in agreements on smaller, more realistically perceived scales.

First, a very brief background on trust that is relevant to the subsequent data: the study of trust in international relations is widely conducted but very conflicted. A wide breadth of information is available on how trust impacts relations among nation states, international institutions, and multinational enterprises, however, a common definition is difficult to pin down.[72] Finding a definition of trust often means narrowing down what trust is not (Hoffman, 2002; Considine, 2015). Hoffman (2002, p. 379) sums up a variety of different definitions of trust across fields related to international relations as being a combination of trust expectations, perceptions, obligations, and risk taking. Considine (2015) takes issue with commonly used definitions of trust, pointing to the fact that often when trust is used in politics, the phrase includes some sort of interpretation of policy and political expectations; trust is never simply about confidence or risk, it is about political agendas, and thus loaded beyond a simple definition. In Considine's work, they also point to how terms commonly used in association with trust frame the questions and answers asked about international political events, and therefore our answers as researchers become biased. In this case of this research it is the author's opinion that their perception of trust in Southeast Asia has been coloured by their time in China and their understanding of Chinese economic influence in the region. Therefore, this author, in line with Considine's recommendations, recognises that there is some bias in their interpretation of trust, its impact on EMI, and the relevance of China's role (for further discussion on research bias please refer to Chapter 3: *Research Design and Plan*).

In terms of governance and international relations, trust intersects with power and the balancing of interests. Hoffman (2002, p. 394) makes links to the

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[72] See also: Baier (1986); Barber (1983); Brenkert (1998); Coleman (1990); Dasgupta (1988); Deuttsch (1958); Gambetta (1998); Holzner (1973); Keohane (1984); Sztompka (1999); for a variety of viewpoints and disciplines that utilise trust in theoretical and analytical research.

complicated relationship between trust and power, noting how power and opportunism can influence trust, or lack thereof:

> Very simply, opportunism destroys the expectation of trustworthiness, i.e. the belief that trustees will advance and/protect the interests of trustors in spite of their capacity to do harm. Absent basic confidence that other will do what is right, trusting relationships cannot be developed.

Prantl (2014) echoes the sentiment that power dynamics deserve more attention in international relationships and are vital to understanding politics in a changing international order. Power, or perceptions of power, have the ability to indirectly impact regional and sub-regional relations and markets. Joint responses to shared concerns, such as those used by Northeast Asian economies, encourage regional integration and counterbalance power dynamics (Atanassova-Cornelius, 2017, p. 7), shifting focus to cooperation and integration as opposed to focusing on regional differences in responding to such concerns. Reinke de Buitrago (2009) similarly agrees, positing that where threats are perceived, East Asian states have overcome them by engaging in multilateral institutions where trust is built through education and "confidence-building measures…[that] reduce uncertainty and allow actors to trust one another more" (p. 739). When economies engage in multilateral governance organisations, such as ASEAN, trust is fostered; but we must also consider issues of trust within the organisation itself and how these may impact joint-governance initiatives.

Friendship is commonly used to study and analyse bilateral relationships in the international system (Oelsner & Vion, 2011) and is relevant here when discussing the challenges of trust in ASEAN. ASEAN itself has provided all of the components of friendship[73] to its members, creating an institutional framework for which friendship is rewarded and used as a political and economic tool. In international relations friendship represents the antithesis of enmity. Based on these interpretations of trust and friendship it is logical to deduce that an absence of friendship and predominance of enmity would lead to distrust, and a reticence to engage in cooperative agreements or relations. It is reasonable to posit that trust, however, exists on a spectrum like many social and cultural

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[73] Oelsner and Vion (2011) combine multiple disciplinary approaches to friendship in order to frame its role in the international system. This includes the institutionalisation of friendship, which requires the production of a common good or shared sense, the formalisation of international relations and institutions to guarantee sovereignty, structure mutually beneficial relationships, promote cooperation, foster social justice, and result in the creation of order in a chaotic world system (p. 5-6).

phenomenon, and therefore an absence of distrust among partners does not mean 100% trust exists between partners, and vice versa.

While ASEAN operates with relative success in reaching agreements and producing data on shared issues, how to address them, and progress made, as well as incremental assessments of projects, there is concern about trust among members. This has been reflected by interview subjects and in literature on the limitations of cross-border electricity trade and EMI in the sub-region (Pacudan, 2016; Shi, 2015; *Former Government—Informant 1*; *Academic 26; Former Government 27*). How, a member economy might question, will disputes be settled should a member hold electricity hostage in the event of a conflict? How can members ensure a potential conflict won't lead to electricity shortages? What if a member economy decides to stop electricity trading arbitrarily and with no warning? These are common questions in cross-border electricity trade literature and reflected in expert opinions on the challenges associated with cross-border electricity trade expansion and regional power sector reform, not just in ASEAN but elsewhere in the world as well (See Chapter 1 for further global EMI examples). These member economy concerns are reflected across a variety of experts interviewed inside and outside of the region.

According to *Think Tank 11,* trust within ASEAN is fraught. Member countries, while joined together in numerous economic agreements, do have histories of conflict that have overshadowed policy development in the past. In addition, placing dependence (whether full or in part) of electricity access on a neighbouring country does raise security of supply concerns at the national level *(Development Bank 5).* In the case of an economic or political conflict among members, *Academic 26* said a common concern among members—expressed at the national level—is could cross-border electricity trade cease or access be restricted in order to be used as a bargaining chip? An additional challenge to this point according to the same expert, is that "often ministerial level [political] will puts priority on security concerns over energy poverty concerns" (*Academic 26*). Following this argument, if a ministry had the perception that trade of excess capacity was hindering national security, trade may be cut-off in order to assuage security of supply concerns.

In addition, bilateral agreements that are expanded incrementally to include more and more neighbours, or joined with other, local bilateral agreements, are more realistic than larger, multilateral agreements given the variety of concerns that must be addressed among partner nations, including coordination, deregulation, harmonisation and standardisation among others previously

discussed (*Multilateral Organisation—Informant 2;* supported by IEA, 2019a, pp. 153-159). Also, the physical needs for increased trade and EMI are high— physical infrastructure connection is required first (grid to grid), and then institutional coordination, management and regulations can be established. Without actual grid connection electricity cannot be traded. Referring back to Chapter 5 analysis of current interconnections in the BIMP-EAGA subsystem, physical connections in the sub-region are limited at the moment, and updates are needed at a local level before sub-regional connection can occur. Finally, liberalisation of national electricity markets, through increased competition and standardised rules of practice and operation, are often identified as equally necessary for physical connection to be successful (see section 5.3-5.4). ASEAN, however, can help with this through funding, policy support, and information exchange—if trust among partners can be established. Here the role of bilateral agreements is further relevant, this time in augmenting against national level concerns and progressing slowly given previously proposed CBDR-EMI approaches.

In ASEAN aspects of trust may also be related to the concept of saving face, introduced in Chapter 3 when discussing working in East Asian contexts. *Former Government—Informant 1* provided anecdotes about their experience working within ASEAN, and questions of trust among members—in meetings members tend to agree with each other but after meetings and in one-on-one settings will express dissatisfaction or concerns:

> *They [ASEAN] like to avoid conflict and have harmony and consensus. Issues where they can't get amenity, they avoid and just don't discuss. For instance, with India and Pakistan if there is conflict they discuss it. With ASEAN they just avoid it. It's a difficult environment to get tough issues addressed.* (*Former Government—Informant 1*)

In addition, saving face, instead of making conflict, is a commonly observed trait of politics within ASEAN , and is reflected in the voicing of concerns regarding trust behind the scenes (Guan, 2004). Where conflict could result in embarrassment, partners avoid voicing conflict in meetings. Take for example this anecdote by *Former Government 17,* when describing the challenges of energy policy consulting in ASEAN power sectors:

> *...The job is so challenging. There are times that it feels like we are constantly being told two or three different things—no one wants to lose face! Everyone wants to avoid conflict and as a result my team experiences a lot of conflict behind the scenes trying to figure*

> *out what our partners want. It's very hard*. (*Former Government 17*)

In this sense, saving face is the prevention of embarrassment via conflict or disagreement, and therefore requires the feigning of harmony when in a group, and reversal of that agreement behind the scenes. This false harmony, therefore, becomes untrustworthy when no disagreement or conflict is ever truly hashed out, and complete agreement is never reached. In the ASEAN sense this means, for example, agreeing to climate targets or subsidy removal in a group, but refusing to prioritise these issues or even work seriously towards the agreed upon goals at the national or local level. This can also, according to *Former Government—A27,* mean that targets among ASEAN members are only as strong as individual members national priorities, and therefore agreements "can't always be trusted at face value". Here the intersection of national and sub-regional priorities is an interesting addition to the challenge of trust in policy making. If this is true, that sub-regional agreements will only ever be as strong as national priorities, then if the two don't fully align structural economic and political change may not happen at the ambitious level regional groupings like ASEAN aim towards. This does not bode well for the APG or subsystem-to-subsystem development, where trusting relationships may be lacking and EMI capabilities mismatched based on differing levels of power sector development.

6.3.a Mistrust Moving Actors to Trust

Where trust is viewed as a foundational requirement for personal relationships, government and governance, and human success (Reinke de Buitrago, 2010), mistrust is also a factor in moving relationships forward. Mistrust is defined as the absence of trust,[74] which Carey (2017) bases on the notion that "familiarity is insufficient ground for trust" and therefore expectations about behaviour cannot be based on familiarity in relationships (p. 7). In his ethnography on the absence of trust Carey posits that mistrust moves politics and institutional relationships forward, and should be equally considered when studying trust, as opposed to its general absence in the majority of trust literature (p. 5). The concept of mistrust, while not widely applied outside of Carey's work, piqued the author's interest based on feedback during interview data analysis. As a result of

[74] Distrust, however, would be a lack of trust as a result of conflict, disagreement, or experience. As referenced earlier in this chapter, if trust existed on a spectrum, one end would be absolute trust and the opposite end would be distrust. Mistrust is harder to place on this hypothetical spectrum, however, as it is a lack of either but familiarity with the subject to which trust could be applied.

expert suggestions, the author began exploring how this concept might be applied to ASEAN and the trust challenges highlighted among interview subjects.

In Carey's conceptualisation of mistrust he examines politico-organisation structures as a response to mistrust—they provide a solution to uncertainty and fear, a place for structure to be built out of uncertainty (p. 12). In the case of ASEAN this characterisation is quite realistic; the creation of ASEAN in 1987 was in part a response to lack of structure for post-colonial states in Southeast Asia (Zhao, 2016), part response to fear of the spread of communism and rising tensions in the region (Albert, 2017). Where bilateral relationships between the founding ASEAN members did exist prior, mistrust was present between all countries—there was no prior experience of cooperative organisational development based around these specific, five founding members and the formation of ASEAN provided a means for structure in a tumultuous sub-regional environment. In the context of ASEAN, trust was built based on mistrust and the need for a balance to the anarchy of no relationships or politico-organisations in the sub-region. Regional institutional governance was built upon the existence of mistrust, and the formation of a sub-regional institution to address shared governance challenges was born; in this sense, mistrust is a useful addition to governance, and in fact aids in the building and maintaining of institutional governance relationships as long as distrust does not also exist between all participating parties. Using this conceptualisation of mistrust, we can go even further with ASEAN, applying mistrust to cross-border electricity trade; this can be further applied to BIMP-EAGA and governance challenges highlighted among interview subjects.

There are few (if any) recent experiences of ASEAN countries using energy access against one another in disagreements. There are few (if any) examples of cross-border interconnections being hijacked by partner countries. There are few (if any) examples of ASEAN members using energy as a political tool in general. Therefore, there is no distrust in the power sector, but there is mistrust (no subject interviewed was aware of a clear example where distrust had been fostered via electricity trade conflict). Mistrust in power sector reform, climate change mitigation, and EMI in ASEAN can, based on an expansion of Carey's original conceptualisation, move these mistrusting countries together in cooperation as a response to the lack of structure in these areas. In fact, that is already happening as illustrated by the various EMI agreements built into ASEAN's APG initiative and the gradual progression of bilateral to multilateral cooperation. Mistrust is, in a sense, the invisible hand that is being used to tie

BIMP-EAGA nations together in climate change, energy policy, and EMI cooperation at the sub-regional level.

Applying this logic to wider ASEAN relations, outside of subsystem cooperation, there is opportunity for deeper EMI between national markets. While sub-regional and subsystem EMI is overseen by ASEAN and HAPUA, there has been little movement in coordinating national markets up to this point. As bilateral and multilateral EMI cooperation is expanded, the opportunities for success based on absence of distrust and presence of mistrust are positive. This can also further incorporate [national] market-to-market coordination, harmonisation and standardisation, criteria and reform needs established as necessary for EMI and cross-border electricity trade. While there are challenges of trust, distrust does not yet exist and mistrust may actually bode well for the long-term development of these subsystems, ASEAN's governance role, and the eventual creation of the APG.

6.3.b Bilateral vs. Multilateral Cooperation

Bilateral agreements emerged as another common talking point in interviews (*Former Government—Informant 1, Multilateral Organisation—Informant 2, Academic 10, Think Tank 7, Think Tank 11, Former Government 17, Former Government 27*), reflecting the breadth of ASEAN's own policy and research on EMI throughout the region (APAEC 2009, 2014). In the case of the APG, some progress is better than no progress—if trust, capacity, and national priorities are all barriers, moving forward where able is appreciated as "better than nothing" (*Academic 10*).[75] This is where bilateral agreements can play an important role in APG progress.

Among experts interviewed it is clear that ASEAN is moving forward with the APG and an integrated, sub-regional electricity market is the ultimate aim of this connectivity (every interview subject with expertise in ASEAN agreed upon this point). A significant limit to APG progress is, unfortunately, the pace of development (*Former Government—Informant 2; Multilateral Organisation—Informant 2; Think Tank 5; Think Tank 11; Think Tank 12; Academic 26; Former Government 27; Conference Event 2; Workshop 1)*. According to these

[75] There is quite a lot of research on bilateral and multilateral cooperation in trust literature and East Asian studies. However, as this research is focused on the IPE of cross-border electricity trade, the author has opted not to critique this approach, simply provide context to the utilisation of these two forms of cooperation in relation to regional power sector development. For more on bilateral and multilateral cooperation see: Low (2003); Akaha (2004); Qi (2009); Oelsner & Vion (2011); Choo (2014); Atanassova-Cornelius (2017); among others.

interviews, the initiative is moving quite slow as a result of common limitations identified in this research. While progress has been incremental, for example the grid-to-grid connection between Lao PDR-Thailand-Malaysia-Singapore (LTMS), the 100 MW power agreement is not enough to reasonably meet region wide or ASEAN specific clean energy goals (*Think Tank 5; Think Tank 11)*. This raises the question, how is any trade possible given the barriers countries encounter? The example of LTMS power trading provides interesting insight into the dynamics of multilateral versus bilateral trade, and the difficulty in achieving either one. The following subsection examines three examples of existing trade in the region, highlight the fraught LTMS multilateral trading scheme and two bilateral trading relationships in the BIMP-EAGA subsystem. This analysis adds context to the difficulty ASEAN member states have experienced in achieving any cross-border trade relationship, while highlighting the mutually beneficial terms such relationships can provide.

Existing Interconnections

LTMS represents the very first multilateral project in the sub-region, originally initiated in 2013 (Owen et al., 2017) and representing ASEAN's attempt at progressing APG development incrementally (ACE, 2018b). Pilot projects for LTMS interconnection were further developed in 2014, transmitting electricity from Lao PDR to Singapore via existing infrastructure in the transit countries of Thailand and Malaysia (Andrews-Speed, 2016). Later successful iterations of the project developed without the inclusion of Singapore—The largest transmission to occur is the Lao PDR-Thailand-Malaysia interconnection, which was signed in 2017 to transfer hydropower from Lao PDR to Malaysia via transmission lines in Thailand (Atmo & Otsuki, 2018, p. 1). According to Owen et al. (2017) it is unknown why Singapore decided not to join this particular interconnection, although the authors point out Singapore's energy needs and landscape are quite different from the other three partners (p. 146), as is Singapore's power sector structure, which exclusively allows private generation to participate in generation and trade—meaning Singapore has no counterpart to join the LTMS inter-utility agreement (p. 154). It is not known if this is why Singapore did not join later iterations of the LTMS interconnection (Owen et al, 2017, p. 145-146).

Motivators behind the multilateral LTMS interconnection are closely aligned with broader ASEAN interconnection motivations—sustainability and energy mix goals, rural electrification, and financial gain (Owen et al., 2017; ACE, 2018b; Atmo & Otsuki, 2018). The needs of individual LTMS economies can be identified as follows (Owen et al, 2017): (1) all the partner economies have growing

electricity demand that needs to be met, motivating the search for alternative power sources to add to system reliability (p. 146, 169, 177,). (2) In the case of Lao PDR that demand growth will put stress on the undersupplied domestic market and stress the need for expansion of reliable transmission and distribution systems for rural electrification and industry growth (p. 169). In addition, domestic government focus on export-oriented bilateral interconnection has established policy incentives for engaging with neighbours in interconnection projects (p. 170). (3) In the case of Malaysia, energy mix motivations have encouraged diversification of power sources, as domestic renewables growth is expected to remain small for the next 10-15 years as a result of prevalent fossil fuel subsidies and cost perceptions (p. 177); In addition, in order to increase rural electrification of its island communities the Malaysian government has placed importance on the growth of bilateral interconnections between Malaysia and its neighbours (p. 180). (4) With regards to Thailand, electricity imports allow the country to augment its reliance on natural gas (p. 188) and diversify its own energy mix with more renewables; In addition, acting as a transit country reaps economic benefits on its own (p.). (5) Singapore is motivated by its energy security and energy mix concerns, seeking out diversification via imports (p. 194). In all cases the domestic motivations also benefit the sub-region as a whole—development of a regional power trading system has benefits for both the importers and exporters (p. 148-149).

Two particular examples of successful bilateral interconnection are the Thailand-Lao PDR interconnection and the Malaysia-Indonesia interconnection. The Thailand-Lao PDR interconnection is one of the oldest interconnections, having been established in 1972 (IEA, 2015, p. 13). Via this interconnection both countries gain from each other—First, Lao PDR is able to export electricity to Thailand that is fueled by hydropower, offering Thailand the opportunity to diversify its energy mix; Second, in exchange, Lao PDR is able to not only gain financially but also technically, as it uses Thailand's developed transmission network to provide electricity to its own remote communities (IEA, 2015, p. 13). In addition, this relationship has allowed Thailand to act as a developer of power projects in Lao PDR, further growing the developing economies power system and improving infrastructure while deepening the two countries' continued electricity exchange relationship. Similar models of exchange are being employed by Lao PDR in the development of future exports to Vietnam.

The only successful BIMP-EAGA interconnection to date is the bilateral interconnection between Sarawak, Malaysia and Kalimantan, Indonesia. This

interconnection began formally exchanging electricity from Malaysia to Indonesia in 2016 (IEA, 2015). Kalimantan, Indonesia, like the rest of the country, is heavily reliant on oil fueled power generation. In 2012 the two countries signed a power exchange agreement for the length of 20 years (ADB, 2013). This project was made possibly largely by an ADB loan that funded the development of the Indonesian side's transmission infrastructure; Malaysia funded the expansion across the border and into Sarawak (ADB, 2017). The project, while benefiting Indonesia's energy mix with hydropower and gas produced electricity from Malaysia (Pacudan, 2015, p. 48), has also sought to solve the problem of power scarcity in this particular region of Indonesia—as a result of the Malaysia interconnection Indonesia has had the opportunity to increase its national electricity access with more reliable excess Malaysian power (ADB, 2017, p. 5). Malaysia, on the other hand, has gained economically from the sale of excess electricity. In addition, expansion of the Malaysia-Indonesia interconnections will allow continued improvements in efficiency and cost reductions—interconnections allow utilities to invest in larger and more efficient systems (Pacudan, 2016, p.49). Furthermore, this project represents an important political and economic expansion of the BIMP-EAGA subsystem's role in the APG and potential future expansion of this bilateral interconnection into a multilateral network that includes Brunei and the Philippines (ADB, 2013).

While the progress of the multilateral Lao PDR-Thailand-Malaysia 100MW transmission is an important development in ASEAN's long-term multilateral power trading goals, progress was slow and the removal of Singapore in later iterations of the project signal the difficulty in engaging in cross-border electricity trade on a multilateral level. Owen et al (2017) find that financing, reform of market structure, coordination, harmonisation, and standardisation of systems, and trust to be barriers to quicker LTMS development. This supports the author's findings regarding BIMP-EAGA and the relative ease of bilateral versus multilateral transmission, as well as the breadth of literature on the topic (See also: Footnote 54 on page 199; also the work of: Low (2003); Akaha (2004); ADB & ADBI (2009); Qi (2009); Oelsner & Vion (2011); Choo (2014); Atanassova-Cornelius (2017); and ACE (2018b), among others).

Experts interviewed also remain optimistic that ASEAN power connectivity will be accelerated as more bilateral agreements come on-line, and eventually these bilateral agreements will increase trust and form the basis for an ASEAN electricity market (*Multilateral Organisation—Informant 1; Academic 10; Multilateral Organisation 18; Academic 26)*. This logic of progression is

supported by Choo's (2014) characterisation of the unique, East Asian style of institutionalism whereby institution building leads to trust as opposed to the common western model which is opposite; in the case of the APG bilateral agreements lead to trust, which leads to further interconnections and additional partners (*Former Government—Informant 1; Multilateral Organisation—Informant 2; Workshop 1*). This complements ASEAN's subsystem development, and the ASEAN model for expansion based on multiple subsystems' gradual linking (See Figure 4.1 in Chapter 4), as well as the ADB's findings regarding the primacy of bilateral agreements in the progression towards multilateral, sub-region-wide interconnection (ADB & ADBI, 2009, p. 35).

In this section trust has been framed in the ASEAN context—this includes examining trust in ASEAN among member economies and exploring how this relates to cross-border electricity trade, EMI, and the development of the APG. In addition, this section has covered the challenge of bilateral versus multilateral EMI, demonstrating the contradiction between bilateral engagement and ASEAN wide, multilateral EMI goals. This has also included expert interview testimony and literature to support the findings that bilateral EMI cooperation is a steppingstone to eventual multilateral integration. In the following section trust of outsiders will be introduced in the context of ASEAN engagement with China and Chinese EMI investment. Included in this will be an analysis of APG needs and interlinked Chinese connectivity goals.

6.4 Trust of Outsiders

Trust of outsiders is an obstacle in many relationships, between nations, corporations, communities or other. In East Asia trust of outsiders is largely attributed to historical memory. This is principally associated with Chinese-Japanese relations (Drysdale & Zhang, 2000; Togo, 2008; Prantl, 2014; among many others); however, Southeast Asia's historical memory of China is that of an often benign but sometimes aggressive empire that influenced regional politics and sought leadership over the larger East Asian region—a perspective that is reflected in Chinese foreign policy today (Weatherbee, 2009).

In Northeast Asia (China, Japan, the Republic of Korea, the People's Republic of Korea, and sometimes Mongolia) trust has played a large role in regional relations. Atanassova-Cornelius (2017) argues that the duelling factors of competition and cooperation have created a unique practice of trust building in Northeast Asia; mutual distrust has been exacerbated by geopolitical tensions, but ultimately economic interdependence and shared security concerns have

increased trust and fostered a shared understanding of the value of trust for regional stability. Non-traditional security (NTS) concerns in Northeast Asia have driven trilateral (China-Japan-Republic of Korea [ROK]) cooperation, necessitating a joint response to shared challenges. In the case of energy and power sector reform climate change is the clear challenge, requiring joint and individual action.

Following Choo's characterisation of institutional development first, followed by trust, it is logical to posit that trust-building between ASEAN +China will follow after increased institutional cooperation. NTS issues, particularly related to power sector reform and climate change mitigation, are perhaps the most important concerns in the wider East Asian region, representing the amalgamation of both environmental and energy security, both of which are truly transnational regional issues. In the case of EMI and power sector reform suspicions abound due to power sector imbalances and perceptions about energy security, as discussed previously in this chapter. Suspicion of outside influence and control over a country's resources or electricity is similarly evident, particularly in the ASEAN-China relationship. This has been made evident by China's global Belt and Road Initiative (BRI). The following subsections will bring BRI investment into the discussion about trust as a barrier to ASEAN's APG. This will include an introduction to BRI, an examination of its potential contribution to the APG, and also an analysis of its shortcomings and concerns with trust. Finally, this section will examine ASEAN-Chinese trust and how it may be a barrier to BRI assistance with development of EMI in Southeast Asia.

6.4.a Chinese Investment through the Belt & Road Initiative (BRI)

A dominant theme that emerged in conversations about trust was expert interest in BRI as one potential solution to the shortcomings and difficulty of realising power sector integration in ASEAN through the ASEAN Power Grid. This is where similarities between BRI Infrastructure investment and ASEAN Power Sector Integration began to emerge. In initial interviews the most common theme was BRI & Trust. 6 out of 10 respondents mentioned both of these issues in a variety of forms across multiple discussions.

BRI refers to China's infrastructure investment project, announced by Chinese President Xi Jinping in September 2013. BRI is made up of two avenues of investment, China's [overland] Silk Road Economic Belt and the 21st Century Maritime Silk Road, collectively making up the largest infrastructure investment project in history (Chatzky & McBride, 2019). If realised, the two routes of the

BRI would connect China with Europe via Central Asia, Southeast Asia, South Asia and Africa. Infrastructure ventures that include railways, ports, roads, accommodations, power projects, etc. would boost China's impact in the regions developed and encourage economic development among emerging economies along the BRI routes.

The BRI is an ambitious project when looked at from above—over 10,000 projects spread across three continents (South China Morning Post [SCMP], 2019), ranging from $1-8 trillion USD (Hillman, 2018). In 2014 President Xi announced the creation of the Silk Road Fund, a "medium to long-term fund" which would contribute $40 billion USD to projects that promote connectivity along the BRI routes (Silk Road Fund, no date). Additional BRI funding comes from a combination of Chinese, state-owned commercial banks, development banks, sovereign wealth funds, and foreign exchange reserves (Deloitte, 2018).

A challenge with examination of BRI is in part the distinction of what BRI actually is—state-sponsored financial investment with an expectation of return or government aid (Wharton Business Daily, 2019, p. 2). Hillman (2018) points out the difficulty in making this distinction based the nature of BRI financing—BRI financing is Chinese government supported aid with the expectation of return via the winning of contracts by Chinese companies (p 2-3). BRI contracts in the Reconnecting Asia Database (2018), which tracks BRI funds and projects, found that 89% of all contracts were held by Chinese companies (Hillman, 2018, p. 4). The general complication of identifying BRI projects and whether they are investment or aid is in part due to the process BRI investment goes through: State sponsorship of BRI investment leads to capital provided by Chinese financial institutions, these Chinese financial institutions give loans to partner countries, but Chinese companies win the majority of the contracts required, which means partner countries in turn hold the debt—if the investments returned don't pay off this debt then China repossesses the project in what becomes "foreign appropriation of energy sector assets" (Lowder et al., 2020, p.6). Chinese state sponsorship also leads to support for difficult to complete projects—lending credence to projects that otherwise might not find outside investment. This is not to say that outside investment of the APG does not exist—it does—but in this context BRI is relevant as an oft cited example by interviews of a potential investment source for APG projects; and it is a big potential source.

Along the BRI routes the World Bank (2019) has identified 70 countries, however, the BRI is open for any country to participate in. For the 70 countries used in World Bank analysis the investment is estimated to be closer to $575

billion USD; of this, 46% of BRI investment is in energy and electricity, the largest focus of BRI investment. 34% of all BRI investment is focused in East Asia and the Asia-Pacific. While qualifying projects that were underway prior to the creation of the BRI are eligible for funding and are in some cases lumped in with BRI projects that are being scoped,[76] the World Bank has found that the majority of investment is in projects that are in the construction or planning stages (p. 45).

While the investment levels of BRI range depending on the source reporting and the types of projects examined, BRI projects fit within a five priority areas that encourage cooperation among parties: promote policy coordination, facilitate connectivity, unimpeded-trade, embolden financial integration, and foster people-to-people bonds (NDRC, 2015). Similar to ASEAN, the BRI is meant to provide mutual benefit for all parties and shared security (NRDC, 2015). Each BRI focus area is reflected in the key sectors funded, namely transport, communications and energy (Renwick et al., 2018).

Many of the BRI projects fall under the broad umbrella of infrastructure, but that does not mean it is just an infrastructure investment map; it is also the catalyst for what could be the largest improvement to trade in modern history (Mckinsey&Co, 2016). The BRI includes roughly 65 percent of the global population and nearly one-third of global GDP, but it also includes just under one quarter of goods and services moved around the globe (Mckinsey&Co, 2016). In addition to providing investment the BRI could be the world's largest platform for regional trade and economic collaboration (*Business 22*), pushing regional economic development where lack of access to funds previously prevented it from going—providing an "unrivalled form of investment for the APG" (*Business 22)*.

While energy and electricity may be the focus of the majority of BRI funds, not all of this is investment in clean energy sources or renewable energy integration. In fact, a large focus of state-sponsored BRI energy investment is in hydrocarbon projects, including oil, gas, and coal, accounting for roughly 90% of the Silk Road Fund's investments (Nakano, 2019, p. 1). Many of the countries along the BRI routes are also rich in hydrocarbon resources, however, a common perception is this will revive overseas investment from Chinese oil companies (*Workshop 3*). In addition, questions regarding China's true commitment to 'greening the BRI'

[76] The World Bank found that only $66billion of total funds went to projects that were completed by 2016.

have arisen, as "Chinese financial institutions have invested $15 billion in coal projects abroad" (Nakano, 2019, p. 1). Suspicions regarding China's true intentions, or eagerness to put its own gain above that of its partners, abound. Oil and gas investments at a time of global movement away from fossil fuels and ASEAN sustainability and emission reductions pledges, seem at odds with the reality of BRI investments.

One interview subject particularly concerned with this dynamic, *Think Tank 11*, an energy analyst with a 25-year career working in East Asia and research director for an international research institute questioned whether, in fact, BRI is bad for ASEAN's energy goals. Perhaps, this subject posited:

> *BRI is useful for investment, but really the goals do not really align with ASEAN* [sub-]*regional emissions reductions priorities...they don't seem to even align with China's emissions targets.*[77]

This is similarly reflected in the struggle between ASEAN's region-wide goals and the policy making at the national level—where targets are agreed upon with the sub-regional governance structure they are not reflected in national level energy policies, particularly when looking at energy mix and renewable targets (see, for example, chapters 4-5).

Another common criticism of BRI (in addition to its state-sponsored investment model) is its breadth—BRI covers a wide range of projects, but also a broad timeline. Projects started years before the initiative was even announced are being included in its progress and monitoring (Hillman, 2018). Additional criticisms concern China's ability to manage BRI investment and training, with questions regarding the country's ability to engage and also let go of projects once they have been established or terms of agreements have been made (*Former Government 28*). According to *Former Government 28*, a Chinese expert in energy policy development, there are lessons learned from BRI that are not yet being fully integrated in the power sector projects:

> *Including the relevant local and regional parties needs to also be made a larger priority in the power sector...we learned this in development projects years ago. China's* [BRI] *projects need to reflect this lesson as well. We get this criticism all the time—it's low hanging fruit! We know it already.*

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[77] Or, the author wonders, are ASEAN priorities actually in-line with the goals of member economies? As discussed earlier in this chapter these appear to be at odds, as well.

An interview with a leading BRI scholar, creator and manager of one of the largest BRI databases, put into words some of the challenges associated with just understanding BRI, let alone tracking its progress in specific sectors (*Think Tank 12*). As stated by this scholar, because the BRI is broad and virtually all inclusive in scope and objective, identifying, assessing, and tracking projects linked to the initiative is quite difficult:

> *The variety of institutions involved in BRI projects further complicates how BRI is viewed from the outside—It's no wonder ASEAN is sceptical (Think Tank 12).*

Given the broad nature of BRI in terms of process, scope, and objective, assessing infrastructure projects linked to the initiative as a whole proves difficult. This is further complicated by the vast number of private, public and international institutions involved in the initiative.

According to *Former Government 28* a large proportion of BRI projects remain in the planning stages and a number of leading, high profile projects were cancelled following their announcement; this statement was later confirmed by the author's own research (Economist Intelligence Unit [EIU], 2019). For example, high-speed rail projects that fall under the BRI remit have seen very little development in the years since their first proposal. China's proposed rail network that link Southeast Asia with its northern neighbour is one such project (EIU, 2019). As stated by The Belt and Road Portal,[78] there are 22 Power Plant projects and three energy transmission projects seeking funding in Southeast Asia as of June 2019 that fall under BRI. These include projects in Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, and Singapore at a variety of phases of development—from planning stages to follow-on investment to construction. Projects range from traditional power plant projects to waste-to-energy projects. The likelihood of whether all or some of these projects will be completed is unknown based on the data available.

The number of projects in the tendering stage does not mean China isn't taking this seriously, however, or that power sector connectivity isn't a priority. Approximately 44% of BRI construction projects are energy related (Nakano, 2019), with an estimated $7 trillion USD going towards power grid development specifically (Office of the Leading Group for Promoting the Belt & Road Initiative,

[78] The Portal was developed by the Hong Kong Trade Development Council to provide a platform for global businesses to take advantage of BRI opportunities via Hong Kong. More information can be found at https://beltandroad.hktdc.com/.

2019). While concern over Chinese commitment to clean energy is based on current investment, discussed previously in this subsection, there are positive investment projects and interests of China that ASEAN could utilize. In particular, China's Global Energy Interconnection (GEI) initiative may be a tool for deployment of BRI funds while fulfilling ASEAN's APG and power sector connectivity interests.

The GEI is a strategic plan to develop and connect the power grids and systems of the countries of greater Eurasia (Cornell, 2019). While initial interviews pointed to BRI, subsequent interviews pointed to GEI as a strategic tool that could assist APG progress where it has stalled. Conversations at a conference in June 2019 provided valuable feedback on the exploration of GEI and recommendations for inclusion in this research (*Academic Conference 11*). Later workshop conversations (*Government Workshop 14*) with GEI officials pointed the author towards additional resources and insight into the power behind these Chinese proposals.

GEI was announced in 2015 by President Xi as an initiative with the goal of eradicating energy poverty, enhancing global power sector integration, all with the utilisation of clean energy resources, for the same reasons covered in this research. In addition, in 2016 the State Grid Corporation of China (SGCC or State Grid) created the Global Energy Interconnection Development and Cooperation Organization (GEIDCO) to oversee GEI (Cornell, 2019). Interestingly, GEI largely promotes neoliberal value of free trade, economic interdependence, and the removal of barriers to trade and financial exchange. Even infrastructure development coming from China is embracing the neoliberal values advocated as a requirement for power sector development in Southeast Asia.

The positive environmental and infrastructure impacts Chinese BRI investment broadly, and GEI specifically, could have on Southeast Asia and the APG are overwhelming. However, the national interests of energy security and sovereignty mentioned earlier in this chapter are at play here, as well. Cornell (2019) notes that even in regional electricity or power sharing agreements sovereignty concerns are present, and so at an international level, and bringing in China, exasperates these concerns (p. 8). Cornell further suggests that one solution is piecemeal interconnection, or, as this author posits, on a bilateral scale, subsequently growing interconnections with additional partners as trust is built. This is where ASEAN and China may be able to find some common ground, if mistrust doesn't get in the way.

6.4.b ASEAN-China Bilateral Relations

Historically China and ASEAN have engaged both positively and negatively along their development paths. Chinese soft power in the region is quite strong and felt in a variety of sectors and socio-cultural environments. This includes Chinese diaspora, pop culture, food, history, education and even economic interests via initiatives and agreements such as GEI, infrastructure development, or trade agreements (Roasa, 2012; Cho & Jeong, 2008). Chinese and ASEAN history are intertwined, as are their people and economies.

ASEAN-China relations, while strong today and largely integrated into each other's economies as well as the larger regional and global economies, is not based on entirely confident relations. The creation of ASEAN (discussed in more detail in Chapter 2) was positioned around a fear of communism, and suspicion of China's intentions in Southeast Asia have persisted (Astarita, 2008). Mutually beneficial economic relations have largely driven the development of this relationship, however, ASEAN's western partners have maintained a hesitancy when cooperating with China, as evidenced by the tumultuous relationship of China and the United States, one of ASEAN's largest strategic partners (with a similarly fraught relationship in the region). Astarita (2008) points to a familiar dynamic among Chinese relations with other Asian economies, ASEAN members included—China engages in multilateral institutions with a pattern of seeking dominance, while other Asian economies engage out of a fear of missing out (p. 85). This is a similar motive identified earlier when discussing trust; often trusting relationships are build out of a fear of missing out, as are trade agreements (See Chapter 5 for more discussion on trade engagement and EMI cooperation).

An interesting point in the ASEAN – BRI power sector convergence is the issue of bilateral vs multilateral cooperation. As discussed previously, within ASEAN power sector integration has happened at a primarily bilateral level. ASEAN itself has advocated for bilateral power sector integration before multilateral, and ASEAN's own APAEC (ASEAN Plan of Action for Energy Cooperation) identifies bilateral cooperation in power sector integration as a means to eventually achieve its goal of an integrated ASEAN power sector via the APG.

Similarly, ASEAN and other Southeast Asian experts interviewed advocated for bilateral cooperation and investment with BRI. Two former government experts interviewed went so far as to say China itself will have an easier time hurdling trust issues on a bilateral as opposed to multilateral basis (*Former Government 27; Former Government 28*). Other experts (*Academic Workshop 2)* pointed to this

decision being a strategic one, whereby China has chosen to engage on a bilateral basis as their strength will be greater one-on-one as opposed to with ASEAN as a collective. In July 2018 preliminary interview results that reflected this sentiment were presented at an academic workshop *(Academic Workshop 6).* The session these views were presented at included dominant European academic experts with research interest in China's BRI. A number of experts gave positive feedback and advice for further research in this area, for which the author is grateful. Two particular experts suggested a more critical approach to China's motivations for BRI investment in Southeast Asia, pointing to historical relations between China and ASEAN. This led the author to include an additional interview (*Academic 32*) with a historian and Chinese studies expert who explored China-ASEAN relations in more detail, providing context to some of the scepticism expressed in April 2018.

This new expert (*Academic 32*) pointed to predominantly positive historical relations between China and ASEAN member economies, with a few exceptions (notably disputes over the South and East China Seas and the sometimes-tumultuous Vietnam-China relationship). While Chinese influence in the region is a predominantly western focused topic, and there is some mention of Southeast Asian concern in the news (See: Gong, 2019 for one example among many), there is little reflection of this concern among ASEAN members publicly. However, the ASEAN pattern of non-interference and saving face, discussed in detail with interview Academic 10 (See Chapter 2 for references) is likely in partly a cause. In addition, ASEAN has taken a public stance of accepting Chinese infrastructure and economic investment pledges, while individual states are able to make their own decisions regarding accepting proposed packages; Malaysia, for example, put three projects on pause in 2018, two of which were resumed under fairer terms in April 2019 (Reuters, 2019). In short, ASEAN-Chinese relations are stable above the surface, but below there are ripples.

The viewpoint that China is invested in bilateral relations for strategic purposes, expressed in interviews and conference conversations, is contradictory to some of the literature that argues China is an advocate of multilateralism in East Asia and has actually advanced multilateral institutional development in the region (Kuik, 2005; Prantl, 2014). Unfortunately, this leads the author to the conclusion that Chinese motives are likely sensationalised, but also in part unknown. This viewpoint is also reflected in the work of interview subject *Think Tank* 29, a leading author and analyst in Asia-Pacific affairs. This interview subject cautions that a negative interpretation of ASEAN response to China's BRI is exceedingly

narrow and a misread of sub-regional motivations. Instead, the current state of BRI developments in Southeast Asia points to:

> *…actors weighing the pros and the cons of engagement with China's BRI, and in the end the majority find more positives than negatives.*

For the time being, caution in policy making at the national level of ASEAN member states will likely be the norm as further agreements and investments with China are developed. Until then, strong ASEAN relations are likely to continue, but perhaps not "reflect the reality of mixed responses" at the sub-regional and national level (*Think Tank 29*).

There is also the issue of trusting BRI investment management and training; however, this seems to just be a perception of critics, and is not widely accepted by experts interviewed as an actual shortcoming of BRI investment in Southeast Asia (*Former Government 28; Government Workshop 14*). Instead the reality is quite the opposite: China has successfully managed power sector integration and the reduction of energy poverty on its own and in other countries. Engineers and electrification experts are often trained in managerial roles. The capacity of Chinese companies outweighs that of many other global actors and is therefore a moot point. Therefore, ASEAN concerns over Chinese management and training capacity should not be an issue, but instead be addressed via ASEAN and Chinese leadership as a non-existent barrier. Here the narrative and education issue discussed previously in relation to national level considerations is similarly present, and similarly surmountable.

Interviews with ASEAN experts and members demonstrated that there is ASEAN political will, there is infrastructure need, but there is a lack of money for the envisioned APG to be completed. ASEAN itself recognizes the limits of APG progress to date and is eager to incorporate outside funding sources in order to move the initiative forward (*Multilateral Organisation—Informant 2)*. The baseline ADB estimate for infrastructure investment needs in developing Asia and the Pacific's power sector is roughly $12.6 tn. USD; including climate mitigation and proofing costs this number goes up to $15 tn USD for the wider region (ADB, 2017). A combination of BRI funds can provide $2-3 tn USD a year that is well over estimated financing needs, roughly $20 billion USD for the entire APG (IEA, 2015).

Without Chinese financial support the APG will undoubtably reach some investment roadblocks, whether slowing down further or halting full expansion. The IEA (2015) estimates that power sector investment, excluding

interconnections, will reach $308 billion USD (p. 14) in order to support growing demand projected out to 2040. This coupled with the estimated $20 billion USD expense of the APG will be a heavy price for the developed and developing ASEAN member economies to fund. Chinese aid and investment appears to come with some strings attached, and motives are unknown; however, as in other relationships of trust, priorities and risks will have to be weighed. It is the author's position that Chinese funding of the APG is inevitable, however, that does not mean ASEAN has no bargaining power over terms. In fact, China's eagerness to engage in Southeast Asia is to the sub-region's advantage, whether done on an incremental, bilateral scale or multilateral. In the subsequent subsection progress of APG will be examined, as well as limits to progress based around previously discussed governance challenges associated with trust and Chinese financial involvement.

6.5 ASEAN Power Grid (APG): Status

Power Sector integration in Southeast Asia is an important component of EMI initiatives focused on power connectivity. ASEAN itself is a prime place for interconnectivity to be encouraged given the availability of clean energy resources, multilateral institutions, and governance structures that operate there, plus the economic and physical geography of countries within the region. The proposed APG is one potential solution to meet sub-regional clean energy goals and offers the benefits of energy poverty reduction, deeper energy and economic integration and the amplification of ASEAN's regional impact—all common ASEAN justifications for engaging in the APG. It has been argued across the EMI literature previously presented that an integrated electricity market can improve efficiency in electricity supply, reduce costs of production and hence electricity prices, and raise standards of services due to increased competition. As global concerns for climate change increase, regional power integration is an effective way to reduce carbon emissions. In addition, connectivity and infrastructure development are an important priority for China's BRI, and some regional experts have interpreted BRI goals to align with ASEAN's energy and power sector integration goals, not the least of which is because BRI's infrastructure commitments are a significant positive force for the eradication of energy poverty and increases in development throughout the region.

Unfortunately, APG progress to date is quite limited. This is in part attributed to, among financing challenges, difficulty implementing the necessary national power sector reforms in a timely manner. As discussed in Chapter 4, progress to

date is largely bilateral in nature, with no region-wide interconnections. While ASEAN has attributed this to be the first step to wider connection (*Academic 21*; supported by APAEC, 2004). This is attributed by *Former Government—Informant 1, Multilateral Organisation—Informant 2, and Academic 24* to be a way for ASEAN member economies to mitigate trust concerns, engaging first with those they have trusting, cooperative relationships with, then slowly incorporate additional members when agreements can be reached as a larger negotiating block. Complicated power relations make bilateral agreements more realistic as well, as governments must work within complicated systems of interests, including business, consumer, and public interest groups. APG literature supports this as well (Jones, 2016). How the APG progresses is unknown, but current interconnection goals are not being realised as originally set out in AIMS I-II.

Many of the trust issues identified in ASEAN states, in relation to both bilateral cooperation among ASEAN member states and between ASEAN member states and BRI investments, can in theory be solved. *Academic 26* suggested that a consideration of the political forces and historical relationships that colour understandings of present-day dynamics on both sides has the potential to push BRI investments in ASEAN power sectors further. Experts in *Workshop 3* also suggested that ASEAN itself needs to more seriously push transparency in the power sector if it wants transparency in power sector funding. This reflects recommendations by Wu (2016) as well as the IEA (2015) and the APAEC Blueprint 2025 (2010) itself.

The addition of trust among ASEAN member states has brought new considerations to light as the author considers the policy and societal implications of findings thus far. The addition of trust has also opened up analysis to an inclusion of the fluid dynamics of cooperation on a country-by-country basis as opposed to a multilateral effort. According to the majority of interviews, there is a serious need for the continued examination of domestic energy market liberalisation and sub-regional governance shortcomings, particularly related to trust and bilateral versus multilateral cooperation. The following section will continue this examination by focusing on the market and political realities that this research has exposed, discussing their relevance to the broader aims of EMI and cross-border interconnections in Southeast Asia.

6.6 Discussion

So far chapter 6 has examined additional governance challenges to EMI and cross-border electricity trade that have arose throughout interviews, documentary research, and data analysis. These additional governance challenges fall within 3 different broad categories: (1) Sub-regional versus National interests; (2) trust among ASEAN members; (3) trust of outsiders. Examination and analysis of these three challenges to EMI also highlighted for the author the unique economic, political, and social dynamics that play a role in understanding the overall EMI and cross-border electricity trade picture in Southeast Asia. This discussion section will introduce the additional dynamics that emerged for the author via analysis of data and interviews, concluding with a neo-developmental statism-based explanation of the IPE of EMI governance challenges.

In addition to a misalignment between ASEAN and national priorities there appears to be a misalignment between market and political realities. In other words, the sub-regional and national electricity markets involved in ASEAN EMI are able to take on the reforms proposed as necessary for deeper integration; however, the political reality is many governments are not yet able or willing to make these changes. In Chapter 5 (*National Market Factors*) the market needs were discussed in detail, drawing on recommendations from Oseni and Pollitt (2014) and recommendations gleaned from interviews and literature. These were discussed above in relation to the O&PCRB BIMP-EAGA Scorecard, whereby the economic, political and societal reforms were ranked against the realities of the individual BIMP-EAGA markets. None of these reforms are insurmountable—in fact, at the heart of the very design of many of these reforms is their approachability and feasibility for developing economies. However, there are clearly obstacles as many of these reforms are not new or novel in their imagining. Chapter 6 (*Governance Challenges)* explored some of the additional factors preventing such reforms and deeper sub-regional and subsystem integration. These include ASEAN governance shortcomings, particularly perception at the national versus sub-regional level, political will, trust among ASEAN members, and also trust of outsiders. Here these barriers are analysed in relation to their overlap, bringing these three overarching challenges together to map the difficulty of EMI within the neo-developmental state structure of ASEAN and its market subsystems.

6.6.a Political Will

Arguments for and against globalisation, which is largely driven by neoliberal world economic order, as outlined in Chapter 2 (*Cross-Border Electricity Trade: Conceptual Approach & Review of Literature)*, predominantly hinge on issues of power shifts and equity—who benefits and how? In the case of cross-border electricity trade these same arguments are relevant. Electricity is directed from major suppliers and producers into the grid; those connected to the grid already benefit. Those connected but with unreliable access might have some benefit, while those not currently connected may be connected in the future, if funding is secured and projects for infrastructure expansion occur; but it is more likely that those rural, impoverished communities will be the last to benefit from increased cross-border electricity trade. Without grid connections they will never benefit from those new, more affordable or reliable, electricity imports. Grid expansion can absolutely happen. However, it will have to happen in tandem with other technical and physical measures, and have the political will behind it, to be felt in rural, island communities of Southeast Asia.

This highlights yet another challenge of balancing EMI and cross-border electricity given the multiple levels of governance—political will is largely lacking at the national level. This is supported via the conflicting realities of sub-regional level targets and national level shortcomings discussed in Chapter 4 (*Sub-Regional Market Factors)*, via data analysis discussed in Chapter 5 (*National Market Factors)* that highlight coal is still king and renewable energy targets are far from being reached, as well as via interviews in Chapter 6 (*Governance Challenges*) that highlight interview feedback on political barriers. As one expert said (*Academic A26*) "Climate Change is not [a] national priority but is treated publicly as though it is." Evidence across sources demonstrates that the sub-regional energy mix is not defined by ASEAN goals, targets, or even sub-regional connectivity vision, and as a result national level action is not defined by these factors, either. This is difficult to come to terms with in part because there is a logical cross-over between economic development policies, increased energy access, and renewable energy integration (Shi, 2016); however, governments are clearly prioritising economic factors over climate, which is thus reflected in coal dominated regional energy outlooks and heavily subsidised national energy sectors discussed in Chapter 5 (*Market Factors).*

Unfortunately, the challenge of garnering political will at both the national and sub-regional level hinges on an aspect of the neo-developmental state model that was discussed previously in this chapter—ASEAN'S political and economic

systems need to include considerations of equity and people. Who benefits, who gains, and how to make those two issues intersect with regional energy and climate transition goals. This is similarly reflected in the emerging rural and urban divide that the author has caught glimpses of in this research.

6.6.b Rural vs Urban

There is a distinction to be made between poorer populations and electricity access, one with important implications for this research and broader liberalisation and economic development goals. It has been mentioned repeatedly in prior chapters that access to reliable electricity is a fundamental barrier to improved quality of life and increased economic development among the world's disenfranchised populations. Despite growth in Southeast Asian electricity access there is still a significant portion of the population (65 million people according to IRENA, 2018b) without reliable electricity access. This is magnified by the fact that those without access are in large part in poor communities and/or rural locations—in urban communities it is the poorest that remain without access, and in rural locations the cost of building new infrastructure and connecting to the grid can be prohibitive. Thus, paying for better access, and funding new projects, is largely driven by neoliberal economic expectations about payment for goods and services. Physical and technical barriers, like generation capacity, poor infrastructure, remote service costs, lack of financing, and affordability all come down to economic factors, which in economically disenfranchised populations are near to impossible to overcome without new political commitments and financing options. However, the supremacy of neoliberal economic policy is based in part on the idea that bigger markets mean more access. Here, another contradiction emerges, one that has followed neoliberalism throughout its varied history—does more market access translate to improvements for the world's poorest? Where ASEAN's connectivity agenda includes these poorer populations, perhaps, but it is apparent that they are not the primary focus, regardless of messaging, considering the realities of power grid growth among island economies.

ASEAN's connectivity agenda itself is a replication of the growth pushed by the dominant global capitalist system. The Master Plan on ASEAN Connectivity (MPAC) was introduced in Chapter 2 (*Cross-Border Electricity Trade: Conceptual Approach & Review of Literature)* as the basis for ASEAN's power sector connectivity goals, but it is also related to a variety of connectivity measures, including transport and trade (ASEAN, 2017). This agenda, in fact, reflects the common, neoliberal push for infrastructure development that enforces global

trade progress and development. This connectivity agenda also reflects many of the neoliberal policies underscoring the current economic system as discussed in Chapter 2—reflecting ASEAN's own sub-regional commitment to the global capitalist market system insofar as it benefits ASEAN members and their role in the global system. ASEAN's connectivity agenda, however, largely focuses on urban populations and urban growth and support, leaving the rural ASEAN communities out of the connectivity agenda.[79] This point was made by the author during discussions at three high-level policy events, *Government Conference 12 & 13,* and *Government Workshop 14*, and was widely well-received by participants from within the ASEAN community. One interview subject, *Multilateral Organisation 4,* echoed these sentiments, saying "The rural population isn't forgotten in broader electrification goals but the reality is they aren't a priority for connectivity." This might seem contradictory to ASEAN messaging echoed in this research, which highlights the ability of the APG and other cross-border electricity trade or EMI projects for increasing electrification, but the distinction is where and how electrification occurs. In these projects grid-connected electrification is the priority, and while that can include rural populations, the truth is off-grid connectivity is more likely for these groups (ACE, 2013a).

This poses an interesting additional point—are sub-regional and national connectivity agendas further fragmenting the rural versus urban divide that already exists in ASEAN (See Table 1.1 in Chapter 1 for a reference to the urban versus rural electricity divide)? Within ASEAN 55% of the population lives in rural communities (ACE, 2013a) and roughly 10% of the total population in ASEAN remains without electricity (IEA, 2019). Much of ASEAN's growth has included the movement of large populations from rural to urban settings, and dramatic growth in urban centres as ASEAN's regional production network has also grown and become further integrated into the global and regional economic

[79] Fünfgeld (2019) conducted a study of ASEAN connectivity imagery, finding that the focus of this major ASEAN initiative is almost exclusively on the urban ASEAN population. The Economic Research Institute for ASEAN and East Asia's (ERIA) own report The ASEAN Economic Community into 2025 and Beyond (Maria, et al., 2017) highlights a vast array of business cases for connectivity, but only refers to rural communities in relation to movement of workers; similarly the updated Master Plan on ASEAN Connectivity (ASEAN, 2017a) largely refers to urban communities in relation to sustainable urbanisation only, with little mention (if any) of rural communities and increased connectivity among rural populations. Instead the urban narrative tangentially references agricultural communities, but only in relation to job movement and growth, and never explicitly quality of life improvements. While there is an ASEAN Guideline on Off-grid Rural Electrification Approaches (ACE, 2013b) this is not a part of the connectivity agenda in so far as it is discussed at the policy level, identified in the literature, or defined in interviews, including with ASEAN officials.

system (see Singapore and Thailand, for example; Drysdale, 2000). Urbanisation growth is expected to continue for the foreseeable future, with 90 million people moving to ASEAN's urban centres by 2030, with McKinsey's Global Institute (2014) projecting that as a result $520-930 billion could be added to ASEAN's annual GDP by 2030. It's no surprise then, that there is much focus on urban populations within ASEAN. However, this does conflict with the ASEAN policy messaging, and perhaps explains some of the national level restraint on echoing this connectivity agenda through domestic policies that contribute to it. Failing to consider and include rural concerns and needs in both national and sub-regional/regional policy making would be a great failure, particularly considering the sustainability challenges that already exist. This could not only exasperate environmental and energy challenges, but rural urban divides globally as well as regionally.

Uneven development in rural and urban communities is no new concept to ASEAN policy makers and is already an important part of the AEC (ASEAN, 2015). However, failing to similarly prioritise rural electrification, or at least make it an equal priority to urban connectivity, will not only weaken the ability of ASEAN to achieve its connectivity agenda and sub-regional EMI goals, but it could weaken trust in national level policy making and further expose existing development divides among rural and urban populations, as well as weaken trust in ASEAN governance, sub-regional level targets and the reasoning behind them. Prior criticisms of neoliberal economic policies (Chapter 2, *Conceptual Approach & Review of Literature)* and equitable economic development are echoed here as well. Focusing on urban centres, traditional cross-border linkages between urban centres, and connectivity that supports international trade among partners does not ring true to ASEAN's message of connectivity for all.

A neo-developmental state model that includes considerations of power and power balancing factors (such as subsidy removal or transition from hydrocarbon to renewable sources) along with alignment of sub-regional and national goals would better fit the combined policy approach of neo-developmental statism, instead of being driven from a strictly neo-liberal reform processes applied to regional developmental state systems with no considerations for market or social realities of individual economies within the wider system.

6.6.c A Comprehensive, Neo-Developmental Statism Explanation

One of the unique factors of this research is the application of the author's adapted theoretical framework of neo-developmental statism to sub-regional EMI and cross-border electricity trade efforts. Chapter 2 (*Conceptual Approach & Review of Literature*) discussed the ways in which neoliberal, free market ideology is translated in common proposed modifications of national and sub-regional electricity markets in order for deeper integration to occur. A commitment to free trade, increased competition, and liberalisation efforts are all recommendations referenced in the O&PCRB BIMP-EAGA Scorecard; these recommendations are similar across a variety of literature on EMI, across expert interviews conducted for this research, and in Southeast Asia and elsewhere globally. Developmental statism (DS), the common, state directed economic policy that drove many East Asian economies farther along in the development process from the 1970s onward, is also present throughout the sub-region of Southeast Asia. Chapter 2 considered, in part, how the two seemingly contradictory economic processes could operate in tandem in Southeast Asian energy markets—neoliberalism, driven by free markets, and DS, driven by government policy planning.

In response the author has proposed neo-developmental statism as a useful explanatory tool for the examination of the IPE of sub-regional electricity markets. Neo-developmental statism is a process of state directed and market liberalisation policies, where free market processes are embraced alongside government economic planning, including targeted industries and directed growth; power dynamics play a role in compelling directions and outcomes of policy planning and neoliberal market pressures similarly coerce economies in their policy choices. In the following section the concept of neo-developmental statism will be discussed in more detail in relation to proposed electricity market reforms, bringing into this analysis a discussion of where sustainability and energy transition discussions can fit within this state driven, neoliberal market structure. This will include examples of where neo-developmental statism is currently in use within power sector reform, and how reform and policy making can evolve given current market realities and neo-developmental statism practices.

Regional and national shifts towards a combined policy approach, one that utilises both neoliberal economic policies and traditional developmental state ideology, has become a common policy strategy within the broader East Asian region. ASEAN has further progressed this combined policy approach in its sub-

regional development strategies, visible in such examples as the MPAC and the ASEAN Economic Community (AEC) and EMI agendas. Analysis of electricity markets within each of the BIMP-EAGA countries shows that further liberalisation is needed; liberalisation does appear likely to occur given the pressure from ASEAN to do so and the economic gains perceived to be realised from such reforms. At the same time electricity markets remain highly controlled by the state, and power dynamics remain structured between energy and political interests, similarly represented elsewhere in global energy markets. Regional shifts towards a neo-developmental statism are already being realised and are visible across the span of sub-regional energy and electricity markets via a combination of state directed and neoliberal economic policy making. The sub-regional shift towards a hybrid, neoliberal-oriented developmental strategy has resulted in benefits across the variety of developmental paths within ASEAN and corresponded with region-wide assimilation into the global capitalist market system.

In short, neo-developmental statism has already been realised in ASEAN through a combination of state-led planning and control of energy and electricity markets, coupled with implementation of neoliberal trade practices, a focus on the removal of trade barriers, and commitments to increasing trade across the region. These reform combinations are already in place in many Southeast Asian economies or are planned for further inclusion as a result of ASEAN EMI policy planning. Interview subject *Academic A6*, an economist with expertise in Asian clean energy development, directly discussed the challenge state intervention poses to traditional notions of free markets:

> *The movement to decarbonise electricity markets is really about reconciling liberalism with interventionism, which is also the main theoretical challenge when considering trade's role in climate action. More broadly, I believe the arguments in support* [of deeper renewable energy integration] *require states to intervene with smart policy and governance approaches to support the development of clean energy techs and power sector integration. However, this depends on which development stage these states are at, and also goes against standard neoliberal expectations of free markets.*

This author has observed in a reading of the literature and analysis of interviews that there does seem to be an expectation among global institutions that neoliberal ideology will be broadly adapted by the economic systems employing these practices and thus deeply integrated in the economic system in question—

recommendations by the World Bank, International Renewable Energy Agency, International Energy Agency, ADB and others all include a focus on liberalisation as key to further energy transitions and necessary for continually higher stages of development. What is instead happening in ASEAN is a combined policy approach with collectivist Asian values remaining at the forefront of politics domestically but complemented by the picking and choosing of neoliberal economic policies where and when they may be beneficial to the government employing them; essentially, another example of traditional DS, whereby the government directs policy based on domestic political and economic choices and/or needs.

An area where there is evidence of room for neo-developmental statism is in investment and financing of power sector development and electricity access in developing economies. It was discussed in Chapter 4 (*Regional Market Factors)* that reforms to electricity markets are varied in their outcomes; in particular, where neoliberal market reforms result in higher prices for consumers, such reforms are detrimental to welfare indicators while being positive for overall economic growth. The policy disconnects between privatisation goals and consumer access, where price becomes a factor, is another example of the delicate policy balancing act that is employed regionally. Governments can offset this price, as can regulators, but this may have implications for financing or project development in the first place. One multi-country study (Sen et al., 2016) recommends that reforms include transferring surplus gained from increased competition and liberalisation to underprivileged consumers, thus increasing wellbeing (p. 39).

These concerns were echoed in an interview with a development bank economist whose work focuses specifically on developing country electricity market reform. When asked about the biggest obstacle to power sector reform among emerging economies, interview subject *Development Bank 25* brought together a few of the finance and investment obstacles identified across Southeast Asia—some of which are not actually consistent with truly liberal market structures, but instead a combined, neo-developmental statist approach:

> [The largest barrier is] *Absolutely cost. Due to the expenses involved in setting up power infrastructure, the costs are very high for consumers. As a result, governments provide subsidies. This in turn puts pressure on the government's finances…* [Governments] *need to attract more investment. In order to attract investment, power sector reform is crucial. While transmission and distribution continue to be monopolized* [sic] *by*

> *government, power generation has been open for investment. Crucial reforms like tariffs continue to impede potential growth in the energy sector. It's a cycle! But also, I also see a role for power sector reform in fiscally deficit countries to move from providing subsidies to more sustainable prices for power generation.*

These comments highlight the need for a well-rounded approach in reform that supports the neo-developmental state model: holistic reform approaches need to be taken by each ASEAN member, considering communities, capabilities, finances, investors, and market biases in order to structure national electricity market transformations that will have a lasting impact on not just energy mix and access, but communities that benefit as well. While parts of this approach are being used already, the challenges in local communities (see prior sub-section) and the performative nature of governance institution targets point to limits in the current approach. Based on the realities of national market factors outlined in Chapter 5, a holistic approach to sub-regional EMI would be difficult considering that the ideal reform package would include reductions in coal generation or removal of subsidies. Here the dynamics of power in electricity markets are obvious—private and public interests make up both the current shortcomings and the potential solutions necessary in developing economies where physical, economic and policy structure of power sectors require some balancing.

6.7 Conclusions

By examining the governance challenges that emerged in expert interviews this chapter has addressed Research Question 3 and its associated sub-question: (RQ3) *What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian Development?* And (RQ3a) *What is the political and economic status of the APG?* First, national markets factors and challenges between sub-regional and national interests complicate the ability of EMI to address renewable energy integration challenges as a result of limits to market integration; challenges of trust and relationship power dynamics also limit the ability of the APG to develop in line with ASEAN's EMI plans. In addition, progress to the APG is slow and complicated by political and economic uncertainty associated with power sector development.

In order to reach these conclusions this chapter has examined trust in ASEAN, the potential impact of China's Belt and Road Initiative (BRI) on power sector integration efforts among ASEAN member economies, and developments within

the ASEAN power grid. This includes an analysis of BRI policy and financial support for power sector infrastructure development in Southeast Asia, and the development of the ASEAN Power Grid (APG) through bilateral, sub-regional and regional initiatives.

The significance of addressing the potential impact that BRI may have on regional power sector integration lies in the pressing need for coordinated, global responses to climate change. The role of BRI as a supporting mechanism for regional growth in clean energy utilisation and integration is poorly understood in relation to national and sub-regional power sectors.

While the theme of trust emerged over time, it is a thread linking many governance challenges associated with cross-border electricity trade and EMI in ASEAN. This includes trust within ASEAN and trust with outsiders. The challenge of managing sub-regional and national incentives, priorities and perceptions is also a further complication to EMI governance and barrier to APG development and EMI growth. Trust adds an additional challenge to the management of interests in the development process of the APG, as ultimately trust is required for strong relations. As discussed in Section 6.1, trust does not necessarily have to precede organisational membership or multilateral cooperation—in some cases trust can develop as relationships are developed within these groupings. For ASEAN and China this may be one avenue towards stronger EMI cooperation.

Based on themes identified in this chapter the author has developed 2 additional findings: (1) an all-of-the-above approach is necessary in order to fully realize the potential of trade as a means to respond to intermittency concerns in regional and international electricity markets. This means in addition to electricity trade on a bilateral scale, progression towards multilateral should also be included. In addition, utilising a broad array of energy efficient policies, practices, and partners is necessary in order to reach regional climate goals; and (2) BRI financial and technical assistance offers one necessary solution to a multitude of shared problems. In some cases this is progressing, but ASEAN advocacy of BRI funds and movement of BRI funded power sector projects is needed.

Chapter 7
Conclusions

7.1 Introduction

This concluding chapter will summarise the main findings of the research as they relate to the research questions and objectives set out at the beginning of this research. This will begin with Section 7.2, *Summary of the Thesis*, where the research questions, objectives, and aims of this research will be presented. This section will also summarise each prior chapter and connect the main themes discussed in the corresponding data chapters (chapters 4-6) with the key findings and research questions and answers. Next, Section 7.3, *Original Contributions*, will discuss the original contributions of this research to the intersection of IPE, East Asian studies and sustainability research, including the author's theoretical framework, neo-developmental statism, data collection, and elite interviews. Section 7.4, *Research Limitations*, will discuss limits that the author identified and aspects of this research that challenged the author. Section 7.5, *Suggestions for Further Study,* will discuss a few key ideas that the author is interested in exploring in future research as an expansion of the key concepts identified here and related to the IPE of cross-border electricity trade. This section will also highlight the ways in which the key themes of sub-regional market factors, national market factors, and governance challenges create options for further political and economic exploration of the phenomenon and drivers behind them. The penultimate section in this chapter, Section 7.6, *Policy Implications*, will discuss the repercussions for policy that have emerged through the analysis of the key themes. These policy implications highlight the overarching challenge of climate change imperatives for cross-border electricity trade—the energy transition towards less reliance on hydrocarbon resources and more utilisation of renewable energy sources could be improved. Ultimately, power sector needs and the reforms necessary to achieve them are reflective of the priority of responses to climate challenges, and the way in which economic and market factors take precedence within national policy decisions. The final section of this chapter, *Concluding Remarks*, will briefly summarise the main points and arguments made.

7.2 Summary of the Thesis

This thesis was led by a focus on the three primary research questions set out at the beginning of this research. The three themes identified in data chapters 4-6

were drawn together and examined alongside the three primary research questions and the three research objectives that were originally conceived. As research progressed, and the research plan took shape, relevant sub-questions were added, providing context to the key findings that were identified. These objectives, questions, and themes were paired together as follows:

Table 7.1 Consolidation of Research Aims

Objective 1: Provide an overview of cross-border interconnections and assess market factors in Southeast Asia;
RQ1: How do governments understand the IPE of cross-border interconnections in Southeast Asia? **Chapter 4: Sub-Regional Market Factors** Sub-questions: • What are the energy and trade policy incentives for increased cross-border interconnections? • How can sub-regional electricity markets diversify their energy mix and reduce emissions? What incentives exist to do so?
Objective 2: Assess market factors in sub-region of Southeast Asia and case study selection and identify areas of individual and collective reform needed to reach deeper levels of EMI among BIMP-EAGA member states;
RQ2: How does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets? **Chapter 5: National Market Factors** Sub-Questions: • How does the political and economic structure of national electricity markets impact the expansion of cross-border interconnections in BIMP-EAGA? • Is the structure of national electricity markets conducive to sub-regional and international policy goals in Southeast Asia?
Objective 3: Identify and analyse additional governance challenges to deeper EMI and increased electricity interconnections among ASEAN member states and case study selection;
RQ3: What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian Development? **Chapter 6: Governance Barriers** Sub-Questions: • What is the political and economic status of the ASEAN Power Grid?

When research questions were originally conceived they were intended to demonstrate policy considerations for cross-border electricity trade and increased interconnections. The research findings demonstrate that there are tensions between different levels and types of interests—national versus sub-regional interests, economic versus sustainable interests, and liberal versus state-led markets. This dichotomy draws on the themes that emerged in data collection and discussed in the corresponding data chapters—sub-regional market factors (Chapter 4), national market factors (Chapter 5), and governance challenges (Chapter 6); within each of these themes there are additional factors, such as national priorities, interests, political will, and the rural versus urban divide, all of which have been explored in chapters 4-6. Increased interconnections are motivated by multiple elements that are weighted differently depending on the national and sub-regional interpretation of global goals and the economic and political structure within which the interpretation is rooted. There is, the author believes, a balance between economics, climate challenges, and trade (here, cross-border electricity trade, specifically) that is demonstrated via the three themes identified within this research. Whether or not governments can equally balance these three considerations is yet to be seen, as the analysis will suggest.

In order to make this case each data chapter was framed around a single, corresponding theme and the associated research question that informed the theme. Chapter 4, *Sub-regional Market Factors,* examined the state of electricity interconnections in the ASEAN sub-region and the BIMP-EAGA subsystem. This included an overview of the current and projected cross-border interconnections in the sub-region and BIMP-EAGA subsystem. Analysis of the state of interconnections also revealed the incentives and reform needs for further interconnection and diversification of the sub-region's energy mix. This section also first introduced the contradictions between national versus sub-regional practices and the priorities employed at both levels. Chapter 4 addressed Research Question 1 and its associated sub-questions—(RQ1) *How do governments understand the IPE of cross-border interconnections in Southeast Asia?* (RQ1a) W*hat are the energy and trade policy incentives for increased cross-border interconnections?* And (RQ1b) *How can sub-regional electricity markets diversify their energy mix and reduce emissions and what incentives to do so exist?* In response to these questions this chapter revealed: at the ASEAN level governments are incentivised to participate in cross-border electricity trade by climate, energy and economic imperatives to utilise cross-border interconnections and augment VRE challenges while also diversifying their

energy mix; however, economic incentives drive EMI at the national level, exposing the need for better coordination across multiple governance levels. EMI and interconnection progress is intermittent and uneven across ASEAN and in the BIMP-EAGA subsystem due to a variety of different market factors related to climate targets, electricity supply, energy mix, and sustainability. In addition, goals are ambitious and national level commitments fall short where diversification of the energy mix is concerned. Instead, it appears that sub-regional institutions of governance (ASEAN) and sub-regional commitments are standing in performatively for concrete action.

Chapter 5 sought to answer Research Question 2 and its associated sub-questions: (RQ2) H*ow does the IPE of sub-regional cross-border electricity trade affect the opportunities for renewable energy to participate in national markets?* (RQ2a) H*ow does the political and economic structure of national electricity markets impact the expansion of cross-border interconnections in BIMP-EAGA?* And (RQ2b) I*s the structure of national electricity markets conducive to sub-regional and international policy goals in Southeast Asia?* Chapter 5 explored the theme of *National Market Factors,* explaining the realities of individual markets within ASEAN and the BIMP-EAGA subsystem, while describing the weaknesses and strengths within these markets using the criteria established by Oseni and Pollitt (2014). The author also created their own market criteria for increased EMI (O&PCRB EMI Criteria) by expanding upon work done by Oseni and Pollitt and details elucidated in data collection via documentary and data analysis and elite interviews. Chapter 5 also highlighted the relationship between liberalisation and DS in East Asia, looking at the contradiction between policies in both camps and their materialisation in the broader ASEAN system and within the BIMP-EAGA subsystem. This chapter built upon prior discussions in Chapter 4 about national versus sub-regional priorities, expanding analysis to emphasise the primacy of national concerns and need for three types of reform: (1) market liberalisation; (2) coordination, harmonisation & standardisation; (3) subsidies. Discussion in this chapter included a revised, liberal development strategy, neo-developmental statism.

In response to RQ2 and associated sub-questions, Chapter 5 revealed the findings that the variety of economic and political structures present in BIMP-EAGA are not currently conducive to increased cross-border electricity trade based on requirements for EMI to flourish. The present structures of national electricity markets are also not conducive to sub-regional and international policy goals related to energy and climate targets given a continued reliance on

subsidies, dominance of fossil fuels in sub-regional and subsystem energy mixes, and the market structure of national electricity systems. In addition, the IPE of these national market factors and sub-regional interconnections have revealed that while there is room for growth in renewables, countries do not have an electricity deficit, and therefore the impetus for increasing renewable integration as a means to trade surplus electricity is not actually present. As a result, while renewable energy has potential for participation in national markets, current market factors point to limits in its ability given the present national power systems and the corresponding economic and political structures.

Chapter 6, *Governance Challenges,* addressed Research Question 3 and its associated sub-question: (RQ3) *What can the case of cross-border electricity trade and renewable energy integration tell us about the IPE of East Asian Development?* And (RQ3a) *What is the political and economic status of the APG?* This chapter discussed governance barriers to EMI and cross-border electricity trade in ASEAN as they relate to issues of interest. These included national versus sub-regional interests, trust within ASEAN, and trust of outsiders, including China and its role in the sub-region via power sector investment. Discussion in this chapter probed the market and political realities in ASEAN, political will and prioritisation of responses to global climate challenges, rural versus urban divides, and the impacts these issues have on a fully integrated ASEAN energy market and increased EMI. This chapter further used neo-developmental statism to explain the existence of these dynamics in a hybrid system that requires holistic responses to pressing climate and energy challenges that greatly impacted by economic factors.

In response to RQ3 and RQ3a, Chapter 6 revealed: First, national markets factors and challenges between sub-regional and national perceptions and interests complicate the ability of EMI to address renewable energy integration challenges as a result of limits to market integration and commitment to EMI goals; and second, challenges of trust and relationship power dynamics also limit the ability of the APG to develop in line with ASEAN's EMI plans. In addition, APG progress is slow and complicated by political and economic uncertainty associated with power sector development and commitment to climate targets amid economic pressures. Overall cross-border electricity trade and renewable energy integration in Southeast Asia are limited by performative sub-regional commitments that enable economies to appear to be engaging with liberalisation and contributing to market integration, but with slow moving progress as a

result of complex systems. ASEAN economies perform neo-liberalisation while practicing neo-developmental statism; the ASEAN governance of sub-regional EMI is disabling reform due to its performative nature.

Here it is the author's intent to draw a thread through these three independent data chapters: sub-regional targets (discussed in Chapter 4, *Sub-Regional Market Factors*) and the realities of those interconnection goals are not possible without national reforms and system changes (discussed in Chapter 5, *National Market Factors*), which in this research are framed around the work of Oseni and Pollitt (2014) as well as interview results; these reforms are further complicated by additional barriers, including the role of competing interests, political will, and dynamics of trust (discussed in Chapter 6, *Governance Challenges*). ASEAN and ASEAN member economies are limiting the development of sub-regional EMI via the performative goal setting employed by member economies that are driven by neoliberal market incentives. Neo-developmental statism offers a lens through which to understand this research thread, whereby the traditional development paradigm of East Asian economies has evolved into a more complex and nuanced method for operating in neoliberal markets and gaining from liberalisation while maintaining traditional state-driven economic policy making practices.

7.3 Original Contributions

The thesis makes a number of original contributions to the conceptualisation of cross-border electricity trade in Southeast Asia, understanding of the economic development practices employed throughout East Asia, and how these practices intersect with global, regional, and sub-regional EMI and cross-border interconnections.

First, this research exposed the need for new modes of IPE analysis in interconnection research in East Asia. While there are some academic studies of the BIMP-EAGA sub-region and its potential for EMI, this thesis is the first to analyse the IPE of individual electricity markets in order to explain incentives behind cross-border electricity trade and the policies necessary for it to be carried out. In addition, this research expands on Oseni and Pollitt's (2014) work on EMI criteria to include additional criteria relevant to developing Asia and the BIMP-EAGA subsystem, contrasting these criteria against the market factors and IPE of cross-border electricity trade and EMI in Southeast Asia specifically.

Secondly, the application of neo-developmental statism to electricity markets is novel in its interpretation and application. While various iterations of DS have been applied to IPE topics in East and Southeast Asia, the application of the author's conceptualisation of neo-developmental statism offers insight into the very specific challenges of energy policy development amid state-driven economic policy making. In particular, neo-developmental statism offers an explanation for the difficulty of EMI in Southeast Asia and within BIMP-EAGA not articulated previously—the challenge of applying neo-liberal policy reforms in state-dominated markets has resulted in gaps between the identification of needs, interpretation of those needs and policy action in EMI development. Neo-developmental statism also explains the gaps between national and sub-regional EMI developments, and the delays that have been observed between these two levels in this research. In addition, neo-developmental statism explains the evolved economic development practices present among ASEAN member economies, whereby a balance is struck between engagement in neo-liberalism and commitment to centrally planned economic policy making.

Finally, the elite interviews conducted in this research represent novel contributions to the IPE of cross-border electricity trade. Among respondents were established experts in their fields, high-level energy analysts from across a swath of energy market issues sub-regionally and regionally, and practitioners on the ground dealing with energy and electricity issues daily in their respective sub-regions. In addition, contributions from representatives of development banks, research institutions, and national governments offered high-level policy opinions that have not been combined in this format previously because of access challenges. These interviews, combined with the data collection of individual BIMP-EAGA markets, offer an original contribution to the study of EMI in Southeast Asia and the fields of IPE and sustainability research as they are applied to EMI issues.

This Ph.D. research also makes an original contribution to the approach to studies of EMI by combining IPE, East Asian studies, and sustainability research to explain the drivers behind and reality of cross-border electricity trade in East Asia. Ultimately this cross-disciplinary research has utilised conceptual and methodological approaches from each individual field, combining them to achieve new results and deeper insight into a very specific area of study. The empirical, conceptual and methodological choices carried out and described in previous chapters have resulted in the collection of unique data and analysis. These methods have aided in addressing the primary research questions and, as

a result, made multiple contributions to our understanding of the IPE of cross-border electricity trade. While these results are not necessarily prescriptive, and in some ways leave only aspirational policy recommendations, they do offer insight into the difficulty of EMI and cross-border electricity trade expansion in an environment where policy is conflicting and not always complementary with broader sustainability goals.

7.4 Research Limitations

Research limitations in this Ph.D. dissertation are largely based around access, data and methods. While the author chose to utilise a mixed method approach, access to electricity market data for analysis did prove difficult, resulting in a tendency to utilise interview data and elite opinions where market data was not available. In addition, the difficulty in finding current, reliable electricity market data across all BIMP-EAGA countries means that historical data was used in some cases. Tracking interconnections in Southeast Asia was largely done via ASEAN data and contacts. Contradictions between sources did mean that in some cases the author had to rely on older data or make judgement calls based on multiple data sources. Broadly, however, the author's mapping of interconnections complements related work done by previous scholars.

If additional data access and time were available an expansion of analysis of the case study could benefit further research. For example, in Chapter 5, a heat map was used to visualise relative progress across EMI requirements, type of requirement and country. The author noted that further insights could be acquired by adding a number range to the score card. However, this would require expanding the number of requirements for each type to create a more quantifiable measurement of success and failure, i.e. 1-10. A colour gradient would further visualise success or failure by type. This expansion would require more data and further study, which was beyond the time and data available. This data could include a review of actual government policies, statements, and assessment of individual projects or initiatives. Financial analysis could also be included to gauge commitment. The addition of a SWOT analysis (strengths, weaknesses, opportunities and threats) of each individual BIMP-EAGA country might also yield beneficial insights into progress and development of EMI reform, further expanding the data collected. However, time limitations and data access prevented both of these additions.

Time limitations also meant that the author was not able to do as many interviews as they had imagined at the earliest stages of this research

development; initially 68 potential interview subjects were identified. This was eventually narrowed down to 32. Follow up with interview subjects and analysis of interview materials based on new data from data collection or documentary research meant that additional time was needed for further expansion beyond 32 interviews. As research interviews began revealing similar information and saturation was approached the author made the difficult decision to cease interviews despite access to additional subjects. Expansion of interviews could be one avenue for future research in this area as well, such as the inclusion of civil society representatives and interest groups among interview subjects. There were a number of additional issues that were not covered in this research in serious depth, but their inclusion would likely have contributed salience to this project were there no time limitations. These additional issues will be covered in the following section.

7.5 Suggestions for Further Study

This research represents a thorough examination of the IPE of electricity market integration in Southeast Asia and within the context of East Asian economic development practices. However, this research is only a small microcosm of the entire picture of policy responses to climate change and the global energy transition, both in terms of issues included, elite opinions gathered, and time period covered. As research progressed beyond the original research design and data collection began to take shape into analysis, a number of additional questions arose. However, due to the parameters of research and time limitations these issues were touched upon briefly, where relevant, but ultimately saved for deeper analysis in future study.[80] Four primary issues revealed themselves: (1) the intersection of water policy management and cross-border electricity trade, which overlaps with (2) the role of China and the Belt and Road Initiative (BRI); (3) Moral International Political Economy (Moral IPE) considerations; and (4) grid connected distributed generation. These four areas are explored further in the following subsections.

7.5.a Water Policy in the GMSR

At the outset of this research it was clear time limitations would hinder the number of case studies that could be employed. The author chose to use the least

[80] The availability of additional data and further interviews with civil society groups would also be avenues for further research; however, here the focus will be on additional topical areas as opposed to expansion of the current project.

successful ASEAN subsystem as the primary case study, BIMP-EAGA. Considerations for further study include expansion of case study to include other ASEAN subsystems identified in the ASEAN Interconnection Master Plans (AIMS), such as the GMSR. Were this analysis to include a deeper examination of GMSR, the focus would likely switch towards a success story (GMSR) and a developing cross-border electricity trade subsystem (BIMP-EAGA) with comparisons across the two subsystems. Unfortunately, time and parameters set out early on did not allow for this deeper comparison. One avenue to exploring the lessons learned between these two subsystems would be a greater analysis of water policy and its implications for cross-border electricity trade regionally. Via interviews and data collection the author learned that GMSR water policy has some interesting implications for cross-border electricity trade within the sub-region. A greater analysis of regional and subsystem water policy would be beneficial to explorations of cross-border electricity trade as water policy considerations are alive and well among ASEAN countries that border China, as damn management is a major challenge in both upper Mekong countries (China, Lao PDR, Myanmar, Thailand) and lower Mekong (Cambodia and Vietnam) countries, all of which fall within the GMSR. In addition, including a deeper analysis and exploration of water policy in GMSR would also add to sustainability and climate change considerations and arguments within cross-border electricity trade and EMI topics.

7.5.b China & BRI

Interestingly, considerations of greater water policy in GMSR also highlight the dominant role of China and its BRI initiative in sub-regional and regional power sector development and reform. Chapter 6 (*Governance Challenges)* explored China's role in sub-regional cross-border electricity trade as it relates to issues of trust among ASEAN members. However, research and interviews revealed China's BRI also intersects with water policy management in the GMSR and across ASEAN broadly. An expansion of this research that considers China's BRI and water policy impacts, as well as the cross-over with power sector development, could include a variety of country case studies and bridge a previously limited area of research, China's water policy development projects and ASEAN connectivity goals.

Additional avenues of exploration that incorporate China's BRI projects could focus on a variety of subsystem case studies, building on discussions this author had with experts across a variety of fields, both in interviews and at conferences and workshops. In particular, at *Government Workshop 14*, discussions focused

on China's GEI initiative (which was discussed in Chapter 6). In the context of this workshop the value GEI and BRI could add to power sector modernisation and coordination in ASEAN was a dominant focus. Primary recommendations and considerations included utilisation of GEI and BRI to aid in the necessary standardisation of grid codes and physical needs necessary for EMI to take place in ASEAN's primary APG interconnections. While these issues are already being addressed among ASEAN members, workshop discussion focused on the limited priority standardisation and coordination seem to have at the national level, and the role knowledge sharing via GEI and BRI could play. China, it was pointed out in discussions, is already an important global example of electricity grid development and integration, with many successful and pending projects on national grid interconnection and synchronisation with internet connectivity (Chen, 2018). Exploration of the physical and structural needs of electricity grids at the national level, and Chinese investment and knowledge-sharing, would be beneficial for the broader knowledge base in this area. The author has, in fact, received two offers for deeper knowledge exchange with GEI representatives, aiding in potential development of future projects in this area given access opportunities. Additional BRI considerations could include analysis of China's 'greening the economy' initiatives, which would add useful economic analysis.

Finally, given the repeated emergence of power in this research, an additional approach for further research is to focus more specifically on the power dynamics entrenched in China's BRI investment in ASEAN's power sector. By taking a more specific look at structural and relational power in ASEAN-China power sector cooperation, theoretical contributions could potentially span not just IPE but international relations or politics & government as well, broadening the application of this research across fields. In addition, an examination of power dynamics between specific ASEAN member economies and China could prove quite political and timely given sub-regional and regional affairs (for example, Myanmar and China in light of border conflict and hydropower concerns).

7.5.c Moral IPE Considerations

An additional consideration arose via conversations about the IPE of cross-border electricity trade with political economists in a variety of fields. While attending *Academic Workshop 1*, the author was introduced to the concept of Moral Political Economy (Moral IPE). This concept was expanded upon further at *Academic Workshop 2*, where the author had the opportunity to explore ways in which moral IPE could be applied in energy sectors. The following description

expands on some of the ideas introduced at these two workshops, framing the author's thoughts for additional IPE research across energy policy fields.

Mainstream neoliberal economic policy recommendations may make sense in the context of electricity access and grid integration of variable renewable energy resources, but they don't necessarily account for the broader, underlying issues of economic development, continued industrialisation, and energy intensity that have led East Asia to a place that calls for increased renewables in the first place. If global climate goals, specifically emissions reductions, are to be met, capitalistic, neoliberal systems that encourage development-as-is do not appear conducive to long term changes to the global political economy. "Neoliberal market restructuring", whereby neoliberal norms are placed not just on a market, in this case electricity in nature, but trickle down into society and all aspects of management and socialisation (Wiegratz, 2016), is clearly visible in the reform practices proposed. How can these liberalisation recommendations be further critiqued in the context of East Asian development practices, current political-economy structures of regional electricity markets, and broader climate-related goals? Moral political economy provides a lens through which the economic order and relations of an economy are viewed with moral dimensions, preconditions and implications that are reflected in economic relations and practices of governments (Wiegratz, 2016).

Based on the analysis conducted in this research it has become more apparent to the author that the reform proposals and neoliberal market restructuring aimed at ASEAN electricity markets does not reflect the moral political economy of the region or sub-regional organisation represented in this context, particularly given the focus on climate change responses. Moral political economy creates space for the environment in political and economic conversations; it prioritises the moral considerations societies (and economies) base their actions on, instead of the traditional, neoliberal economic ideology that prioritises growth and consumption as a means to improve quality of life but on a seemingly unending scale (Sayer, 2016).

This, of course, would be a hard pill for any national government or regional institution to swallow—values can be arbitrary, differ from person-to-person or institution-to-institution. A neoliberal may place importance on the values of free and fair trade, whereas a Marxist may place more value on the wellbeing of workers and workers' rights amid neoliberal structures of labour. However, refining of values and goals is at the very root of ASEAN, so, then, perhaps a refinement of economic, political, and energy goals would better reflect not only

the energy transition imperative but also the state-driven structures that already exist in the region. Thus, a neo-developmental state model that places clean energy transitions at the top of the priority list may be just such a structure where moral political economy decisions are incorporated into policy choices at the national and also sub-regional and regional level. This would allow a better alignment of ASEAN goals with national goals but would require political will and incentives to occur. This aspirational, moral political economy-policy making aligns with market factors, interests and perceptions discussed across chapters 4-6, most notably the market and political realities within ASEAN and BIMP-EAGA and their shortcomings. Further research that examines aspirational policy making, moral IPE, and collectivist Asian values would be a unique addition to the canon of political economy-based energy research and offer additional insight into policy making within the ASEAN context. However, time limits and research parameters established at the outset make the exploration of moral IPE outside the scope of this research and instead an avenue for future IPE research in this area.

7.5.d Grid-Connected Distributed Generation

The electricity focus of this research was centralised grids. However, grid-connected distributed generation is being deployed at increasing rates globally and holds relevance to ASEAN's own geographical challenges. As a sub-region made up of a variety of island nations and rural communities with limited grid access, distributed generation holds a lot of promise for increased electricity access and energy poverty targets in the sub-region. Distributed generation refers to small-scale renewable energy technology "options that connect to the electrical distribution network" including bioenergy, small-scale wind, photovoltaics (PV), and others (Passey, et al., 2011). Research into the challenges associated with grid-connected distributed generation exists, however, expansion into its relevance and role in the APG and ASEAN power connectivity targets is limited. Exploration into the minutia of grid-connected distributed generation in ASEAN would be a relevant and timely area of research with potential disruptive impacts on sub-regional and regional targets, as well as opportunities for innovative financing mechanisms among rural communities. Questions regarding distributed generation arose when the author was presenting research findings *(Development Bank Conference 4) and* would be a logical direction for this research to go if focus remains on ASEAN and the challenges associated with national versus sub-regional targets and interests.

7.6 Policy Implications

A number of policy implications have emerged through the key themes sub-regional market factors, national market factors, and governance challenges. Some of these are standard energy policy recommendations, such as: better coordination of policy goals and initiatives with sub-regional and national competencies, a consolidation of needs across sectors, and prioritisation of deregulation in order to encourage other power sector needs, such as liberalisation and increased FDI. These recommendations are reflected in the literature on electricity market integration, they are reflected among the opinions of elites interviewed, and they are reflected in the work of organisations and multi-national institutions on the ground in the region pushing for EMI. What is clear from the consistency in responses is that these needs are not being adequately addressed or at a pace in line with sub-regional and national energy goals. The energy transition towards less reliance on hydrocarbon resources and higher utilisation of renewable energy sources, with higher levels of efficiency, could be improved.

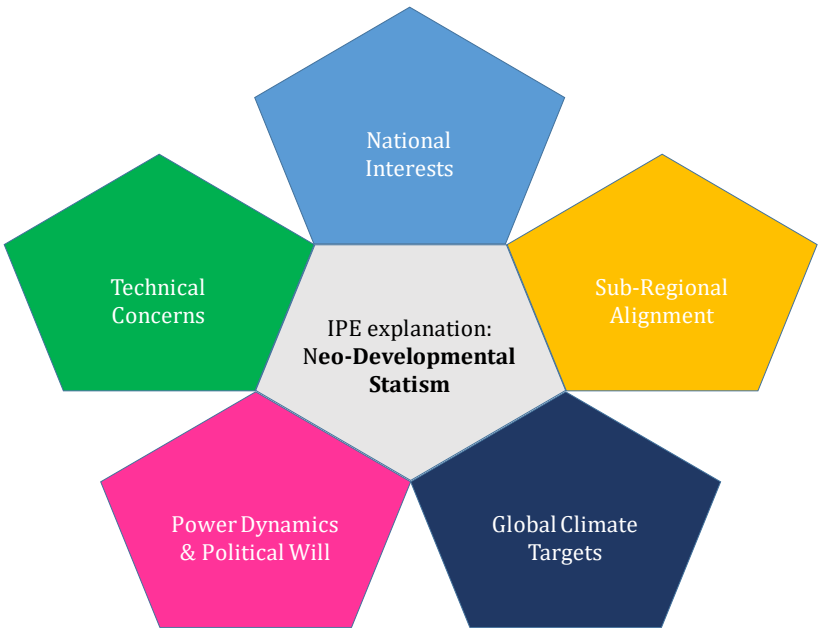
The primary policy implications identified by this author, based on data and interview analysis described in the previous pages, are as follows:

1. National: Physical infrastructure development, market liberalisation, and refinement of market design are all necessary at national levels. Without these three overarching adjustments EMI progress will not be realised among ASEAN members and BIMP-EAGA countries. Decarbonisation of national power sectors should also be a prioritised. Current national interconnection efforts appear to be driven by economics, not decarbonisation goals and climate targets.
2. Sub-Regional Alignment: National priorities and sub-regional targets are not aligned in policy responses at either level. Better coordination and development of join initiatives / support policies (political and economic / financial) could help in this area, but, ultimately, national needs may not align with sub-regional targets for many years. Regionally engagement in the global, neoliberal market system remains a priority.
3. Technical Concerns: More technical targets, including enhanced capacity, sub-regional coordination, including grid codes, sub-regional transmission systems, and other sub-regional jurisdiction considerations are secondary to national power sector reform. These needs are years away among BIMP-EAGA countries if EMI is to be realised.

4. Power Dynamics & Political Will: Strong political and economic relationships need to be present in tandem with national power sector reform. These trusting relationships are a necessary by-product for national and sub-regional reform measures to be realised. Political and economic power dynamics will be challenged if EMI measures are realised; this will be difficult in the short term but have benefits for the sub-regional and global energy transition. The importance of political will cannot be over emphasised.
5. Global Climate Targets: sub-regional, regional, and global climate targets are not fully integrated into national policy making and local level concerns. Engagement in global and sub-regional climate commitments is performative.
6. IPE Explanation: neo-developmental statism provides a long-term, development paradigm by combining power and equity to provide context to sub-regional and regional energy and climate priorities. It is a mistake to expect or predict power sector reforms on the trajectory towards a fully liberalised power sector instead of a hybrid model, which is in fact the legitimate form of East Asian developmentalism. In this regard neo-developmental statism has moved on one step forward from the traditional developmental state model and offers a better explanation of economic and political decision making in Southeast Asia.

These policy implications can be summarised around the above key issues as follows:

Figure 7.1 Policy Implications



These power sector needs and the reforms necessary to achieve them are one piece of the energy transition and global responses to climate change. But they are reflective of the priority of responses to climate challenges, and the way in which economic and market factors take precedence within national policy decisions in this area.

7.7 Concluding Remarks

There is, from this author's reading of the materials and data collected, a further, but more complicated implication of the sub-regional EMI development in Southeast Asia: the identified needs and reforms necessary for deeper energy market integration are, ultimately, liberal in nature, and reflect the needs of a neoliberal market system; decarbonisation is itself reliant on neoliberal market reform. Unfortunately, national governments seem to be prioritising the continued use of hydrocarbon energy resources and selling of excess electricity across borders for economic reasons, not energy transitions reasons. The neoliberal, market-driven push for EMI appears to be a contradictory dichotomy given the responsibility for climate and environmental challenges that falls upon the neoliberal market system. Industrialisation, carbonisation of world economies, and global trade development are a part of the cycle that has created climate imperatives. Where increased share of renewables can play a role in responding to these imperatives, neoliberal economic policies are also a necessary side effect—and, in fact, take priority over the renewable energy transition.

This intersection of power system development and economic development poses the question of whether or not economic development can actually continue as is, with market reforms and technological advancements that also lessen environmental impact while simultaneously contributing to improvements in access. Perhaps the solution is not, in fact, deeper integration and reform alone, but instead a restructuring of priorities, placing environment, climate and equity above even electricity access where it may be detrimental to sustainable choices.

The data analysis of the BIMP-EAGA case study resulted in the findings that market realities do not necessarily reflect a current positive outcome for increased EMI and cross-border electricity trade in Southeast Asia. This is for two reasons in particular: (1) decarbonisation of the power sectors, via increased shares of renewables for electricity generation, is not evident via the current sub-regional and subsystem energy mix; coal is still the dominant

resource in individual markets and projected to continue as the dominant fuel source. (2) Because, ultimately, there is very little (if any) gap between electricity needs and domestic supply—according to data collected and interviews (*Former Government Informant A1*, *Academic A23, Academic A26*, *Development Bank A25*), each country is able to supply its own electricity needs based on 2016 rates, however, this could change depending on future added electricity demand (Zheng, et al., 2017).[81] As *Development Bank A25* said: "The need is not [there] for demand—most countries can provide for their [own] needs. There are not many exceptions, and those are the emerging countries." Combine this reality with point number 1, and there is no incentive for larger structural change if ASEAN and BIMP-EAGA economies are ultimately providing for electricity needs via already embedded hydrocarbon sources. ASEAN, instead, is providing a performative role in its sub-regional targets, while national economies are aimed at economic gains for partial engagement in these initiatives.

These two points, coal dominance and electricity needs, ultimately signal that ASEAN's BIMP-EAGA subsystem is not, system-wide, committed to immediately decarbonising electricity sectors and energy mixes. Instead of short-term necessities these goals have been relegated as medium to long-term ambitions with market realities that echo these findings. Fear of short-term energy security, economic impact, and distrust are driving national policy, instead of sub-regional commitments to engage in relevant energy policy changes as a response to man-made climate change and CO_2 emissions. This research, while not focused solely on energy diversity, but the usefulness of cross-border electricity trade for responding to the variability, uncertainty and flexibility challenges of increased renewable energy integration, exposes what this author now considers an uncomfortable truth: cross-border electricity for renewable energy integration is not the same priority as cross-border electricity trade for economic gain. The selling of excess electricity and continued use of hydrocarbon resources in said electricity generation is a very real possibility for EMI in Southeast Asia. Combining the moral, climate-driven choices for sub-regional, regional and global energy transformation is a necessary addition to sub-regional and regional EMI initiatives.

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[81] According to the IEA (2019b) renewables will only meet roughly 1/3 of the region's total electricity demand by 2030, with coal remaining the dominant resource unless regional and domestic policy push for renewables changes dramatically.

This research has combined the barriers to EMI discussed in chapters 4-6 to illustrate the competing interests at both sub-regional and national levels of EMI. A variety of different reforms have been proposed to address these barriers. These political and economic reforms were observed via interviews and data collection to be realistic but contradictory in how they are carried out at different levels. In addition to the contradiction between sub-regional vs national level policy implementation and priority, there is the possibility of certain populations being left behind in the benefits to be gained from increased renewable energy integration and electricity market expansion and integration. As such, neo-developmental statism can combine power and equity in explaining energy and climate priorities; perhaps, ultimately, this is an unrealistic call for action considering the dominant sub-regional, regional and global neoliberal economic system and the climate change mitigation linkages discussed.

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Appendix A
Interview Codes

Code	Date(s)	Subject Location	Meeting type	Notes
Interview subjects				
Former Government--Informant 1	16/01/2018, 13/03/2018, 21/08/2018, 17/09/2018, 09/10/2018	Washington, D.C., USA	Virtual	Background interview 3
Multilateral Organisation--Informant 2	19/07/2018, 03/08/2018	Jakarta, Indonesia	Virtual	Background interview 1
Business 3	17/09/2018	Washington, D.C., USA	In person	-
Multilateral Organisation 4	06/06/2018	Manila, Philippines	In person	-
Think Tank 5	17/09/2018	Washington, D.C., USA	In person	-
Academic 6	18/10/2019	Leeds, United Kingdom	In person	-
Think Tank 7	18/01/2018, 03/02/2018	Washington, D.C., USA	In person	-
Development Bank 8	06/05/2018	Jakarta, Indonesia	In person	-
Business 9	19/09/2018	Washington, D.C., USA	In person	-
Academic 10	28/01/2018	Jakarta, Indonesia	Virtual	-
Think Tank 11	21/09/2018	Washington, D.C., USA	In person	-
Think Tank 12	10/03/2018	Washington, D.C., USA	In person	-
Academic 13	28/08/2019	London, United Kingdom	In person	-
Academic 14	07/03/2018	London, United Kingdom	In person	-
Think Tank 15	19/09/2018	Washington, D.C., USA	In person	-
Former Government 16	20/09/2018	Washington, D.C., USA	In person	-
Former Government 17	21/09/2018	Washington, D.C., USA	In person	-
Multilateral Organisation 18	04/11/2018	Jakarta, Indonesia	Virtual	-
Business 19	04/10/2018	Hong Kong, People's Republic of China	Virtual	-
Academic 20	17/09/2017	Leeds, United Kingdom	In person	Background interview 4
Academic 21	22/03/2018	Jakarta, Indonesia	Virtual	-
Business 22	17/09/2018	Washington, D.C., USA	In person	-
Multilateral Organisation 23	12/01/2018	Paris, France	In person	-
Academic 24	24/09/2018	Washington, D.C., USA	In person	-
Development Bank 25	16/01/2018 , 23/05/2018	Washington, D.C., USA	Virtual	-
Academic 26	12/01/2018 , 15/03/2018	Jakarta, Indonesia	Virtual	Background interview 2
Former Government 27	18/09/2018	Washington, D.C., USA	In person	-
Former Government 28	20/09/2018	Washington, D.C., USA	In person	-
Think Tank 29	17/09/2018	Washington, D.C., USA	In person	-
Journalist 30	06/05/2018	Tokyo, Japan	Virtual	-
Business 31	02/11/2019	Leeds, United Kingdom	In person	-
Academic 32	11/01/2019	Beijing, People's Republic of China	Virtual	-
Conferences & Workshops				
Academic Conference 1	07/01/2016	Reading, United Kingdom	In person	-
Academic Conference 2	23/06/2016	Duisburg, Germany	In person	-
Academic Conference 3	30/09/2016	Tokyo, Japan	In person	-
Development Bank Conference 4	06/05/2018	Manila, Philippines	In person	-
Academic Conference 5	20/06/2018	York, United Kingdom	In person	-
Academic Workshop 6	09/07/2018	Leeds, United Kingdom	In person	-
Policy Conference 7	17/12/2018	Washington, D.C., USA	In person	-
Policy Conference 8	20/11/2018	Berlin, Germany	In person	-
Policy Conference 9	26/09/2018	Washington, D.C., USA	In person	-
Academic Workshop 10	22/03/2019	Oxford, United Kingdom	Virtual	-
Academic Conference 11	27/06/2019	Copenhagen, Denmark	In person	-
Government Conference 12	24/10/2019	Seoul, Republic of Korea	In person	-
Government Conference 13	25/10/2019	Seoul, Republic of Korea	In person	-
Government Workshop 14	25/10/2019	Seoul, Republic of Korea	In person	-

Appendix B
Ethical Approval

Performance, Governance and Operations
Research & Innovation Service
Charles Thackrah Building
101 Clarendon Road
Leeds LS2 9LJ Tel: 0113 343 4873
Email: ResearchEthics@leeds.ac.uk

UNIVERSITY OF LEEDS

Clare Richardson-Barlow
East Asian Studies
School of Languages, Cultures and Societies
University of Leeds
Leeds, LS2 9JT

Faculty of Arts, Humanities and Cultures Research Ethics Committee
University of Leeds

5 August 2016

Dear Clare

Title of study	**Trade Governance of Renewable Energy in the Asia-Pacific**
Ethics reference	**PVAR 15-098**

I am pleased to inform you that the above research application has been reviewed by the Arts and PVAC (PVAR) Faculty Research Ethics Committee and I can confirm a favourable ethical opinion as of the date of this letter. The following documentation was considered:

Document	*Version*	*Date*
PVAR 15-098 CGRB_NewEthicalReviewForm_Signed_v1_15072016.pdf	1	15/07/16
PVAR 15-098 CGRB_EthicsSupportingDoc1_InformationSheet_v1_15072016.pdf	1	15/07/16
PVAR 15-098 CGRB_EthicsSupportingDoc2_ConsentForm_v1_15072016.pdf	1	15/07/16
PVAR 15-098 CGRB_EthicsSupportingDoc3_RecruitmentMaterial_v1_15072016.pdf	1	15/07/16
PVAR 15-098 CGRB_EthicsSupportingDoc4_GatekeeperLetter_v1_15072016.pdf	1	15/07/16
PVAR 15-098 CGRB_EthicsSupportingDoc6_HealthandSafetyRiskAssessment_ lowrisk_v1_15072016.pdf	1	15/07/16
PVAR 15-098 CGRB_EthicsSupportingDoc7_HealthandSafetyRiskAssessment_ Appendix1_v1_15072016.pdf	1	15/07/16
PVAR 15-098 CGRB_EthicsSupportingDoc8_DataManagementPlan_v1_15072016.pdf	1	15/07/16
PVAR 15-098 CGRB_EthicsSupportingDocs5_InterviewQuestions_v1_15072016_.pdf	1	15/07/16

Committee members made the following comments about your application:

General comments
This appears to be a very sound application, outlining a strong and well thought-through research project. Good luck with your fieldwork.

Application section	**Comment**
6.2	It is assumed that the gift will fall within the requirements of the Protocol for reimbursement of research participants. It is important to ensure that the gift will not interfere with the voluntariness of the participants' consent by acting as an undue inducement.

Risk assessment	Your fieldwork risk assessment will need to be signed off by one of your supervisors.

Please notify the committee if you intend to make any amendments to the information in your ethics application as submitted at date of this approval as all changes must receive ethical approval prior to implementation. The amendment form is available at http://ris.leeds.ac.uk/EthicsAmendment.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited. There is a checklist listing examples of documents to be kept which is available at http://ris.leeds.ac.uk/EthicsAudits.

We welcome feedback on your experience of the ethical review process and suggestions for improvement. Please email any comments to ResearchEthics@leeds.ac.uk.

Yours sincerely

Jennifer Blaikie
Senior Research Ethics Administrator, Research & Innovation Service
On behalf of Dr Kevin Macnish, Chair, PVAR FREC

CC: Student's supervisor(s)

Appendix C
Interview Protocol

The following interview protocol includes a research introduction and background provided to interview subjects, as well as sample interview questions. Questions varied based on interview subjects and progression of interview and not all prompts or questions were used.

Contextual Protocol: Research Objectives

The variability of electricity produced from clean energy resources provides an opportunity for regional and international electricity market expansion and the efficient disposal and purchase of power capacity. Based on the resulting potential for cross border electricity trade, this research examines the expansion of these markets in Asia and opportunities for their further development. A number of issues play a role in this research: including national, sub-regional and regional electricity market development, sub-regional governance, interconnectors, and trade governance. A case study examination of 1 or 2 potential growth markets in East Asia will be conducted following informative expert interviews.

Introductory Protocol

You have agreed to take part in a research study entitled 'The International Political Economy of Electricity Markets: Cross-Border Electricity Trade & Interconnections in East Asia.' The following information is for your convenience and understanding, but please do not hesitate to ask for clarifications or more details should you need to.

This interview will take between 30-60 minutes. During this time, I have several questions that I would like to cover. Follow up via email may be applicable should we run out of time or be interrupted. I may ask you to provide information, recount events, or describe your experiences and understanding about issues of importance to trade and economy policy, electricity markets or clean energy utilization. With your permission, the interview will be recorded in digital audio and subsequently transcribed. Once the transcript is finished, the voice recording will be disposed of.

Participants will remain anonymous unless they explicitly wish to be named in the research. If you prefer anonymity, the data will contain no personal

information. With your permission, I may include information on your occupation but this requires your explicit approval and the interview does not depend on it. The data collected during this study may be used in presentation at conferences or in publications. However, all anonymity will be preserved.

You have the right to omit or refuse to respond to any question that I may ask. You will be given the right to withdraw at any point up to October 1, 2018. You also have the right to ask that any data you have supplied to me during the interview be withdrawn or destroyed. If you wish to withdraw from this study, let me know by phone or email at any time. My contact information is listed on the release form.

Please sign the attached release form to demonstrate agreement with these stipulations. This document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time. Thank you in advance for agreeing to participate.

Background Protocol

1. How long have you been:
    a. Working in your current positions?
    b. At this institution?
    c. Retired?
2. What is your:
    a. Highest degree?
    b. Area of expertise?
3. Probes:
    a. Years of relevant experience?
    b. Other relevant qualifications?
    c. Briefly describe your role (office, committee, organization, etc.) as it relates clean energy development / electricity trade / electricity market integration (if appropriate).
4. Probes:
    a. How are you involved in policy making/coordination/responses here?

   b. How did you get involved?
   c. What motivates your organization?
5. What are some of the current [research] projects you're conducting?

Conversational or Transition Questions: (*Pick and choose based on situation)*

1. In recent years, we've seen numerous positive trends in policy towards the transition to clean energy. Is the speed of change fast enough to meet the climate and efficiency targets?
2. If we look at the East Asia/ European Union, what have been the most important legislative initiatives in favor of the energy transition?
   a. Probe: Do you know of specific initiatives geared toward electricity market integration or electricity trade expansion?
3. What is the role of trade policy in climate change adaptation?
4. What trade policy and/or theoretical approaches can make the best case for optimising clean energy's contribution in addressing climate change and energy security challenges?

Key Questions: Electricity Markets:

1. What is your understanding of cross-border electricity trade and/or electricity market integration in reaching global emissions reduction targets?
2. What is the role of trade policy in the growth of cross border electricity trade?
   a. In what ways can governments incentivize or enable…
   b. Cross border electricity trade?
   c. Interconnector development/expansion?
3. What is changing about international and national policy initiatives in electricity market integration?
   a. Probe: What is being accomplished through these initiatives?
4. What kinds of networks do you see developing around electricity market integration and cross border electricity trade?

5. How might current trade policies be put into effective practice in order to support wider cross border electricity trade?
6. Do certain global governance structures support cross border electricity trade better than others?
    a. Why or why not?

Key Questions: Electricity Markets & East Asia / Europe:

1. Where is this issue most alive in East Asia?
    a. In Europe?
2. What is the relationship between interconnectors and cross border electricity trade in East Asia?
3. What resources are available for improving electricity market integration in East Asia?
    a. *Probe*: Do you see a widening of the circle of participants in East Asia?
4. What is the political and physical capacity for increased cross border electricity trade in East Asia?
    a. In European economies?
5. What are the policy obstacles to the increased exchange of electricity across borders in East Asia?
    a. In European economies?
6. How can stakeholders in East Asia partner with their European counterparts in order to accelerate the trade of electricity across borders within their respective regions?
7. Are you aware of trade disputes over cross border electricity trade, and what discernible political economic patterns may be observed concerning these disputes?

Key Questions: Assessment

1. How do you assess progress in electricity market integration or trade expansion?

   a. *Probe*: What kinds of assessment techniques tell you the most about progress?

2. What kinds of assessment most accurately capture what is happening internationally?
3. How is the assessment of market integration/expansion of trade used to improve policy responses in your department/organization/country?

Key Questions: Institution/Department/Discipline

1. What are some of the major challenges your institution/department/discipline faces in attempting to encourage trade policy development in electricity sectors/clean energy development/market integration?
2. What are the major opportunities?
   a. *Probes*:
      i. How can barriers be overcome?
      ii. How can opportunities be maximized?
3. Have you or your colleagues encountered resistance to reforms in your institution/department/discipline?
   a. In international forums?
4. What is the strategy at your institution/department/discipline for clean energy/trade policy/electricity market integration/interconnector expansion?
   a. *Probes:*
      i. Is it working – why or why not?
      ii. What is the ideal timetable or strategy for success?

Concluding Questions / Post Interview Comments/Considerations