MAINSTREAMING CLIMATE CHANGE IN THE PUBLIC BUDGETS OF DEVELOPING COUNTRIES: A MIXED METHODS ANALYSIS APPLIED TO LATIN AMERICA AND THE CARIBBEAN COUNTRIES

SANDRA LETICIA GUZMAN LUNA

PHD

UNIVERSITY OF YORK

POLITICS

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ABSTRACT

In 2018, the Intergovernmental Panel on Climate Change (IPCC) stated that to avoid an increase in the temperature of more than 1.5-2.0^{o}C by 2030, as the Paris Agreement proposes, a reduction of global greenhouse gases (GHG) emissions of between 25-45% is needed. To achieve this, most of developed and developing countries have submitted their nationally determined contributions (NDCs), but further work is needed to achieve another goal of the Agreement: making financial flows consistent with a pathway towards low GHGs and climate-resilient development **(UNFCCC, 2015).**

In this context, this thesis analyses the extent to which developing countries are mainstreaming climate change in their public budget to comply with national and international commitments, and what factors promote and hinder such processes. Using a fuzzy set qualitative comparative analysis (fsQCA) and two case studies (Mexico and Colombia), the study found that developing countries, at least in Latin America, are more likely to mainstream climate change in their public budget if there is international support in the form of Overseas Development Aid (ODA) or climate finance. While the thesis identifies international cooperation as a promoter of climate change mainstreaming in the planning and budgetary processes, also it highlights how dependence on fossil fuels in the public finance cycle is a major constraint on such processes.

The thesis suggests that while international cooperation remains key to promoting national climate action in developing countries, this will not be enough to achieve transformational changes, if the economies of developing countries remain dependant on fossil fuels.

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DECLARATION

I certify that this thesis that I have presented for examination to obtain the PhD degree at the University of York is solely my own work.

I have clearly indicated the work that has been done building on the work of other authors, which are acknowledged as references.

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other University.

CHAPTER 1. EXPLAINING CLIMATE CHANGE MAINSTREAMING IN THE PUBLIC BUDGET OF DEVELOPING COUNTRIES

Introduction

The Intergovernmental Panel on Climate Change (IPCC) report published in October 2018 declared that humanity has to cut 45% of greenhouse gases (GHGs) by 2030 to avoid an increase of more than 1.5^{o}C in average global temperature and to avoid irreversible negative impacts in ecosystems and societies **(IPCC, 2018).** The report reaffirmed and highlighted the relevance of urgent action from both developed and developing countries, to accelerate mitigation and adaptation actions to tackle climate change.

The Paris Agreement resulted from five years of negotiations under the United Nations Framework Convention for Climate Change (UNFCCC) and it has recognized both developed and developing countries obligations to tackle climate change, based on common but differentiated responsibilities and capacities. On this basis, states have established and committed to Nationally Determined Contributions (NDCs). Furthermore, the Agreement calls for financial flows to be made consistent with a low greenhouse gas emissions strategy.

In this context my thesis aims to examine whether developing countries can make these commitments and so: *under what conditions are developing countries willing to mainstream the climate change in their public budgets as a way to comply with national and international climate goals, such as the NDCs. Moreover, what are the factors that promote and hinder such processes?*

A key question is whether the provision of USD100 billion agreed by parties of the UNFCCC in 2010 is enough to address the challenges that climate change is bringing to humanity and the planet or whether further mobilization of climate finance is needed? In this context, the public finance system of developing countries will also have to play a vital role in delivering the NDCs. Some developing countries, including Latin American and the Caribbean (LAC) countries, have already proposed some conditional and unconditional measures in their NDCs, the first subjected to international support and the second, which will be implemented with their own resources.

In order to further explain the rationale behind the selected question and to describe how this research will be conducted, this chapter is divided into five sections. Section one lays out the research puzzle and the context of the research, providing an analysis about the role of developing countries in the international regime of climate change. Section two explains the

research question and provides a literature review to locate this research in the broader literature. Section three presents the argument and the theoretical approach. It also describes the research design and the methods used, which are Qualitative Comparative Analysis and comparative case studies using qualitative methods. Section four explains the original contributions that this thesis makes to the literature before outlining the thesis chapters are outlined in section five.

1.1. Research puzzle

The UNFCCC argues that tackling climate change should be based on such principles as 'common but differentiated responsibilities and respective capabilities among states', according to Article 3.1 **(UNFCCC, 1992).** This Convention recognizes the historical responsibility of developed countries to reduce emissions and also to support developing countries in their endeavours to deal with the effects and impact of climate change. Nevertheless, there is also a growing debate about the urgent and proactive roles that developing countries should take in addressing the problem of rising temperatures around the world, because the growing emissions in the developing countries are also a threat to achieve emission stabilization in the atmosphere. There is a growing consensus that action by developing countries is needed too. Stern **(2012)** argues that developing countries are on a path of increasing their emissions towards 2030 by which time around 70% of global emissions will come from the developing world.

The signing of the Paris Agreement is also recognition that the role of developing countries is crucial if the established targets are to be achieved. Although this agreement does not set specific targets for developing countries, it suggests in Article 2 a collective target to stabilize emissions to avoid an increase in temperature of 2^{o}C and ideally 1.5^{o}C **(UNFCCC, 2015)**. To reach this target the signatories were required to submit voluntarily NDCs that will guide their participation in the global commitment.

As of March 2020, the Interim NDC Registry reported that 189 countries have submitted their first NDC, including most of the developing countries that are members of the UNFCCC; while four have submitted their second **(UNFCCC, n.d.1).** However, clear and decisive strategies and implementation pathways are absent. Furthermore, some developing countries have included measures within the NDCs that are conditional, which means that such measures can

only be achieved with international financial support, while some of them also included unconditional measures that can be achieved with national means of implementation.

In this context, my research aims to investigate and analyse the conditions that promote and/or hinder a state's capacity to mainstream climate change in planning processes, and particularly in the public budget and subsequent expenditure, that each year reflects the priorities of the state. My argument is that while the support from developed countries remains crucial, as is stated in the Paris Agreement (Article 9), flows at the global scale might not be sufficient to fulfil the developing countries needs and commitments, therefore developing countries also need to better incorporate and ideally mainstream climate change in their public budget to invest in mitigation and adaptation measures as part of their daily priorities. In this sense, the allocation of public budget is critical, since it represents the amount of resources available to deal with the designated priorities at the national level. If developing countries do not integrate climate change as part of their budgetary allocation, there is a risk of non-compliance as regards their NDCs.

The analysis of climate change has been studied not only as an environmental issue in isolation, but as a problem that has impacts in other development areas. In this context, the role of public budget for climate change becomes extremely relevant. While some developing countries point to other priorities such as poverty, insecurity, unemployment that dominates their national agendas, there is evidence that climate change will also impact and compound these traditional problems because it threatens the national security of countries **(Miklos, 2018).**

A key factor is that if developing countries aim to have further international support, they also need to demonstrate effective actions at the national level, which creates a conditionality that can also influence the quantity and quality of such international cooperation. This suggests that there is an important relationship between the reception of international cooperation and the allocation of public budget at the national level, which this research will analyse in depth.

1.1.1. The complexity of climate change

According to the IPCC **(2013)**, the main scientific body in charge of monitoring the phenomena of climate change,

> …warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased (**p. 4).**

The IPCC additionally pointed out that, "*almost the entire globe has experienced surface warming"* **(IPCC, 2013, p. 5).** Another crucial declaration that the IPCC has shared is that the likely cause of this increased warming observed in global average surface temperature from 1951 to 2010 is the "*anthropogenic increase in greenhouse gas concentrations and other anthropogenic forces together*", which means that "*human influence on the climate system is clear*" **(IPCC, 2014, p. 2).**

After years of monitoring the climate system, the IPCC has identified the need to implement measures to reduce emissions (mitigation), and measures to reduce vulnerability (adaptation) in an urgent way to be on time to stabilize emissions in the atmosphere. In its 2018 special report demanded by countries during the COP21 in Paris, France, the IPCC has stated that 45% of global emissions must be cut by 2030 in order to avoid an increase of 1.5^{o}C in global temperature. The scientific body has confirmed that if countries stabilize by 20% and not 45%, the increase in temperature could be 2^{o}C or more, producing irreversible impacts in ecosystems and societies **(IPCC, 2018)**.

According to the IPCC, climate change "*involves complex interactions between climatic, environmental, economic, political, institutional, social and technological process*" **(IPCC, 2001, p. 78).** Accordingly, the change in climate and its resulting impacts result from inter-connected issues, which emanate from actions and decisions by different sectors. Gupta & Grijp **(2010)** commented that most sectors are likely to be affected by the potential negative impacts of climate change, and measures to adapt would need to be integrated into sectorial plans beyond the environmental sector and beyond the state. Previously, international discussions on climate change were seen as "*an abstract global future problem with a technocratic nature*" **(Gupta & Gijp, 2010, p. 9),** because for many years, the state was the only actor making and taking decisions on this regard. Though the role of the state remains central, increasingly there are calls for wider participation in climate discussions by non-state actors in order to deal with the problem effectively **(Gupta, 2007)**.

Climate change thus presents a distinctive level of complexity in the international system owing to the cross-cutting nature of its causes and impact. This level of complexity requires a rethink of the pathways that are critical to tackle the problem structurally and across different sectors at the international level, but also at the national level. In this sense, in this thesis, I examine the international climate regime, specifically, the UNFCCC and its Paris Agreement and the logics they propose, to then analyse the role of developing countries in that regime.

1.1.2. The International Climate Change Regime

The UNFCCC

The UNFCCC is the central international body in charge of facilitating the creation of global agreements to collectively deal with climate change. Correspondingly, its goal is to achieve:

> … stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system … **(UNFCCC, 1992, Article 2)**

Historically, climate related negotiations have been contentious because of the multiple points of views and interests that exist among the 194 countries that are signatories to the Convention. Further complicating these negotiations are the different levels of state responsibilities regarding GHG emissions and capacities to respond to the threats from and causes of climate change.

According to the Preface of the UNFCCC **(1992)**, *"the largest share of historical and current global emissions of GHGs has originated in developed countries*" **(p. 1).** However, the Convention points out that the *"per capita emissions in developing countries are still relatively low and that share of global emissions originating in developing countries will grow to meet their social and development needs"* **(UNFCCC, 1992, p. 1).** The question here is to what extent developing countries can continue growing their emissions if the IPCC clearly called for a global cut in emissions. Based on this, my thesis aims to understand the role of developing countries and the ways they can mainstream climate change in their planning and budgetary process to respond to this goal. These challenges are at the core of international climate negotiations.

In order to differentiate actions, the UNFCCC allocated countries in annexes. Annex I consist of the developed country parties that are committed to adopting and implementing national policies on climate change - limiting the anthropogenic emissions of GHGs and protecting and enhancing GHG sinks and reservoirs. Crucially, according to the Article 4, they must also calculate and report on their emissions **(UNFCCC, 1992)**. Annex II consists of the developed country parties that shall provide new and additional finance resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12 of the Convention **(UNFCCC, 1992)**.

A third group of countries is the Non-Annex I, where all developing countries are included. Although this group is not obligated to reduce emissions, it is called upon to develop policies and measures to reduce emissions and to reduce vulnerabilities at the domestic level. The fact that Brazil, China, South Africa, and other emerging economies where the GHG emissions are growing, belong to the Non-Annex I classification, lies at the core of the debate on party responsibilities. The position of the United States of America, for example, is that emerging economies should also take responsibility for reduction in emissions. However, the Kyoto Protocol signed in 1997 [1] did not allocate targets for developing parties; while not all developed countries comply with the reduction of emissions **(Keohane & Victor , 2010)**.

The UNFCCC regime has been the subject of several studies that have questioned the effectiveness of its processes and results. According to Keohane and Victor **(2010)** this climate framework is a complex regime. Instead of a comprehensive regime governing a collective effort to limit climate change, the regime prior to the Paris Agreement was a loosely coupled set of specific regimes lack of coherence, accountability, effectiveness, determinacy and sustainability **(Keohane & Victor, 2010).**

In this sense, the lack of success of the Kyoto Protocol, and the lack of progress in the reduction of global GHGs, led to the latest international treaty on climate change, which is the Paris Agreement.

The Paris Agreement

[1] Entering into force in 2005, the Kyoto Protocol was the first attempt to establish reduction responsibilities, asking developed countries for a reduction of 5.2% of 1990 GHG levels by 2012.

The Paris Agreement, signed in 2015 by 195 countries, aimed "*to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty*" **(2015, p. 3).** According to Article 2 of the Agreement, it aims to do so firstly, by "*holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels*", which requires the reduction of emissions in several sectors such as energy, transport and forestry, among others **(UNFCCC, 2015, p. 3).** Critically, and most pertinent to this thesis, is that the second goal of the Agreement advocates, "*making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development*" **(UNFCCC, 2015, p. 3).** Although it does not specify which financial flows, it suggests that all financial flows should work consistently to address these issues.

The global approval of the Paris Agreement was considered an important success in the international negotiations according to authors such as Stavins and Stow **(2016)**. Others, such as Keohane and Oppenheimer **(2016)**, agree that the Paris Agreement marks a decisive break from the unsuccessful Kyoto regime, establishing a pledge and review system under which states will offer NDCs. Nonetheless, they argue that this successful negotiation was achieved "*at the price of vagueness of obligations and substantial discretion of governments"* **(Keohane & Oppenheimer, 2016, p. 146).**

Although since 2015 there have been efforts to tackle climate change in developed and developing countries through the NDCs, a study conducted in 2019 by the United Nation Program of Environment (UNEP), suggest that the pledges allocated in the NDCs so far are not enough to comply with the goals of the Paris Agreement, and instead they "*would lead to a global mean temperature rise of between 3.4°C and 2.7° C by 2100"* **(UNEP, 2019, p. 5).**

It is worth understanding some of the key elements of the Agreement as they relate to developing countries, as well as the actions that have to be taken at the national level to comply with its goals.

1.1.3. The role of developing countries in the climate change regime

Recent studies show that emissions from developing countries are increasing significantly and that, in order to comply with the goals of the Convention to stabilize emissions, it is necessary to promote low carbon strategies in developing countries as well **(Stern, 2012; UNEP, 2019).**

This view has been primarily promoted in countries whose economic growth is increasing GHG emissions, such as China, India, South Africa and LAC countries such as Brazil and Mexico.

In 2009 it was stated that "*if current trends remain unaltered, the contributions of developing country emissions to total GHG stocks in the atmosphere should grow from around 20% of the world total in 2000 to 45% by 2030*" **(Stewark, *et al.,* 2009, p. 100)**. According to Bailey and Compston **(2012)**, although the per capita GHG emissions of these countries are still relatively low compared with those of industrialized countries (both currently and in cumulative terms), their high rates of economic growth and large populations have led to steep rises in their emissions, to the extent that it is widely acknowledged that effective action against climate change is impossible without the active participation of major emerging economies. In that sense, there is growing pressure to create low carbon pathways in developing countries, to leapfrog the traditional development achieved by developed countries **(Perkins, 2003)** in order to avoid an increase in the planet´s temperature of more than 2^{o}C.

The Paris Agreement has thus moved further by articulating the roles of both developed and developing countries. To this end, Article 4.3 of the Agreement established that *"developed countries should continue taking the lead by undertaking economy-wide absolute emission reduction targets. Developing countries should continue enhancing their mitigation efforts and are encouraged to move over time towards economy wide emission reduction or limitation targets in the light of different national circumstances*" **(UNFCCC, 2015)**. Although the Agreement does not establish legally binding emission reduction obligations to parties it recognizes the necessity for countries to submit and review their NDCs as a minimum but attainable commitment.

The NDCs were proposed, "*to initiate or intensify domestic preparations...towards achieving the objective of the Convention as set out in its Article 2*…" **(UNFCCC, 2014)**. These contributions may include:

> … Quantifiable information on the reference point (including, as appropriate, a base year), time frames and/or periods for implementation, scope and coverage, planning processes, assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions […] and how it contributes towards achieving the objective of the Convention **(UNFCCC, 2014)**.

For climate change practitioners, as well as academics, the submission of the NDCs has been a major subject of study because these stated contributions are seen as an opportunity to achieve the success of the Paris Agreement **(Keohane & Oppenheimer , 2016)**. Nevertheless, most developing countries pointed out the necessity of climate finance to implement these actions, and to reduce GHGs and nurture resilient development.

The drafting and reporting on NDCs by developing countries were a laudable achievement. However, the anticipated cumulative value of NDCs may not be reached if developing countries lack the necessary financial resources to implement their stated contributions. In this context and acknowledging what the Paris Agreement says about the role of the developed countries as the leaders of the climate finance mobilization, the role that developing countries have to play in order to be part of the climate action is highly significant. Building greater domestic financial capacity, which links climate policies with domestic budgetary considerations, is crucial to better enhance transitions toward a low carbon and sustainable development.

Low carbon development is a concept that has been analysed by different authors. According to Urban and Nordensvard **(2013, p. 5)**, it refers to "*the use of less carbon for growth, which includes switching from fossil fuels to low carbon energy, promoting low carbon technology innovation and business models, protecting and promoting natural carbon sinks such as forest and wetlands…*", a definition that is consistent with what De la Torre *et al*., **(2010, p. 128)** defines as low carbon. Transitions, however, are not automatic. Rather, they are processes that need significant amounts of investment to transform not only the way that things are done, but also the technologies and practices that need to be implemented.

1.1.4. International climate finance flows and needs

As previously explained, since the creation of the UNFCCC, it is clear that financial resources are needed to invest in mitigation and adaptation measures to deal with climate change. These resources called "climate finance" are one of the pillars of climate action. There is no international agreement, however, about what climate finance means. The Standing Committee on Finance (SCF) has created an operational definition that points out:

> Climate finance aims at reducing emissions and enhancing sinks of GHG, and aims at reducing vulnerability of, and maintaining and increasing the resilience of, human and ecological systems to negative climate change impacts **(SCF, 2014, p. 19)**.

In the last decade, there has been an effort to measure the amount of climate finance that has been flowing primarily from developed to developing countries as part of their commitments under the UNFCCC, which is why the SCF conducts a biannual assessment of climate finance flows **(SCF, 2014; SCF, 2016; SCF, 2018; OECD & CPI, 2015).** These reports showed that climate finance has been increasing, however, the gap that exists between the needed financial flow and the mobilized financial flow has also increased. According to the UNEP at least USD500 billion annually are needed to fulfil only adaptation needs **(UNEP, 2016)**. Since Article 3 of the UNFCCC points out that developed countries are the ones that have to provide financial support for developing countries **(UNFCCC, 1992)**, a commitment was established under the UNFCCC to transfer USD100 billion annually by 2020 to developing countries **(UNFCCC, 2009)**.

A report conducted by OECD and the Climate Policy Initiative found that the mobilization of climate finance was respectively USD52 and USD62 billion in 2013 and 2014 **(OECD & CPI, 2015).** This report was criticized by developing countries that questioned the methodology used by the OECD and the information underpinning the calculation, because according to the G77+China (a negotiation group) the results were too high compared to what developing countries had actually received **(Roberts & Weikmans, 2015)**.

The SCF found in its Biennial Assessment and Overview of Climate Finance Flows that *"the estimated global total climate finance increased from a high bound estimate of USD650 billion for 2011–2012 to USD687 billion for 2013 and to USD741 billion for 2014"* **(2016, p. 4)** and that finance increased 17%, according to its report in 2018. An important part of the analysis conducted by the SCF is that while 70% of the finance has gone to mitigation actions, only 25% has gone to adaptation actions, which creates an imbalance in the allocation of financial support **(SCF, 2016).** The SCF has pointed out the limitations of the estimation because the absence of a methodology universally agreed upon to measure and report climate finance.

In response, a negotiation topic was established related to the creation of modalities for accounting for climate finance in the context of the UNFCCC. Although technical issues were discussed and agreed upon during the COP24 in Poland, a relevant issue was not solved: to what extent climate finance has to increase and how to ensure that is new and additional of official development aid? This topic, which will be further discussed in this thesis, is not solved yet.

Furthermore, the financial gap that exists imposes a challenge to make financial flows consistent with a GHG emissions and climate-resilient development. While the Agreement recognizes the role of developed countries in the provision of financial support, in its Article 9.5 also references that "*other parties are encouraged to provide or continue to provide such support voluntarily*" **(UNFCCC, 2015).** There is no definition about what "other countries" means, but it is also related to the issue of "differentiation", which according to Pauw *et al.,* **(2014)**, means that all countries are responsible for climate change but at the same time they have different capacities to contribute to climate change mitigation.

In this sense, as the SCF has proven, developed countries have increased their financial support. The flows towards developing countries have been increasing with Latin America as the third largest recipient after Asia Pacific and Africa **(SCF, 2018).** The role of international cooperation in developing countries has been crucial for the development of climate policies, and this is one of the key findings of this research that will be explained in next chapters.

Whether climate finance is part of traditional aid support or is additional is still a matter of debate. In this context, I examine the role of developing countries in dealing with climate change, particularly those that are also responsible for GHG emissions, and that are highly vulnerable. While developing countries require the international support, they should not simply wait for this support, because resources flowing internationally are not enough to deal with the problem in all developing countries and further mobilization of different sources of finance is needed.

In this sense, this thesis analyses the role of the public budget of developing countries as a key source of finance to deal with climate change. The thesis, however, is not suggesting that public budget by developing countries can solve the problem alone, because it has been noted that *"there is not enough public money"* **(Interview 5FGM)** but rather, the thesis argues that

while international support remains important to fulfil climate commitments, those flows will not be transformational if public money in developing countries does not also mainstream climate goals.

1.2. Research question

The central aim of my research is to provide evidence about the conditions that motives the mainstreaming of climate change the budgetary processes as a way to comply with national and international commitments on climate change. As parties to the Paris Agreement, developing countries have committed to their NDCs but these do not make clear under what conditions these countries are willing to act effectively or invest sufficient resources to deal with a problem that many developing countries have claimed is caused by developed countries. Currently, the literature does not make strong links between the shared burden of climate change and the role of developing countries in making available public finances to address its ensuing effects. Owing to this gap, this research aims to answer the following question:

Under what conditions are developing countries mainstreaming climate change in their public budget to comply with national and international climate commitments, such as the National Determined Contributions and what conditions promote and hinder such a process?

1.3. Literature Review

This research aims to contribute to the academic literature on public climate finance from the developing country perspective, which is an evolving field in the context of climate change. The research builds on two premises. The first one concerns the role of developing countries in combatting climate change, since my argument is that while the role of developed countries remains necessary as major emitters of greenhouse gases as well as climate finance providers, the development pathway established by developing countries is as critical and important to achieve the GHG emissions stabilization. If these countries follow the same pathway as developed countries, the increased GHGs will lead the world towards a temperature increase of more than 2°C.

The second premise is related to the actual role of the state within developing countries. While there is a growing debate about the need to have different actors dealing with climate change, my argument is that the role of the state remains relevant, and that the elaboration of policies, legislation and particularly the allocation of public resources to combat climate change are critical.

In this sense the research situates itself in two different areas of study: on one hand, climate finance academic literature and, on the other hand, public finance literature. Therefore, the aim is to contribute in the area of study of public climate finance from the developing country perspective.

Some scholars have studied the necessity to mobilize climate finance using several sources, instruments and channels to complement public **(Chirambo, 2017).** Others such as Metz **(2009)** have studied the shared burden of climate change, emphasizing that while developed nations should carry the major the burden, developing countries have to take advantage of the fact that many measures could have negative costs, such as energy efficiency in buildings, transport and industry. The author points out that "*we do not have the luxury of time to enter into a global agreement where developed countries move first and developing countries follow on behind*" **(Metz, 2009, p. 44).** The question that the author raised is how the reduction of emissions could be fair to developing countries with their lower incomes and limited responsibility for current climate change?

Roberts and Weikmans **(2017),** point out that it is necessary to identify the financial needs of developing countries but also to understand the effectiveness of international climate finance, because this is not always transparent. These scholars further discuss the importance of clearly defining the relationship between climate finance and the ODA flows, in attention of what the UNFCCC says about climate finance as "new and additional" sources of finance **(UNFCCC, 1992).** This means that while the proposal is to look for further contributions to developing countries related to climate finance provision, some developing countries are wondering where the actual support is that developed countries are meant to provide **(Roberts & Weikmans, 2017).**

The debate regarding the additionality of climate finance within ODA is still on-going in the context of the UNFCCC and is a topic often discussed in the context of the Organization for Economic Cooperation and Development (OECD). However, some scholars have pointed out the necessity to go beyond the debate and start talking about the importance of mainstreaming climate change in ODA **(Gupta & Grijp, 2015).** This is mainly because there are areas of development and climate change that are difficult to separate, particularly adaptation actions **(Weiler, *et al.*, 2018).** According to Huq and Reid **(2004),** the concern about mainstreaming climate change in ODA, is that one thing is to connect actions such as institutional arrangements and polices, but another thing is to fulfil the commitments of the two agendas with the same limited amount of resources.

Other scholars have focused attention on the real intentions of donors, such as Klöck *et al.,* **(2018),** and Berthélemy **(2006)**, who consider that the donors are not always motivated by the willingness to support, but rather for self-interest. This explains why not all the international cooperation goes to where is needed. Besides that there are different ways to cooperate, and some scholars have analysed the consequences of cooperation, because for developing countries "*development finance has been mostly a matter of transferring resources to developing countries through the vehicle of investment projects*" **(Gupta & Grijp, 2015, p. 329)**, which in many cases has increased public debt.

The recent debate on the future of ODA in a world battling with climate change, where threats to humanity are increasing is complex. It may be necessary to think in terms of a "global insurance survival" **(Hübler, 2016).** This particular debate goes beyond the loss and damage debate and refers to the actual existence of sufficient capital to redesign the way that civilizations are living on earth.

There is a clear understanding about the obligation of developed countries as major donors, or leaders of the mobilization of climate finance as the Paris Agreement pointed out. However, the discussion is starting to change from the traditional role of developed countries as providers, and developing countries as recipients, to see the developing countries as key drivers of financial transformation. This is because the traditional role of developing countries as recipients will not be enough to achieve Article 2 of the Paris Agreement. However, a key question that remains is under what conditions are developing countries willing to mainstream climate change in their own public finance system to deal with climate change

and comply with national and international climate goals (particularly if those countries rely economically on fossil fuels)?

As Mickwitz *et al.* **(2009)** suggested in their analysis of climate policy integration, while analysis of the role of public expenditure of developed countries exists, further analysis related to the public expenditure of developing countries has yet to be conducted. Based on this gap, this research aims to contribute to the understanding of public climate finance from the developing country's perspective.

An important part of the analysis conducted in this research suggests that there are drivers and conditions that can explain or further support mainstreaming climate change in the public budget and expenditure of developing countries. Werksman **(2009)** suggests that one of the areas that will determine the success of a climate change deal "*will depend upon closing the gap in expectations between developed and developing countries on climate finance*" **(p. 194).** This is related not only to the amount of support provided, but also to the actual capacity building created in recipient countries.

However, there is another caveat in the discussion. According to Werksman **(2009)**, "*financial transfer rarely comes without strings attached, i.e., conditionalities imposed by contributor or lending institutions on recipient countries*" and "*while the south can with some legitimacy demand financial support for reducing emissions, the north and the international community as a whole can legitimately demand a return on this investment*" **(pp. 190-191).**

Davis and Dadush **(2009)** questioned to what extent conditionality really enforces effectiveness and efficiency. Similarly, Woods **(2009)** agrees that other factors are needed to increase the effectiveness of financial support, such as the actual provision of financing from the recipient country to ensure ownership of the project. This approach is highly relevant for this research because it suggests that actual provision of public expenditure is a way to leverage international cooperation and might help recipient countries to better guide projects and programs.

Furthermore, Ha *et al.,* **(2015)** discussed whether climate finance between developing countries, called south-south cooperation, is an emerging opportunity to deal with climate change as well. In this sense the aim is to further discuss and contribute to the literature

regarding the role of developing countries not only as recipients but also as providers of climate finance, as possible donors, but mainly as implementers of national actions.

Here, the opportunity is not necessarily to increase the amount of public resources, but rather to transform the use of their available public budget. Mainstreaming climate change in the allocation of resources would be a key tool to redefine priorities and therefore to re-think the use of their scarce resources in activities that can help to face the problem, instead of activities that will exacerbate it.

For instance, scholars such as Fan and Rao **(2003)** studied the relationship between public expenditure and economic growth and poverty reduction, arriving at interesting conclusions related to the differential influence of types of government spending. They suggest that developing countries should stop spending in unproductive sectors such as defence, as well as cutting excessive subsidies in fertilizer, irrigation, power and pesticides, among others. They also mention the importance of having healthy public finance systems in developing countries. In this sense, scholars consider that the role of the state is still highly relevant to deal with environmental and other major problems such as climate change **(Eckersley, 2004; Sachs, 2012).**

There are other initiatives such as the one developed by the United National Program for Development that created a methodology called Climate Public Expenditure and Institutional Review **(UNDP, 2015).** Other regional initiatives, such as the Climate Finance Group for Latin America and the Caribbean also developed an analysis about climate expenditure in LAC countries **(GFLAC, 2014).** As well as recent work of the Inter-American Development Work (IADB) related to climate budgets in the region. These analyses look for evidence on the allocation of public resources to deal with climate change in developing countries but are not questioning under what conditions such allocation happens.

In this sense, this thesis aims to fill a gap in both theory and practice. There are no academic analyses about public climate finance from a developing country perspective, such as LAC countries, that investigate under what conditions they are willing to mainstream climate change in their own public budget to comply with national and international climate commitments.

1.4. Theoretical approach

I analyse the extent to which the mainstreaming approach has been used in developing countries to deal with the complexity of climate change, where there is a need to incorporate the problem in policies, institutions, and other processes, such as public budget, in order to deal with it in a more comprehensive manner **(Hannan, 2000).** Here, the main goal is to understand under what conditions developing countries are mainstreaming climate change in their own public budget, and what conditions promote and hinder such a process.

According to Piccioto **(2002)** "*The term mainstreaming has become so fashionable in public policy circles that the notion, once rich in promise, has become trivialized through repeated use*" **(p. 322).** Although the term has been attracting more attention, there are many interpretations of what it means. While "*mainstream*" as a noun, refers to the "*principal course of activity*"; mainstreaming as a verb, is more dynamic, and "*suggests a deliberate perturbation in the nature order of things*" **(Piccioto, 2002, p. 323).** The author emphasizes that "*it subverts the status quo and yet it does not evoke chaotic change or painful disruption*", "*in policy terms, it is typically achieved through incremental changes in programs goals, protocols of operation and organizational cultures*" **(Piccioto, 2002, p. 323).** The last definition related to policies is the one that is used in this analysis.

Piccioto **(2002)** points out "*the mainstreaming process requires incremental resources, the exercise of compulsion and persuasion, changes in incentives, adoption of new procedures, adaptation of training protocols, etc.*" and the author emphasizes that "*mainstreaming is a key function of leadership*" **(p. 325).** The gradual expansion of the development agenda is itself an example of mainstreaming **(Piccioto, 2002).**

The reason why mainstreaming is examined in this thesis is because mainstreaming aims to bring key issues to the centre of the decision-making process. According to Hirschman **(1970)** a successful mainstreaming process implies a willingness to exit from past entanglements and to activate the voice of relevant stakeholders. This means that if past development and past investments are causing climate change, then, it is necessary to analyse the causes and be willing to exit such processes to start a new way of doing things, based on previous experiences.

Piccioto **(2002)** describes that there are different approaches to analyse mainstreaming that are connected to theories of behavioural change in society. The three main approaches are:

a) Supported by sociologists, perceives human beings as highly responsive to authority and pliable to the opinion of others so that mainstreaming mostly requires decisions by leaders within the context of social customs, values and norms;
b) Supported by economists, views social systems as atomized and made up of individuals motivated by self-interest; and
c) Puts the focus on formal and informal relations, it views human actions as "embedded" in a web of information networks and social links **(p. 326).**

The last approach emphasizes hybrid mixtures of cooperation and competition. A key aspect that Piccioto **(2002)** sees is that mainstreaming reaches a tipping point at a certain time, and this is when mainstream opinion shifts, and new ideas become the consensus. The author however recognizes that a "limitation" of the mainstream approach is that reaching this point of consensus is not a process written in stone, but rather something that must be constantly evaluated and adapted **(Piccioto, 2002, p. 327).**

In this regard, Gupta and Grijp **(2010),** emphasize that mainstreaming is not only a goal, but it could be also a process. In this research it is analysed as a process. The mainstreaming approach has been applied in different fields such as gender and risk management, but its use in the climate change arena is relatively recent. However, I adopt the underpinnings of this approach to explain three central points of my research.

Firstly, the complex nature of climate change necessitates the use of an approach that can analyse the role of different actors and sectors. In this sense, I maintain that the conduct of climate change action is a multilevel governance problem, where parties are simultaneously committed to and acting within international regimes, as well as national interests and priorities (**Gupta & Grijp, 2010).** International relations theory analyses the relevance of international regimes and their influence on the behaviour of states; however, these theories say little about national action for implementing international regimes **(Harrison & McIntosh, 2010)**. In this research, I refer to regimes as "*set of implicit or explicit principles, norms, rules and decision-making procedures around which actors´ expectations converge in a given area of international relations*" **(Krasner, 1982, p. 186)**. In this sense, the mainstreaming approach suggests the importance of incorporating climate change horizontally (in different sectors

beyond the environment) and vertically (across different levels of government) in order to tackle the problem in a structural way.

Secondly, mainstreaming is a relatively new concept in the climate change field; however, this research argues that it is an approach that can be used to investigate state responses and responsibilities for climate change action in a more comprehensive way. This concept is similar to the policy integration concept. Some authors consider that climate policy integration aims to "integrate" climate elements into existing policies **(Mickwitz, *et al.,* 2009)** while others consider that mainstreaming aims to re-define and re-think the way policies are designed under the lens of climate change that goes beyond the integration **(Gupta & Gijp, 2010).**

Although in Chapter 2 there are further elements about the similarity and differences between climate policy integration and climate change mainstreaming, the research however, does not aim to go further into this debate, considering that there is insufficient empirical evidence about successful cases of climate change mainstreaming as a goal. For that reason, this research takes the vision of mainstreaming as a process, rather than ambitiously situating this approach as the final goal for parties' response to climate change. Nevertheless, I acknowledge that mainstreaming climate change, as a goal is an ideal pathway for a more comprehensive approach to the problem. In that sense, this thesis takes climate mainstreaming and climate policy integration as similar in process, but different in outcome.

Thirdly, a climate change mainstreaming approach enables an analysis of the role of the state at different levels, sectors and parts of the policy cycle, including public budget. The latter is a central element of this research. Even though climate change mainstreaming recognizes the role of non-governmental actors as well, the aim of this thesis is to examine the capacities of the state, especially as designers and key implementers of climate policies such as the NDCs. This technocratic approach has been criticized in the case of gender studies, because while there is recognition that achieving mainstreaming requires the participation of more stakeholders, it always starts by emphasising the role of the state in the mainstreaming approach **(Lamprell, *et al*., 2014)**.

For this research the role of the state is important because it represents the set of institutions that coordinates the public finance system and its public budget and expenditure **(Besley & Persson, 2011).** Moreover, as Eckersley **(2004)** recognizes in her work about the green state,

the role of the state remains key to achieve structural changes. Thus, the state remains important to enable the structural changes necessary to address the multiple issues arising from climate change, which requires systematic planning processes including the allocation of financial resources to be implemented. Nevertheless, the state alone cannot achieve everything; the participation of many other stakeholders is necessary to fully accomplish this mission.

1.5. Research design

To answer my research question, I used two distinct methods: 1) a Qualitative Comparative Analysis (QCA); and 2) case studies based on interviews, as well as a literature review to set the framework of the research.

1.5.1. Qualitative comparative analysis (QCA)

This research applies a *Qualitative Comparative Analysis* method, which in contrast to correlational techniques, such as traditional quantitative methods, "*is grounded in set theory and thus is ideally suited for studying explicit connections*" **(Ragin, 2008, p.23)**. According to Ragin, the creator of the method, QCA is especially useful for analysing complex causation, defined as a situation in which an outcome may follow from several different combinations of causal conditions, instead of only one variable.

The empirical comparative approach is divided into set-theoretic approaches and non-set theoretic approaches. QCA is seen as a third way to do research along qualitative and quantitative methods, as well as a way to connect both, since it combines "*the best of two worlds*" **(Schenider & Wagemann, 2012, p. 10)**. Nevertheless, the set-theoretic method that QCA uses is close to case-oriented comparative approaches used in the qualitative method.

QCA is not only a technique but also a research approach that refers to the process before and after the analysis of the data. Ragin refers to this process as "*the back-and-forth between ideas and evidence*" **(Schneider & Wagemann, 2012, p. 11).**

The goal of QCA is to find the conditions that are a subset or supersets of the outcome given, and thus to arrive at sufficient and necessary (or INUS or SUIN) conditions that explain that outcome. "*INUS stands for a condition that is an insufficient but necessary part of a condition which is itself unnecessary but sufficient for the result" and "SUIN stands for a sufficient, but*

unnecessary part of a factor that is insufficient, but necessary for the result" **(Schneider & Wagemann, 2012, p. 79).**

The idea of QCA is to put those conditions in so-called "*truth tables*" to analyse such set relations. The truth table it is also an important tool in the QCA. In these tables the logically possible configurations of conditions are expressed. According to Schneider and Wagemann **(2012)** there are three steps to building a truth table: 1) the identification of all logically possible conditions; 2) the assignment of each case to one of these truth table rows; 3) the definition of the outcome values for each row (**p. 179**). Once these steps are done the table is subjected to analysis.

According to Ragin **(2008)** an important aspect is that QCA is suitable to analyse a small and medium number of cases: between 10 and 50. "*The motivation for using QCA should be the researcher´s interest in set relations rather than the number of cases under investigation*" **(Schneider & Wagemann, 2012, p. 13).**

My thesis seeks to understand under what conditions are developing countries willing to mainstream climate change in their public budget to comply with national and international climate commitments. The analysis is focused in the 21 major emitters of GHGs in LAC according to the World Resource Institute **(WRI, 2016)**. Although the region contributes only 8% of global emissions **(Vergara, *et al*., 2013),** this share is increasing because of the development model that countries are following.

As is further explained in Chapter 3, this thesis uses the fsQCA to analyse the conditions or combination of conditions that better explain the presence or absence of public budget labelled as climate change in the environmental ministries, as well as the presence or absence of public budget labelled as renewable energy in the energy ministries for two years, 2010 and 2016. This method provided a first analysis of the conditions that are further scrutinised in the case studies, which were selected based on the results of the fsQCA.

It is important to acknowledge that there is an on-going debate around the use of the QCA method and its variants such as the fsQCA, since it uses elements of both qualitative and quantitative methods. Scholars argue that it is important to differentiate QCA from the probability methods that according to Zadeh are complementary methods **(Schneider &**

Wagemann, 2012, p. 31). Furthermore, in order to compare the results of the fsQCA this research also applies a case study analysis, which is described next.

1.5.2. Case studies

According to Gerring **(2004)** a case study is "*an intensive study of a single unit for the purpose of understanding a larger class or (similar) units*" **(p. 342).** To select the case studies, this research applies a comparative method that, unlike the statistical method, allows for the selection of a small number of cases to do the analysis. This is based on the results of the fsQCA method.

According to Lijphart **(1971)**, the comparative method is defined as one of the basic methods of establishing general empirical propositions and recommends, "*doing comparative analysis in comparative cases*" **(p. 687)** meaning that they share similar characteristics.

Latin America and the Caribbean is a highly complex region **(Edwards & Roberts, 2015)**. Even though countries share cultural aspects, the size of the economies, societies and territories vary considerably. To do a comparative analysis requires taking into account these differences and similarities among countries to avoid generalizations. For instance, the fsQCA allowed for understanding that, even though most countries have developed several policies related to climate change, not all of them have allocated a budget to comply with them.

In this sense and based on the fsQCA the selection of two case studies was conducted, which is further described in Chapter 3. Mexico and Colombia were selected because they have characteristics that could be comparable as Lijphart **(1971)** suggests. Mexico and Colombia receive different levels of international cooperation and have different allocations of climate budget, but are similar in other conditions, such as human development, governance, climate policies and international roles, among others.

The goal of the comparative analysis with the two case studies is to obtain a deeper and richer understanding of what factors promote and hinder mainstreaming climate change in their public budget. Since the analysis of all public budgets in one country is highly complex and time consuming, two sectors that are highly related to climate change were chosen: the environmental and energy sectors. It is important to mention that for the case of Mexico and

Colombia it was possible to analyse current budget and also expenditure, and for the energy ministries it was also possible to analyse investment dedicated to renewable energy.

The analysis of the public budget was not conducted in isolation, but alongside other parts of the planning process, such as institutional arrangements in place, development of climate policies and others. To do this the analyses builds on what Daly **(2005)** proposes as levels of mainstreaming: "*it is helpful to register that there are at least five different levels of dimensions at which gender mainstreaming may take effect"* **(p. 442).** This proposal came from a study where the author analysed the extent to which eight European countries have mainstreamed gender. The results provided elements for the theory and practice of the gender mainstreaming approach that shares important aspects with the climate change problem. The five levels that will be further described in Chapter 2 are: 1) *Level of discourse or rhetoric*; 2) *Levels of institutional or structural change*; 3) *Innovation in the tools used to make policy*; 4) *New data available* and 5) *Innovation in the way that policy is made*.

Although Daly suggests that public investments should be reflected in the fifth level of mainstreaming. I suggest that the allocation of public budget requires a deeper analysis, reason why I included it as a sixth level of analysis. It is important to mention that Daly (2005) does not present these levels as linear steps that go one after the other, but rather, they can happen in parallel. The assessment of the six levels of mainstreaming is conducted based on a literature review and interviews.

1.5.3. Interviews

The interview method is widely used in qualitative research. According to George and Bennett **(2005)**, interviews are one of the central tools of research that can be used to apply the process tracing method, which is a method where the researcher examines histories, archival documents, interview transcripts and other sources to identify the causal mechanisms. In this regard, this thesis applies interviews as another method to complete the case studies selected.

Within the different types of interviews, this thesis uses elite interviews that, according to Hochschild **(2009)**, are those conducted "*with people who are chosen because of who they are or what position they occupy*" **(Online).** George and Bennett **(2005)** point out that elite interviewing is useful in political science, where process tracing frequently involves the analysis of political developments at the highest level of government, and elite actors will

often be critical sources of information about the political processes of interest**.** An important element, noted by Tansey **(2007)**, is that elite interviews are important sources of information that do not apply in isolation, but rather work to confirm information that has been already collected.

In this case, the elite interviews help to verify information, but are also relevant "*to gather new data about the beliefs or actions of specific individuals, but also to make inferences about the beliefs or actions of a wider group without interviewing everyone*" **(Tansey, 2007, p. 766**).

This thesis uses elite interviews because climate policy has been built by a growing number of stakeholders and to get everyone's perspectives is highly complex. However, this thesis explores the perspectives of different representatives from sectors such as civil servants, civil society, private sector, academy and others.

The interviews conducted were semi-structured interviews in order to allow the interviewees space to provide more information that they may consider relevant and to avoid rigid conversations. The number of interviews conducted for the analysis was 46: with 24 in Mexico, 18 in Colombia and four from a regional perspective. The interviews were coded depending on the sector that they represented and the country that they are from: Federal Government=FM; Civil Society=CS; Private Sector=PS; Academia=A; Journalist=J; International Organization= IO, Mexico=M and Colombia=C. The interviews with regional perspective were coded as "R". The list of the interviews can be found in **Appendix 4.**

1.5.4. Originality and contributions of this thesis

The present research makes at least five contributions that are important for the theory and practice of the public climate finance debate. The first contribution is related to the role of public budget in developing countries in the fight against climate change. In the literature more attention is now focused on developing countries tackling climate change but most of the analysis explores the role of policies and institutional arrangements (**Nachmany, *et al*., 2017**; ***Burck et al*., 2019**). There is no academic work, however, that has studied the role of the public budget in developing countries as a key means of implementation to comply with national and international climate goals. Although there is a growing interest in the analysis of public budget in the climate change field, most of them analyse the status of public

allocation **(UNDP, 2015; GFLAC, 2015).** There is no work that explores under what conditions developing countries, and particularly Latin American countries, are willing to mainstream climate change in the public expenditure, which is an important element to mobilize climate finance to achieve the goals of the Paris Agreement.

The second contribution is to the international cooperation field, including climate finance and development finance. This research analyses the role of developing countries not only as recipients of international cooperation but also as investors to tackle climate change and in the energy transition. One of the main findings is related to the mutual conditionality that exists between the reception of international cooperation and the allocation of public budget to deal with climate change. While international support in the form of ODA appeared necessary to explain the presence of a public budget, this national work is also important to further gain the trust of donors. This means that while international cooperation helps to build capacities at the national level, it also creates a pressure on countries to allocate public budget to deal with climate change as a way to comply with international commitments. It was observed that international cooperation has also certain limits, because is not always allocated where the money is needed but where donors have more interest; and seems to be insufficient to fulfil all the needs of developing countries.

The third contribution is related to the public finance systems in LAC. The analysis showed that if countries remain reliant on fossil fuels to generate their revenues and keep using this money to fulfil their budgetary necessities, it would be hard to achieve an energy transition from fossil fuels to low carbon technologies. Fiscal reforms and measures to improve the health of the public finance systems are highly desirable to tackle climate change and other social and environmental issues. The analysis of public finance and climate change in LAC has been evolving but this research brings further inputs for the theory and practice on the field.

The fourth contribution is to the Qualitative Comparative Analysis method. There have been studies that applied fsQCA to study climate policy in developed countries **(Tobin, 2017)**, however, there was no identified academic work related to public budget and climate change in developing countries. This is the first work that uses fsQCA to analyse the presence or absence of public budget dedicated to climate change in the 21 major greenhouse gases emitters in LAC countries, to understand which conditions or combination of conditions better explain the outcome. Although not all the results of the fsQCA model present relevant results,

the method obtained two important findings: the influence of ODA and the fossil fuel budget in the allocation of public budget dedicated to climate change. Furthermore, the method generated findings that contributed to the case study selection.

The final contribution is related to the use of the mainstreaming approach in the climate change field. While there are many academic studies of mainstreaming in gender studies, there is still a void in the climate field. This research built upon the progress from gender studies and applied it in the climate field by looking at whether governments are starting to mainstream climate change into their broad approaches to government. Daly's **(2005)** approach, identifying five levels of mainstreaming proved useful, but the addition of a sixth level - climate change mainstreaming in the public budget - significantly strengthened the analysis The approach allowed me to conclude that, while there may be progress in the discourse, design of policies, or institutional arrangements to deal with climate change, if climate change is not mainstreamed in the public budget, few changes will be implemented and success will be limited.

1.6. Outline of this thesis

The structure of the thesis is as follows. Chapter 1 analyses the relevance of the mainstreaming approach and its usefulness to study the complex nature of climate change, taking into account the work done in feminist studies regarding gender mainstreaming. At the same time, it aims to explain the multi-level nature of climate change and the role of developing countries in the international climate change regime. It also explains the important role of climate finance within the climate change debate, and the relevance of the public budget as a key means of implementation to act on and comply with national and international climate goals. Thus, this chapter explains the puzzle of the thesis as well as the research design, methods and its key contributions.

Chapter 2 explains the importance of mainstreaming climate change in public finance, describing the nature of public finance and the relevance of its cycle where revenue, budget and expenditure play a major role in the decision-making process of a country. This chapter also explains the role of the state and presents the assessment of the levels of public budget dedicated to climate change in LAC countries.

Chapter 3 operationalizes the medium-N analysis applied to 21 countries in LAC to identify which conditions or combination of conditions better explain the outcomes identified. The group of conditions selected and analysed are: 1) levels of climate risk; 2) official development assistance received; 3) levels of human development; 4) governance effectiveness, and 5) number of climate change policies. The chapter presents the results based on the fuzzy set software: among several interesting observations, crucially it shows that ODA and fossil fuel budget influence the presence and absence of climate budget in environmental ministries and renewable energy in energy ministries.

The following four chapters examine the two case studies: Mexico and Colombia. Chapter 4 assesses the levels of mainstreaming climate change in the planning and budgetary process of Mexico, based on Daly´s **(2005)** methodology. Chapter 5 explores the levels of climate change mainstreaming in the planning and budgeting process of the energy sector of Mexico because the energy sector is a major emitter of GHGs. The argument in these chapters is that Mexico has been progressing towards the integration of climate change in the discourse, institutional arrangements and the way that policy is made, but the country has been unable to achieve the climate change-mainstreaming goal, not even in the environmental sector. Furthermore, other conditions such as the reliance of its revenue on fossil fuels, appear as major obstacles to mainstreaming climate change in budget and expenditure.

Chapters 6 and 7 explain the case of Colombia, where there is also an assessment of the levels of climate change mainstreaming in the planning and budgeting process in Chapter 6, and the case of the energy sector in Chapter 7. In this case, my analysis shows that by adopting international commitments, Colombia has created national policy tools, which have in turn influenced the allocation of public investments related to climate change. The Colombian case shows active and clear efforts by the government to mainstream climate change at the institutional, policy and budgeting levels. According to civil servants, civil society, private sector and academic experts, these decisive actions are directly linked to the high levels of climate vulnerability that the country faces and that has generated financial loses.

Chapter 8 discusses the results of the two methods (fsQCA and case studies) in order to identify the conditions that have promoted and hindered climate change mainstreaming in public expenditure. This Chapter shows that both methods share two conclusions, which are that international cooperation, such as ODA, is a major promoter of the mainstreaming of

climate change in the planning and budgetary processes in countries like Mexico and Colombia, but that their dependency on fossil fuel is a major hindrance for the success of such processes.

Finally, Chapter 9 provides the main conclusions of the research, as well as a short resume about the contributions achieved in the research as well as the research limitations and the direction that potential future work may follow.

CHAPTER 2. THEORISING CLIMATE CHANGE MAINSTREAMING IN THE PUBLIC BUDGETS OF LATIN AMERICAN AND THE CARIBBEAN COUNTRIES.

Introduction

Chapter 1 outlined the complexity of the climate regime and why the participation of both developed and developing countries is relevant to tackle climate change, including climate finance mobilization based on their respective capacities. This chapter further analyses theoretically mainstreaming climate change in the public budget of developing countries. In order to do so, the importance of the public finance cycle is analysed, as well as the evolution of this topic in the context of Latin America and the Caribbean (LAC) countries.

The chapter aims to highlight the important role that the public budget allocation has for the compliance of climate policies, and while is true that limited resources are available at the national level, there is a need to further diversify the sources of income to reduce the dependence of fossil fuel and to increase the possibility to transform the economies of countries in LAC, otherwise to achieve the national and international commitments on climate change will be highly difficult.

To discuss this, the chapter is broken into five sections. The first section provides further analyses about what mainstreaming climate change in the public budget means in theory and the advantages and disadvantages of the mainstreaming climate change approach. The second section analyses the elements that are part of public finance, such as revenue, budget and expenditure to contextualize the relevance of each of them in the planning process. The third section analyses the evolution of this topic in LAC, where the analysis of public climate finance is only in its initial stages. The fourth section presents the assessment of the public budget allocated to tackle climate change in the 21 major greenhouse gases emitters in the region, which is the base for the Qualitative Comparative Analysis described in Chapter 3. While the fifth and last section presents some conclusion about the chapter.

2.1. What does mainstreaming climate change mean in theory?

Mainstreaming is not a new concept. It has been popular since the 1990s as a means to efficiently tackle development issues such as gender inequality, environmental degradation, risk management and most recently, climate change **(Oates, *et al*., 2011; UNDP, 2015a)**. Oates, *et al.,* explain the concept as cross-cutting issues that should influence the 'main-stream' developmental activities, rather than being addressed as separate initiatives **(Oates, *et al*., 2011, p. 1).**

In the climate change field, the IPCC considers mainstreaming as a means to development policies, programmes and/or individual actions that otherwise would not have taken climate change mitigation into consideration explicitly, including decisions surrounding sustainable development **(IPPC, 2015).**

An important debate in the context of the mainstreaming definition is that, according to Gupta and Grijp **(2009),** mainstreaming is different than policy integration. For the authors, integration is a checklist process while in the case of mainstreaming there is a process to re-think policies based on climate change (in this case).

2.1.1. Climate policy integration and climate change mainstreaming

Underdal **(1980)** suggests that "*to integrate means to unify, to put together into a whole*" and that integrated policy, "*means a policy where the constituent elements are brought together and made a subject to a single unifying conception*" **(p. 159)**. The author says that "*to qualified*

as integrated a policy must meet three basic requirements, viz comprehensiveness, aggregation and consistency" **(p. 159).**

The integration of an environmental perspective in planning processes is something that has been evolving in theory and practice **(Meijers, *et al*., 2004).** The concept that was created to follow such processes is called the Environmental Policy Integration (EPI). According to Oosten *et al*., **(2018)** "*the principle of EPI refers to the incorporation of environmental concerns into other policy areas to overcome policy conflicts*" **(p. 64).**

Persson **(2014)** describes the EPI analysis as a four-part process as follows: (1) a more integrated decision-making process; (2) improvement of underlying conditions such as effective implementation and enforcement; (3) specific environmentally integrated policy outputs such as policy instruments that improve both economic efficiency and environmental quality; (4) improvement of data and analytical input to the policy-making process such as integrated accounts **(pp. 3-4).**

Since EPI aims to include only environmental aspects in the policy, it was not considered well-equipped to tackle a complex subject such as climate change, which must incorporate social, cultural and economic aspects. For this reason, Mickwitz *et al.* **(2009),** proposed the creation of the Climate Policy Integration (CPI) approach, which is "*the incorporation of the aims of climate change mitigation and adaptation into all stages of policy-making in other policy sectors (non-environmental as well as environmental)"* **(p. 19).**

In this same line of thought another concept was adopted in the climate change field, namely the mainstreaming approach. As was stated in Chapter 1, mainstreaming proposes to bring climate change (in this case) to the centre of the policy design, instead of "just" integrating it, with the aim of changing the way that policies are made **(Gutpa & Grijp, 2010).** While, Nkiaka and Lovett **(2018)** point out that **"***mainstreaming involves the articulation of information, policies and measures into on-going development planning and decision-making to address climate change; considering that it is easier to start with existing policies and practices, rather than creates new ones"* **(p. 50).**

There are important similarities regarding the aim of both CPI and climate change mainstreaming. For instance, CPI refers to the relevance of multi-level governance as a key element to ensure integration. Multi-level governance according to Bache and Flinders **(2004)**

"*refers to the increasing interdependence of governments operating at different levels, while 'governance' signalled the growing interdependence between governments and non-governmental actors at various territorial levels*" **(Mickwitz *et al*, 2009, p. 25).** In the case of mainstreaming multi-level governance analysis is also key, since it occurs at various levels from local to regional to global and involves all actors **(Gupta & Grijp, 2010; Wälti, 2010).**

CPI and climate change mainstreaming are similar, but Gupta and Grijp **(2010)** state that integration is not the same as mainstreaming, but that CPI seems to be the first step of the second. Achieve either or both is a complex task that brings challenges. To analyse the difference between the two concepts is not the main goal of this research, but it is important to acknowledge the debate that exists between the two concepts, since some authors use them as synonyms.

For instance, Ravindranth *et al*., **(2010)**, point out that mainstreaming is the incorporation of climate change considerations into established or on-going policies, development programmes, policies or management strategies, rather than developing climate adaptation and mitigation initiatives separately**.** In the same line, Klein *et al*, **(2007)** mention that "*mainstreaming involves the integration of policies and measures that address climate change into development planning and on-going sectorial decision-making, so as to ensure the long-term sustainability of investments as well as to reduce the sensitivity of development activities to both today's and tomorrow's climate*" **(p. 9).**

This is a debate in progress, but there are few observations. The first is that climate change mainstreaming has been analysed mainly in the development agenda, and this one is mainly related to the adaptation side of the climate agenda **(Nkiaka & Lovett, 2018)**, because it is considered highly difficult to separate climate adaptation from the development agenda. Furthermore, climate change mainstreaming and CPI are used interchangeably when they refer to a process, but not referring to a final goal **(Gupta & Grijp, 2010).** This means that in general, integration and mainstreaming involve different levels of action to be achieved. For that reason, in this thesis mainstreaming is considered equivalent to integration when I refer to a process but, but different when I refer to the goal, as suggested by Gupta and Grijp **(2010).**

2.1.2. The process to achieve climate change mainstreaming

According to Gupta and Grijp **(2010)** the goal of climate change mainstreaming is not to include climate consideration into existing policies, but rather to create new policies under the climate change lens to deal with the problem in a structural way.

In this sense, Gupta and Grijp **(2014)** propose five stages that have to be in place in order to achieve mainstreaming: 1) The search of ad-hoc pilot projects and approaches that aim to reduce emissions or enhance adaptation; 2) a more systematic search for win-win solutions that simultaneously deal with climate change and development goals; 3) all policies, programmes and projects are subjected to climate proofing to ensure they are resilient with respect to the impacts of climate change; 4) all policies, programs and projects are subjected to GHG-emission screening to ensure that these emissions are taken into account in project design (mitigation integration); and 5) a climate made upstream across the policy cycle **(p. 77).**

Nkiaka and Lovette, **(2018)** suggest that in the case of mainstreaming climate adaptation, there are policies that can facilitate directly or indirectly the process, to understand, i) how the government organizational structure has been re-configured to accommodate climate change and environmental protection; ii) how information related to climate change is disseminated to the general public; iii) how new academic departments have been created to accommodate climate change, and iv) how climate change adaptation is funded and the various constrains involved **(p. 51).**

The processes to assess climate change mainstreaming proposed by Gupta and Grijp **(2010)** seem rational but it assumes that countries have detailed information to do the assessment, which is not the case of Latin American countries. In the case of the approach taken by Nkiaka and Lovette **(2018),** was useful, but additional levels of analysis were needed. Consequently, the thesis seeks to adapt approaches that have been applied in other areas such as gender.

Daly's approach to gender mainstreaming provides a useful approach to understanding the climate change mainstreaming process to cover a broader spectrum of the planning cycle. Daly **(2005)** suggest that *"the distinctiveness of the gender mainstreaming approach is that it seeks to institutionalize equality by embedding gender-sensitive practices and norms in the structures, processes and environment of public policy***" (p. 438).**

For this work, the proposal of Daly is relevant because it analyses the role of the state, although recognises that further non-governmental stakeholders also have to be part of the mainstreaming process. According to Daly **(2005)**, "*it is helpful to register that there are at least five different levels of dimensions at which gender mainstreaming may take effect*" **(pp. 442-442)**. As described in Chapter 1, these steps were adapted to the context of climate change, proposing five levels of analysis to reach mainstreaming climate change, that are also alike to the EPI analysis proposed by Persson **(2004).** Although Daly does not provide a detailed description of the levels, I further described them in the context of climate change:

1) *At the level of discourse or rhetoric:* this refers to the analysis of language data, including talk, documents and broadcast material **(Taylor, 2012),** and explains the extent to which climate change has been mainstreamed in the discourse of high-level representatives in the government to show a change in the normal trend;
2) *At the level of institutional or structural change: this* explains the extent to which there are institutions created to deal with the specific problem, creating structural changes to deal with the problem (for instance, the creation of dedicated "climate change" units);
3) *Innovation in the tools used to make policy:* this explains the extent to which climate focused policy analysis, evaluation, and monitoring mechanisms to tackle more effectively the problem, are in place;
4) *New data available:* as a result of the last two types of change, this explains the extent to which new data has been made available (sometimes this means old data with new disaggregation), and new research has been undertaken;
5) *Innovation in the way that policy is made:* this explains the extent to which "*the range of official actors in the policy process has broadened, especially through the inclusion of those in line ministries or departments or agencies heretofore not associated with [climate change]. Furthermore, there has been a visible increase in social dialogue through the institutionalization of consultation practices, and an increase in government investment with a view to equipping [climate change´s] representatives with the necessary skills to participate in policy-making*" **(Daly, 2005, p. 444).**

Once the analysis of the levels of mainstreaming is conducted, Daly **(2005)** suggests that there are three possible ways to classify the progress of the countries, which I adapted to climate change to assess the progress of Mexico and Colombia. These are:

> **1)** ***Integrated approach*** is where responsibility for [climate change] is extended to most if not all, actors involve in public policy and is embedded across institutions in society; **2)** ***mainstreaming in the form of limited transversality****, or mainstreaming light*, is where transversality indicates little more than the involvement of different government departments or ministries in the implementation of a plan or program around [climate change]. What [climate change] mainstreaming means in these contexts is a spreading out of responsibility for [climate change] objectives to more line ministries. However, mainstreaming is at an early stage of development and typically does not span the entire policy spectrum or hierarchy. **3) [*Climate change] mainstreaming is a highly fragmented endeavour***, confined either to a small number of policy domains or to a specific program within a domain and disconnected from general governmental policy on climate change **(p. 439).**

Daly **(2005)** does not present these levels as linear steps, but rather as indicators that assess if mainstreaming is taking place to then assess if mainstreaming is actually as effective to achieve the transformational change. In this point, the author considers that the extent to which gender mainstreaming is transformative is a critical issue, which is still unsolved, which also applies to the climate change agenda. The author affirms that while gender mainstreaming has been better developed as policy approach than concept, there are still some critiques, such as the fact that mainstreamed is practiced within and across national settings, which makes the implementation excessively focus on policy makers, which could read as a tendency towards the technocratization of gender mainstreaming.

It is important to note that Daly **(2005)** pointed out the necessity to conclude this process with the inclusion of climate change (in this case) in the public investments as an expression of commitment with the agenda. Although the author barely mentions this as part of the fifth level, she recognizes its importance, which is why I added it as a sixth level: "*allocation of public budget and expenditure*". Public budgets cannot be seen as an isolated element of other public policy instruments but rather as the response to them. In this sense, public policy should then be translated into public budget and expenditure allocation **(Gutierrez, 2013).**

Mainstreaming climate change in public budget and expenditure requires the allocation of financial resources to actions dedicated or related to climate change in a predominant way.

There are clear challenges to achieve that, such as the fact that there are limited public resources, and the unclear definition about what represents climate finance, among others. However, in the next section, I discuss why mainstreaming climate change in the public expenditure represents an important opportunity to tackle its effects.

2.2. The importance of mainstreaming climate change in the public budgets

The evolution of international agreements as well as national policies related to climate change have acknowledged that, in order to fulfil mitigation and adaptation goals, it is necessary to have means of implementation such as technology transfer, capacity building and, primarily, financial resources. The UNFCCC recognizes that developed countries have to provide financial support to developing countries in order to support mitigation and adaptation actions **(UNFCCC, 1992, Article 4).**

However, the Paris Agreement also states the necessity "*to make the financial flows compatible to the low greenhouse gases and resilient development*" **(UNFCCC, 2015).** The goal does not specify the type of financial flow, who must do it or to what end, but rather leaves the goal open for interpretation, but although recognizes that developed countries must lead the mobilization of financial flows and invites "*other parties*" to contribute in the provision of information about the climate financial flows provided and mobilize **(UNFCCC, 2015, Article 9.5).** Although not clear reference to who are "*other parties*" is included, is assumed that refers to developing countries in capacity to do so.

In this sense, developing countries public investments are therefore also important instruments that are needed to deal with climate change. In the Index of Climate Policy Activity, Schaffrin *et al* **(2015),** point out that it is important to distinguish between the standard set of policy instruments most widely applied in climate policy research: regulatory measures ('authority', 'stick'), soft instruments ('nodality', 'sermon'), market-based approaches ('treasure', 'carrot'), framework policies ('organization', 'adhesives'), and public investments ('treasure', 'carrot') **(p. 4).** According to Tanzi **(2008)** the use of public finance tools is important for the state to comply with its commitments. One of the key tools that the state has to deal with domestic matters is public finance, which is part of the public policy cycle, where the decision makers determine priorities.

Before analysing in detail the importance of public finance and its cycle in the context of climate change, it is important to acknowledge that the mainstreaming approach applied in this research has some limitations.

2.2.1. Discussing criticisms about the mainstreaming approach

There are a number of limitations regarding the use of the mainstreaming approach. Some authors consider that mainstreaming tends to technocratize agendas, because it focuses on the action of the state in the first place. It is not that the concept does not recognize the role of non-governmental action, but it refers to the importance of the action of the state as a key step for operationalization of mainstreaming gender and climate change **(Daly, 2005; Jordan & Lenschow, 2008; Adelle & Russel, 2013; Milward, *et al.,* 2015).**

In this research I consider that is important to diversify stakeholders but I also highlight what Eckersley points out about the role of the state, which is fundamental because its institutions are the ones that are creating environmental problems **(Eckersley, 2004, p. 258),** therefore they are the first ones that need to adapt to rethink the way that they operate, as part of the solution of central problems.

Another limitation refers to the diffuse attribution of responsibilities in the mainstreaming process. Since the idea is to include climate change in the planning process at different levels and within different actors, there is a concern regarding the lack of control over the action of each entity. Put in another way, if each entity must deal with the problem, who is in charge of tracking compliance? However there is also a concern about the centralization of the agendas, since under the mainstreaming approach specific areas have been created to deal with problems, but sometimes are "*weak and underfunded*" which is the case of gender, and also the case of climate change **(Milward, *et al.,* 2015).** In this context, to what extent this centralization and further specialization create a barrier to other sectors to participate in the actions remains a problem.

Another important critique in the context of gender mainstreaming that the agenda of climate change needs to consider, is that the approach became so institutionalized that in the aim to achieve the mainstreaming as a goal, it lost the real purpose, which was the reduction of inequalities between men and women **(Milward, *et al*., 2015).** Furthermore Milward *et al.*

(2015) point out that the problem has been also to be able to assess the effects that mainstreaming internally has at the external level, which is part of the critique of the technocratic dimension of the approach, that cannot be disconnected of the effects that the measures taken by the state have in the rest of the society.

Referring to the CPI, Mickwitz *et al.,* **(2009)** point out that it "*is not a panacea*" but an approach that could help analyse the problem in a cross-disciplinary and more integral way. In that sense, both integration and mainstreaming as processes require some effort to be achieved, however mainstreaming as a goal is difficult to assess since there is not enough empirical evidence that demonstrates that one state can put climate change at the centre of its planning process and therefore is not possible to assess its effectiveness. Furthermore, Daly **(2005),** also recognize that the extent to which mainstreaming is producing transformational changes is still unsolved.

These limitations help to understand that there are still important areas to improve in order to make this approach as effective as possible to tackle climate change, which is the ultimate goal, although is still useful to study the progress of countries in regards of institutional, and policy changes related to climate change.

2.3. Public finance cycle: revenue, budget and public expenditure.

Public finance refers to "*the income and expenditure of public authorities, and the adjustment of the one to the other*" **(Dalton, 2015, p. 3).** Dalton **(2015)** points out that the public finance scheme aims to procure public goods, arrange and fund various transfers, and direct entities existing in the economy towards socially desirable behaviour, for instance, through taxes, penalties, subsidies and other stimulus and changes. This scheme can be understood as a cycle where the fiscal system is established to collect an amount of public revenue, which it then organizes as the public budget to fund public expenditures at different levels of the state.

It is a complex system because its functioning depends on many internal and external factors. In the public sector, public funds will never be enough to fulfil all the needs of the population and thus it is necessary to prioritize the areas to be funded **(Interviews 1FGM, 5FGM).** This perception is particularly common in countries where revenue collection is not high enough or sufficiently allocated among all the relevant areas of development. To understand this

complex interaction, I describe some of the key factors that are part of the public finance cycle of the state: revenue, budget and public expenditure.

Revenue

Public revenue includes any revenue flowing to the public budget. The greatest revenue is generated through taxes. There is revenue that does not come from taxes, called non-tax public revenue (interest revenue, charges, and revenue from selling and renting out state or municipal property). According to Bandy **(2015)**, "*tax is a payment to public budgets that is obligatory, determined by law, non-refundable, non-equivalent and usually of no special purpose*" **(p. 41).** Once the income from taxes comes to the general budget, it can be allocated in any area of interest of the state.

In a healthy economy taxes should follow two main principles: a) the principle of justice and b) the principle of effectiveness. In general, "*taxes are considered fair when they correspond with the populous' idea of the division of the tax burden among individual tax subjects*" **(Bandy, 2015, p. 42).** However, the redistribution of taxes is a major challenge because most of the time there is a trade-off between fairness and efficiency or having "*something for something else*" **(Bandy, 2015, p. 54)**.

Taxes are politically complex issues in many countries, however, as Fuentes **(2017)** points out, it is possible that a country avoids increasing taxes as first step because is political unattractive, but that does not rule out rising taxes eventually or reduce expenses**.** Even though the state "*is the largest player in modern societies, and often tries to control via regulation the economic resources that it does not take in taxes*" **(Smith, 2006, p. 12),** in practice the revenue whether it comes from taxes or borrowing will determine the rest of the factors of the public finance: budget and public expenditure.

Budget

Once revenues are determined, budgets are then developed and set in motion. "*The budget is an economic plan that focuses the entity´s financial and human resources on the accomplishments of specific goals and objectives established by the policy makers*" **(Bandy, 2015, p. 42**). Bandy **(2015)** points out that, there are three things to consider in the state

budget: the level of income and borrowing, which determines the capacity of the public manager´s organization, the planned expenditure and investment, which represent the resources converted into goods and services that are valued by the public, and the approval by the organization´s highest level of governance.

Bandy **(2015)** also points out that in the context of the public sector, budget is inevitably political, and is a process that implies a certain level of competence among institutions and where issues such as fairness or social justice are prioritized. Although the budget is an important tool in state planning, "*the outcome of the budget depends heavily on whether there are clear rules for formulating, executing, and reporting on the annual budget, as well as clear statements of medium-term fiscal policy objectives*" **(Lienert & Fainbom, 2007, p. 2).**

According to the Overseas Development Institute, an important factor related to the outcome of the budget is that it creates winners and losers **(ODI, 2004)**. Winners are often those who have the capacity to advocate; those that do not have this capacity are likely to be losers in the budgeting process.

Although this is not a subject of this thesis, it is important to know that not all budgets are developed in the same way or under the same premises. Most state budgets are developed with a political mid-term vision and indicators to track the levels of effectiveness in the allocation of public money. This is what Robinson and Last **(2009)** called performance-based budgeting.

According to Bandy **(2015)**, nearly all OECD countries have developed performance data and tools to improve accountability; while there is a growing number of tools to assess these processes such as the Public Finance Management Performance Measurement Framework of the World Bank **(2016)**, created because according to the Bank**,** the budget is an indicator of the financial health of a state.

A critical element of the budgeting process is that any budget decision will have long-term consequences. Of course, there is a level of uncertainty regarding what could happen in the future such as how much income will be raised, the cost of goods and services and price inflation, among other things. However, the idea of future planning is precisely to re-think today's decisions for future impact, which is more difficult for low-income countries that are

highly sensitive to swings in commodity prices, donor aid and others matters, making particularly difficult to implement medium term budgets **(Bandy, 2015).** Nevertheless, how countries expend their funds is crucial to the efficiency of the fiscal cycle.

Public expenditure

Public expenditure is the flow of financial means within the public budget system. According to Guru **(2016)** "*public expenditure can be used to improve income distribution, to direct the allocation of resources in the desired lines and to influence the composition of national product*". Bandy **(2015)** suggests there are two main types of public expenditure: government expenditure and transfer. Government expenditure is divided into government consumption and investment expenditure. Transfers on the other hand are flows of public funds from the state to various economic entities, which are also called "*negative taxes*".

As Dalton **(1922)** points out, government expenditure is not necessarily the same amount of the national income, because the income serves to do payments of interest on internal public debt and payment of pensions, and others. After all these payments, the government can say what is "available" to spend. Public expenditure that exceeds public income can give rise to public debt **(Bandy, 2015).**

There are different perspectives related to the role of public expenditure in the economy of a country that are not the subject of analysis in this thesis. However, it is important to be aware of these debates. For instance, Wagner´s Law (Alfred Wagner 1835-1917) suggests that public expenditure has a direct impact on economic growth and that economic growth has an influence on the public expenditure **(Akrani, 2011a)**. Meanwhile the Keynesian hypothesis implies that an exogenous factor is government spending, which can influence political factors to encourage economic growth, but does not necessarily have a direct impact **(Chappelow, 2019).** In an empirical study, Pinilla *et al*, **(2013)** concluded that the increment of the public expenditure of the central government in a specific period had a positive although limited impact on the economic growth in Latin American countries.

What is relevant in this discussion for this thesis is that there are several factors that influence public expenditure and therefore economic growth. These factors could be social and demographic factors, threshold events, and technological changes, to mention a few.

To sum up this section, I posit that public finance is a complex and imperfect system that nonetheless has an important role in the planning process of a country, where the state has a major role to play. The role of the state is not static, but rather it is changing to adapt to both local and global contexts, shifting away from an interventionist state, by limiting its participation to that of a regulator of activities **(SHCP, 2015).**

Keynes proposed with the economic crisis of 1929 that the state should control the crisis with economic functions. In that sense, since the 1930s in western economies, the role of the state has broadened to include economic functions, known as the fiscal function or public finance function, that include the capacity of allocation, redistribution, and stabilization **(SHCP, 2015).**

The intervention of the state is relevant because its actions are related to the provision of public goods, which includes social and environmental protection **(Fuentes, 2014).** According to Sachs, the market itself is not necessarily influenced by social or environmental conditions **(Sachs, 2012);** for instance, Stern **(2006)** pointed out that climate change is the major market failure.

My argument is by strengthening the public finance cycle developing countries can redefine priorities to mainstream climate change, because this problem will produce economic and social costs that the public finance system will have to deal with, sooner or later. The next section will discuss how public finance related to climate change is evolving in Latin America and the Caribbean countries.

2.4. Public finance in Latin America and the Caribbean countries

The public finance system could operate differently in developing economies, particularly the public budget and expenditure, depending on governmental priorities. Fan and Rao **(2003)** found that over the past decades, government expenditure in developing countries shows erratic patterns. Based on their study of 43 developing countries, they found that Latin American countries, for instance, had the slowest growth in spending between 1980 and 1998. There was virtually no growth in the 1980s, and rapid growth in the 1990s was primarily due to recovery from the decline in the 1980s **(Fan & Rao, 2003).**

According to Tanzi **(2008),** the Latin American countries were not able to increase their public

spending to the European level because of their inability to raise taxes. Due to this, and the additional pressure to play a larger role in the economy, the author notes that Latin American countries made growing use of tools other than public spending to achieve a similar goal, such as promoting the nationalization and privatization of enterprises, executing expropriations, and other regulatory measures.

In recent years the economic growth in Latin America and the Caribbean varies among countries. According to the Economic Commission for Latin America and the Caribbean (CEPAL, *Comisión Económica para Latinoamérica y el Caribe*) in 2018 the economic growth in the region was estimated at 1.2%, which implies a slight deceleration compared to 1.3% growth reached in 2017. The growth was different per region; in South America there was a decrease from 0.8% in 2017 to 0.6% in 2018. In Central America, Cuba and Haiti, it decreased from 3.4% to 3.2%. In the case of Mexico, it grew at a slightly higher rate, from 2.1% in 2017 to 2.2% in 2018. Finally, "*in the Caribbean the recovery of the impact of the natural disasters of 2017 contributed to an acceleration of growth*" from 0.2% in 2017 to 1.9% in 2018 **(CEPAL, 2018a, p. 11).**

On the other hand, CEPAL **(2017)** has pointed out that the levels of poverty are also increasing, in 2016, the number of people living in poverty in Latin America was 186 million, or 30.7% of the population, while extreme poverty affected 61 million people (10% of the population) **(p. 88).** Situation that has also influenced the growth in the informal employments that do not pay taxes, and therefore less generation of revenues have been available to generate enough budgets to invest in social programs to reduce poverty. This is a complex vicious cycle that could explain the limited economic growth and the growing levels of poverty.

Furthermore, the behaviour of the public finance cycle in Latin America is shaped by the existence of natural resources and the type of activities that contribute to their economies, as explained in the next section, specifically the role of fossil fuels in the economy of these countries.

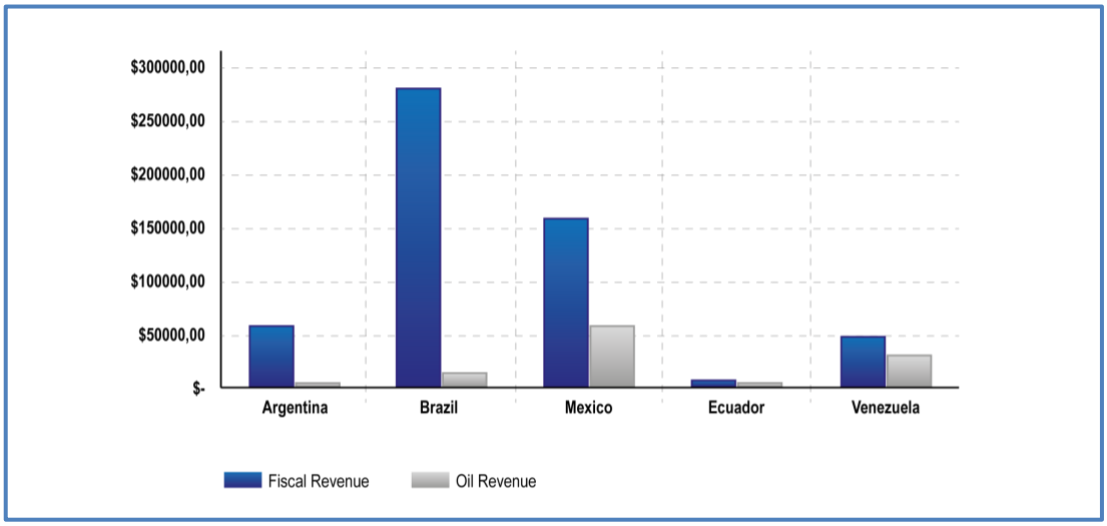
2.4.1. The influence of fossil fuels on the income of Latin-American countries.

An important factor in the economy of the region is the changes in the prices of materials. For instance, in 2018 there was an increase in the price of oil (28%), as well as minerals and other

agricultural products that increased by 5% and 3% respectively **(CEPAL, 2018a, p. 9),** which positively impacted some economies. Latin America is highly dependent on fossil fuels. Hence, to understand the dynamics of public finance in Latin America and the Caribbean it is necessary to understand the role played by fossil fuels in these economies, which is a subject that is receiving growing attention **(Fontaine, 2003; Monge, 2013; Fuentes, 2014).**

The country with the largest amount of oil reserves in the region is Venezuela with 80,000 million barrels (MMB) followed by Mexico with 12,000 MMB, Brazil with 11,800 MMB, Ecuador with 4,600 MMB, and Argentina with 1,900 MMB, which have been declining for several years **(Campodonico, 2008).** According to CEPAL this can be translated into fiscal revenues. For instance, in 2006 the oil revenue in comparison with fiscal revenue was: USD 4,166 million versus USD 51,160 million in Argentina; USD 13,627 million versus USD 280,800 million in Brazil; USD 58,127 million versus USD 158,940 million in Mexico; USD 4,439 million versus USD 6,952 millions in Ecuador; USD 30,147 million versus USD 45,833 million in Venezuela, as shown in Figure 2.1, **(Campodonico, 2008).**

Figure 2. 1 Oil and Fiscal Revenues in selected countries (in millions of USD)

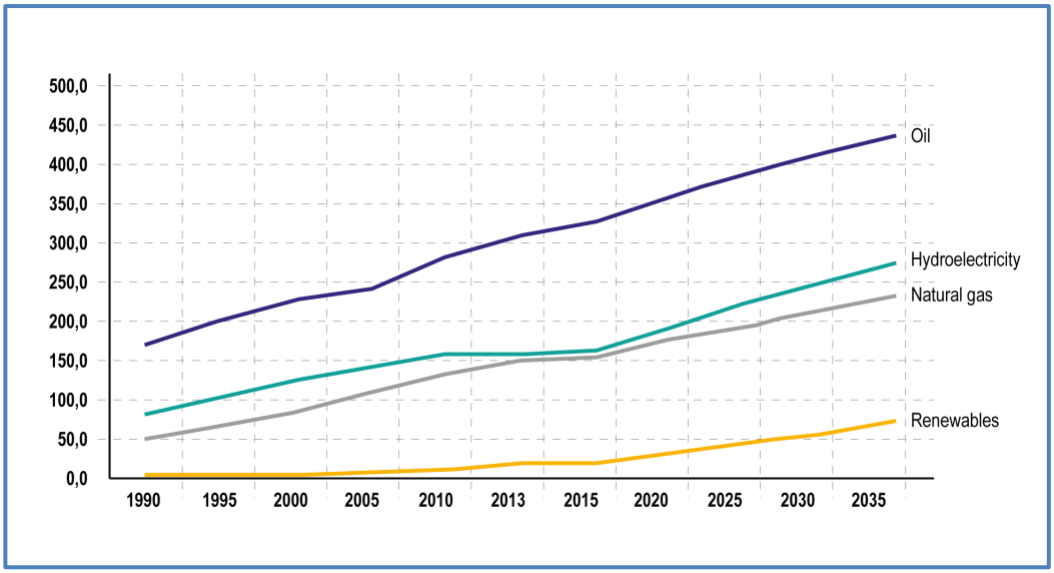


Source: Campodónico, 2008.

The dependence on fossil fuel has been creating a vicious cycle, where countries tend to invest more in fossil fuel infrastructure to increase production. However, the historic trends show that production in many countries has been declining because their reserves are also decreasing. Nevertheless, Honty **(2017)** studied that, even though falls in oil reserves are clear

in Latin America, governments are investing more in fossil fuels than in renewable energy as shown in the Figure 2.2 produced with information from the World Energy Outlook **(2014).**

Figure 2. 2 Energy consumption by source in Latin America (1990-2035)



Source: World Energy Outlook 2014.

According to Honty **(2017),** while conventional oil reserves are decreasing a new trend is on the rise: unconventional methods to extract fossil fuels such as fracking, a drilling technique used for extracting oil or natural gas from deep underground **(EB, 2020; AMCF, n.d.).** There are several criticisms against this method, including of the amount of water and chemical products that are used in the process that are harmful for health, and the potential risk of earthquakes associated with it **(De la Fuente, & Olivera, 2017).** The environmental discussion about the effects of fracking is growing in Latin America, because even though there are a number of risks identified so far, countries such as Argentina, Brazil, Bolivia, Colombia, Mexico, Paraguay, Venezuela and Uruguay are investing in or exploring the possibilities to extract further oil and gas with this technique **(Bessi & Navarro, 2015).**

In further chapters I will explore the cases of Mexico and Colombia regarding their activities related to fracking and other practices that are increasing the production of oil and natural gas in the region.

2.4.2. Public budget and climate change in Latin American countries

Most Latin American countries have submitted their nationally determined contributions to deal with climate change, many of them pointing out that they will be fulfilling the goals with their own means of implementation or, what they call, unconditional measures. This means that they will be able to fulfil commitments with their own financial resources. In this section I explore to what extent some countries have been integrating climate change in their public budget according to available literature.

At the global level, there have been efforts to track the amount of money flowing from developed to developing countries, such as the work done by the Standing Committee on Finance (SCF) mentioned in Chapter 1. Although the analysis conducted by the SCF aims to incorporate information from public finance, it refers primarily to the developed countries public finance. In their biennial report of climate finance in 2016 and 2018 the SCF tried to incorporate information from public expenditure that came from developing countries, but a limited number of countries are reporting this information. What is not clear is to what extent the information is available, but probably not publicly available, or to what extent the information does not exist at all in developing countries.

In Latin America there are two major efforts to analyse public budget related to climate change. On one hand, UNDP conducts analysis about public expenditure and climate change through their Climate Public Expenditure and Institutional Review (CPEIR) methodology that has been mainly applied in Asia and Pacific countries but lately also in Latin American countries such as Colombia and Ecuador **(UNDP, 2015).**

Another regional initiative is led by the Climate Finance Group for Latin America and the Caribbean (GFLAC, *Grupo de Financiamiento Climático para Latinoamérica y el Caribe* for its name in Spanish), that has been analysing climate finance with a hybrid focus, monitoring climate finance flows that arrived to Latin American and the Caribbean countries from international sources (top down approach), and also monitoring the allocation of public budget at the national level (bottom up approach) **(GFLAC, 2015).** Based on this, the organization analysed the cases of Argentina, Chile, Ecuador, and Peru in 2014, followed by Bolivia, Nicaragua, Honduras, and Guatemala in 2015.

The aim of this analysis was to understand to what extent climate change programs or projects were included in the federal public budget, in order to understand the relevance of the topic

in the context of the whole public budget **(Guzman *et al.*, 2017).** This analysis showed that the amount of public budget dedicated to climate change in relation to the total national budget is rather scarce, and some countries like Chile represented only the 0.04% in 2014, while in other represented higher amounts, such as 2.45% Guatemala in the same year, but never more than 2.5% of the total budget **(Guzman *et al.*, 2017).** There are some challenges in the conduction of these analyses, such as transparency challenges, which is a major barrier.

Mickwitz *et al* **(2009),** pointed out that the analysis of the evolution of public expenditure in developing countries is needed. Such exercises as shown above are examples of this in the context of Latin America, although more practical and theoretical work is still needed.

2.5. Assessing climate change mainstreaming in the public budget of Latin-American countries

To build on the previous analysis, I studied to what extent the 21 major emitters of GHG in Latin America have mainstreamed climate change in their public budgets. This analysis sets the stage to conduct the Medium N analysis based on the Qualitative Comparative Analysis that is included in Chapter 3.

Since there is not a universal definition of climate finance, I looked at the budget based on the "current expenses"[23] of these Latin American and Caribbean countries to define two main outcomes: 1) the allocation of budget explicitly labelled as climate change within environmental ministries or within the environmental sector (depending on the information provided by countries), which includes climate policies or institutional arrangements such as climate offices, or any program labelled as climate change; and 2) the allocation of budget labelled as renewable energy in the energy sector, which includes policies, institutional arrangements or programs labelled as renewable energy. As I explained in Chapter 1, renewable energy is an alternative to fossil fuels for power generation and other activities in the energy sector. This analysis presents only current flows and refers to constant prices[4].

[2] **Type of expenses:** Based on its economic classification, the programmable expense is divided into current expense and capital expense. The first one is dedicated to the operation of the public sector, without increasing the net worth; and the second refers to expenditures that increase the net worth of the public sector.

[3] The analysis is based on programmable budget. The numbers presented aim to show tendencies in the budget allocation, not round numbers. The conversion to USD was done in an online converser https://www.xe.com/es/currencyconverter/, which might change the real number of the local currency.

[4] It refers to those that serve as a reference at a certain time to establish a comparison with subsequent prices **(Galan, nd).**

The amount of resources labelled as climate change in the public budgets of Latin American and the Caribbean countries is limited. The analysis presented in Table 2.1., includes the results for the two main outcomes, presenting whether countries label activities in the public budget of their environmental ministries as climate change; and whether they label renewable energy activities in their energy ministries as renewable energy for both 2010 and 2016.

Since transparency of the public budget plays a major role in the analysis conducted, Table 2.1 also indicates whether the budgetary information collected in the table was publicly available and the score that the countries obtained in the Open Public Budget Index[5] in 2017.

Table 2. 1 Presence of climate change and renewable energy budgets in LAC countries (in 2010 and 2016)

Country	Presence of budget labelled as climate change in the public budget of the environmental ministries 2010	Presence of budget labelled as climate change in the public budget of the environmental ministries 2016	Presence of budget labelled as renewable energy in energy ministries in 2010	Presence of budget labelled as renewable energy in energy ministries in 2010	Information about public budget available publicly in in the Finance Ministry websites	Score Open Public Budget, IBP 2017
Argentina	No	No	No	No	Yes	50
Bolivia	Yes	Yes	Yes	Yes	Yes	10
Brazil	No	Yes	No	No	Yes	77
Chile	No	No	Yes	Yes	Yes	57
Colombia	Yes	Yes	No	Yes	Yes	50
Costa Rica	Yes	Yes	No	No	Yes	56
Cuba	NA	NA	NA	NA	NA	NA
Dominican Republic	No	No	No	No	Yes	66
Ecuador	NA	NA	NA	NA	NA	49
El Salvador	No	Yes	Yes	No	Yes	45

[5] The Open Budget Survey assesses budget transparency based on the amount and timeliness of budget information governments are making publicly available. Each country is given a score between 0 and 100 **(IBP, 2017)**

Guatemala	Yes	Yes	Yes	Yes	Yes	61
Honduras	Yes	Yes	No	Yes	Yes	54
Jamaica	No	Yes	No	Yes	Yes	NA
México	Yes	Yes	No	Yes	Yes	79
Nicaragua	No	Yes	Yes	Yes	Yes	43
Panama	No	No	No	No	Yes	NA
Paraguay	No	No	No	No	Yes	43
Peru	No	Yes	Yes	Yes	Yes	73
Trinidad y Tobago	No	No	No	No	Yes	NA
Uruguay	No	Yes	No	No	Yes	NA
Venezuela	NA	No	NA	No	Yes	0
No = Absence of explicit climate change budget/ or renewable energy budget Yes = Presence of explicit climate change budget/ or renewable energy budget NA = information on the public budget was not available						

Sources: Own elaboration with information from the public expenditure of the 21 countries and the information of the Open Budget Index of the International Budget Partnership in 2017.

This analysis provided three important observations that helped to introduce the next Chapter. The first observation is that the allocation of budget to deal with climate change and renewable energy in countries is growing in recent years. For example, in 2010, only 6 out of the 21 countries had allocated resources to tackle climate change but, in 2016, 12 countries did so. The country that allocated the most in relation to its environmental ministry budget was Bolivia in 2010 (2.99%), while Nicaragua was the highest in 2016 (26.4%). Meanwhile, the lowest in 2010 was Guatemala (0.0031%) and Uruguay (0.06%) in 2016. The information about public budgets for climate change can be found in **Appendix 1** and information about renewable energy budget can be found in **Appendix 2**[6].

In the case of renewable energy, 6 out of the 21 countries allocated resources for renewable energy in 2010, while in 2016, the number of countries increased to 9. In 2010, Nicaragua allocated the highest proportion of its budget for renewable energy with 85.6%, Bolivia was

[6] The sources where the budget information from the 21 countries was obtained are included in **Appendix 3.**

the second with 68.99%, and the lowest investor was El Salvador with a mere 0.1%. In 2016, the major investor was still Nicaragua with 83.92%, while the lowest was Colombia with 0.05%.

Regarding the budget of the environmental ministries, in charge of climate policies in most countries, are limited. For instance, in Costa Rica the budget of the ministry represented around 5.7% of the total public budget of the central government in 2010. This amount is high in comparison with other countries and can be explained by the fact that the environmental ministry is the same as the energy ministry. However, this dropped to 0.70% in 2016. In the rest of the countries, the budget for environmental ministries does not represent more than 2% of the total central government current budget in 2016. In 2016 the highest allocation for environmental ministries was Uruguay (1.9%) and the lowest was Colombia (0.03%).

Although the number of countries allocating public resources to climate change in 2016 compared to 2010 doubled, increasing the allocation of public budget from average of 0.89% (including only the countries that allocated resources) to 5.8% of the total of the environmental ministries' budgets. This proportion is minor, when we realize that the budget of the environmental ministries went from average 1.0% of the total of the central government's budget (including only the countries that allocated resources) in 2010, to 0.46% in 2016.

This means that the environmental agenda and therefore the climate change one, are not yet relevant in public budgets in the country analysed. This is one of the key reasons why mainstreaming climate change should be an exercise that goes beyond the environmental sector.

Another key analysis was to compare the amount of public budget dedicated to renewable energy versus that dedicated to fossil fuel. The analysis showed that in 2010, 11 of the 21 countries invested in fossil fuels, but in 2016 increased to 13. In 2010, the highest proportion allocated to fossil fuels was found in Chile with 19.74%, with Argentina on the bottom with 0.32%. In 2016, the highest investor was again Chile with 49.03%, and the lowest was Peru with 0.54%. Meanwhile some countries such as Jamaica, Honduras, Paraguay, Panama, Trinidad and Tobago and Uruguay do not have explicit investment for the extraction and production of fossil fuels.

This analysis does not include investment from the national oil companies, which could significantly change the results, but this analysis will be included for the case studies selected. As previously explained, the lack of labels related to climate change or renewable energy does not necessary means that countries are not doing anything in these areas, but explicit activities show a level of additionality to business-as-usual scenarios.

The third observation is related to the difficulty to analyse the public budget in these countries. The aim of this research was to study the expenditure of the countries since it represents how much was actually spent in specific areas. However, because of the lack of information in all the countries, it was decided to analyse the budget allocation, which was easier to find publicly on the website of the finance ministries.

The problem is that not all countries present the information in the same way, which can also influence de results of the analysis. Some countries have better, accessible systems to present the information of budget and expenditure, such as the case of Peru. Meanwhile, other countries present the information in a highly aggregated way, which makes it challenging to analyse. However, others don't have information publicly available such as Ecuador, Cuba and Venezuela; in this last case there is information missing for some years. For instance, Venezuela, which has large oil reserves, do not have information publicly available to study their fossil fuel investment. The lack of transparency in the case of Venezuela is corroborated with the score given in the IBP index.

Finally, regarding the levels of transparency, shows that based on the IBP index, the country with the highest score is Mexico (79) and the lowest score is for Venezuela (0). However, according to the Index, it was not possible to access information for Cuba and Ecuador, which was also a problem for the present research.

Studying public finance cycles is highly complex but necessary to understand policy cycles as well. In this sense, it was necessary to analyse what conditions could explain why some countries are progressing in investing public money on climate change and renewable energy and others not. Therefore, I applied a Qualitative Comparative Analysis to analyse five conditions, which are presented in the next chapter.

2.6. Conclusions

The application of the mainstreaming approach to climate change is a recent endeavour. The aim is to be able to bring the problem to the centre of the planning process to tackle it in a more comprehensive way, since its causes and impacts are cross-cutting. In this research the mainstreaming approach is applied to study one important part of the planning process, which is the allocation of budget, which according to several authors in the public finance field, is the representation of priorities of the state.

While the use of mainstreaming in the field of climate change is still a work in progress, it can make contributions such as the one mentioned above, but it also attracts criticism. Some authors suggest that mainstreaming tends to focus on the work of states, which lead to the technocratization of agendas, although in theory it recognizes the role of other stakeholders. In the same way, some critiques focus on the diffusion of allocation of responsibilities and the unknown capacity of producing transformational changes.

In this context, the chapter further explores the importance of mainstreaming climate change in the public budget, acknowledging the importance of the whole public finance cycle, which is an important area of study to understand the behaviour of a state to respond to the priorities of the government to face social, economic and environmental needs.

Although in climate finance, the discussion about public finance was primarily focused on the role of developed countries as providers of finance support, recently there has been attention to the role of public finance the developing countries, as well. In Latin America and the Caribbean, the public finance cycle faces different challenges such as the dependence on fossil fuels to generate income, the limited capacity of states to raise taxes, as well as the lack of balance allocation of sources in different agendas.

In the region there is progress related to the allocation of public budget labelled as climate change in environmental ministries, as well as public investments related to renewable energy in energy ministries. However, this is still limited in most countries. Budget analysis is challenging because of the lack of transparency within Latin-American countries; however, the aim is to continue to push for improvement in the quality of available information and the decision-making processes. The next chapter will build on the budget information collected for the 21 countries, to apply the QCA and analyse what conditions or sets of conditions can

explain the presence or absence of a climate change and renewable energy budget in these countries.

CHAPTER 3. ASSESSING CLIMATE CHANGE AND RENEWABLE ENERGY PUBLIC BUDGET IN LATIN-AMERICAN AND THE CARIBBEAN COUNTRIES USING FUZZY SET QUALITATIVE COMPARATIVE ANALYSIS METHOD

Introduction

The analysis conducted in Chapter 2 introduced the relevance of applying the mainstreaming approach to climate change in the public policy cycle and particularly in the public budget allocation in developing countries, as this process reflects the priorities of the governments are reflected. It also assessed the extent to which Latin American and the Caribbean countries have been integrating climate change in their public budgets, where it was found that a limited number of countries have been clearly allocating public resources to face the problem.

The allocation of budget in these countries is complex because of their particular political, economic and social conditions, and so there is a necessity to further understands, what conditions can explain some countries allocating budgets to tackle climate change and others do not. In this sense, this chapter introduces an analysis to explain what conditions or combination of conditions, explain the presence or absence of public budget to tackle climate change and to promote renewable energy, using a Qualitative Comparative Analysis (fsQCA) method.

The aim of the chapter is to understand under what conditions are countries willing to mainstream the problem in their public budget as an important planning tool, which is the core research question of this research. The selection of five conditions: 1) levels of climate risk; 2) official development assistance received; 3) levels of human development; 4) governance effectiveness; and 5) number of climate change policies, aim to identify certain patterns since the QCA, unlike other quantitative methods, does not look for generalizations. This analysis aims also to support the case study selection that will investigate these issues in greater depth.

In order to present the analysis and the findings this chapter is broken down into five sections. The first section explains the QCA method, the definition of outcomes, timeframe and

conditions selected. The second section presents the steps taken to gather the information to operationalize the method, as well as the process to calibrate the information in crisp and fuzzy set language. The third section outlines the most relevant results of the method according to the fuzzy set software, and it discusses the key findings. Section four presents the selection of case studies that will be studied in further chapters and that were chosen based on the results of the fsQCA. In section five, I conclude by assessing the contribution and limitation of the results of the fsQCA to answering the research questions addressed in the thesis.

3.1. Preparation of the QCA method

As stated in Chapter 1, the Qualitative Comparative Analysis (QCA) method applied in this thesis, is according to Ragin **(2008),** critical in analysing complex causation where an outcome can have multiple variables arriving from several different combinations of causal conditions.

Within QCA there are two ways to analyse the information, crisp sets or fuzzy sets. Fuzzy sets have been used in disciplines such as mathematics, engineering, philosophy and more recently have been applied in social sciences. Schneider and Wagemann **(2012)** explain that fuzzy sets require set-membership to be based on three qualitative anchors: full set membership (1), full non-membership (0) and indifference (0.5); while crisp sets have only two qualitative anchors, 0 or 1. This is because this method suggests that in the social sciences not everything can be explained as yes or no, and that sometimes there are degrees or levels in which an outcome can be explained.

It is important to acknowledge that there is an on-going debate around the use of the QCA method and its variants such as fsQCA. As this methodology uses elements of both qualitative and quantitative applications, some scholars point out that is important to differentiate fuzzy sets of other methods, such as probability methods that, according to Zadeh, are complementary and not substitutes **(Schneider & Wagemann, 2012).**

This chapter applies a QCA method using both fuzzy sets and crisp sets to identify which conditions or combinations of conditions best explain the two main outcomes: 1) "*the presence or absence of public budget labelled as climate change in the environmental ministries*", and 2) *"the presence or absence of public budget label as renewable energy in the energy ministries",* in the 21 countries with major emissions in Latin America and the

Caribbean. It was demonstrated in Chapter 2 that resources are allocated to climate change and renewable energy in half of the countries studied, but the allocation is limited, so the first step here is to explain the presence or absence of a budget rather than the actual amount of that budget (which will be discussed in the case studies).

The operationalization of the QCA was done in four stages: 1) defining the target, timeframe, outcome and conditions*; 2)* gathering raw data; 3) coding and calibrating data, and 4) operationalization with fuzzy set software.

3.1.1. Defining target, timeframe, outcome and conditions

Target

This thesis studies Latin American and the Caribbean countries that are major emitters of greenhouse gases in the region according to the CAIT Climate Data Explorer, of the World Resources Institute (WRI)[7].

This calculation does not include, short-cycle biomass burning (such as agricultural waste burning), large-scale biomass burning (such as forest fires) and carbon emissions/removals of land-use, land-use change and forestry (LULUCF) **(WRI, 2016).** The reason why the information related to LULUCF is not included is because this analysis aims to identify the major emitters in the energy sector, which at the global level contributes to 80% of the GHG emissions **(IPCC, 2018).** The emissions studied are the cumulative emissions from 1990 to 2015.

Timeframe

The goal was to compare two years of public budget in the selected countries in order to identify if there were significant changes from one year to the other. The first year chosen was 2010 as this followed the 15ª Conference of the Parties (COP) of the UNFCCC that took place in Copenhagen, Denmark. Here, a major agreement on climate change was expected but it concluded with a "non-inclusive agreement" **(UNFCCC, 2009)** between a small group of countries that had negative impacts on the UNFCCC negotiation process **(Dimitrov, 2010; Ash,**

[7] The emissions estimated are total CO_2 emission of fossil fuel use and industrial processes (cement production, carbonate use of limestone and dolomite, non-energy use of fuels and other combustion, chemical and metal processes, solvents, agricultural liming and urea, waste and fossil fuel fires).

2010). Not everything was a failure, because major economies such as China and the USA were in the same agreement **(Jacobs, 2010).** At the same time, 2010 was the year when the participation of developing countries in climate action was highlighted in the context of the Cancun Agreement **(UNFCCC, 2010).**

The second year examined is 2016, the year after the COP21 that took place in Paris, France, which concluded with the creation of the Paris Agreement, a series of actions to be followed to stabilize emissions, including developing countries. This year was also relevant because in 2013 the Warsaw COP agreed on the submission of intended national determined contributions (INDCs), domestic commitments that indicate the willingness of countries to collaborate in the achievement of the Convention goals **(UNFCCC, 2013).** Most INDCs were submitted in 2015 and some countries included unconditional goals, meaning they are not subjected to international support but to national means of implementation. In this way, the aim is to understand if the submission of NDCs in 2015 had any effect in the public budget in 2016.

The gap of five years is also important because the stocktake included in the Paris Agreement points out that the revision of commitments should take place every five years, which could reflect significant changes at the national level. The outcomes are therefore analysed for 2010 and 2016, but the conditions that are explored relate to the years 2009 and 2015.

Outcomes

The analysis of governmental public budget to determine the extent to which climate change has been mainstreamed across whole sectors is a time consuming and challenging process. Therefore, I decided to conduct the analysis on two specific sectors: the environmental and the energy sectors. While this may limit the extent to which I can make a full assessment of the mainstreaming approach - which is to analyse the inclusion of climate change across several sectors – it was practical to focus on these two sectors due to time constraints, and the availability of high quality data. The environmental sector was chosen because in most countries this sector leads climate policies while the energy sector is the major source of GHGs at the global and regional level.

Since there is no universal definition of what climate finance means, I looked at the resources allocated through the public budget of the 21 countries to identify: 1) *allocation of budget*

explicitly labelled as climate change within environmental ministries or within the environmental sector (depending on the information provided by countries), which includes climate policies or institutional arrangements such as climate offices, or any program labelled as climate change; and 2) *allocation of budget labelled as renewable energy actions in the energy sector*, which includes policies, institutional arrangements or programs labelled as renewable energy[8].

With the aim to do a comparative analysis, two complementary outcomes were also included: 3) *the percentage that the environmental ministry represents out of the total public budget of the central government* (EBT); and 4) *the percentage that the public budget allocated to fossil fuels production represents out of the total energy ministries budget* (FFEM).

Conditions

The conditions named independent variables in traditional quantitative methods are the variables that explain the outcome. According to Ragin **(2008),** in social science it is difficult to find only one condition that can explain one specific result because there could be a number of influential factors surrounding such a condition. However, the author suggests that the number of conditions to be analysed in a QCA should be limited (ideally no more than four), to avoid too many observations. Ragin **(2008)** points out that it is important to consider conditions that are related to the topic but that are not too obvious, to avoid clouding the ability to understand further aspects that may be influencing the outcome.

An extensive review of literature related to climate change and climate policy was conducted to identify economic, political, social, public policy and geographic conditions that could influence the allocation of budget related to climate change. Based on this review five conditions were chosen: 1) levels of climate risk; 2) official development assistance received; 3) levels of human development; 4) governance effectiveness; and 5) number of climate change policies. The rationale behind the selection of these conditions is explained in Table 3.1.

[8] For the purpose of this research, the definition of renewable energy included projects related to solar, wind and geothermal energy policies. There were no projects included related to hydropower energy because as will be analysed in further chapters, it has several methane emissions, and produces other type of social and environmental externalities **(Ortuzar & Aguirre, 2018).** However, there is a possibility that countries include hydroelectric projects within their definition of clean or renewable energy, without being explicit about it.

Table 3. 1 Conditions selected

Condition	Rationale
Levels of climate risk	To analyse if climatic conditions that place countries at a greater risk for human and monetary loss, influence the allocation of public budget on climate change as a governmental response to the problem.
Official development assistance (ODA) received	To analyse if the provision of ODA from developed countries generates pressure on the recipient's governments to invest in climate change.
Levels of human development	To analyse if the levels of human development condition or influence the allocation of public budget related to climate change.
Governance effectiveness	To analyse whether voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption contribute to the strengthening of governments and if that is related to the interest of governments to allocate public budget to tackle climate change.
Number of climate change policies	To analyse if the existence of public policies related to climate change has an influence on the allocation of public budget related to climate change.

Source: Own elaboration

I also selected these conditions based on the availability of public information for all relevant countries in this research. For instance, one condition considered to be studied was climate performance based on Germanwatch reports[9], however, the data was only available for few of the countries studied, reason why it was excluded. Another condition, levels of greenhouse gases, was also considered, but since the selection of the 21 countries was based on them being major emitters in the region, this information was redundant. In the next section each of the conditions is explained.

1) *Levels of Climate risk*

[9] Germanwatch, Climate Policy Index available from https://www.climate-change-performance-index.org/

The IPCC points out that the "*vulnerability to climate change is the degree to which geophysical, biological and socio-economic systems are susceptible to, and unable to cope with, adverse impacts of climate change*" **(Füssel & Klein, 2006).** Some examples that the IPCC provide about vulnerable zones are: low-lying islands or coastal cities, flooding of coastal cities and agricultural lands or forced migration, disintegration of the West Antarctic ice sheet, among others **(IPCC, 2014).**

According to the ECLAC (Economic Commission for Latin America and the Caribbean), Latin America and the Caribbean countries are highly vulnerable to climate change impacts, because of the low capacity to adapt to the changes in temperature and its consequences **(CEPAL, 2012).**

To measure the vulnerability, however, is highly complex because of the existence of several factors that can contribute to it. As part of this debate, Germanwatch created the Global Climate Risk Index (GCRI), which provide information related to weather events such as storms and floods, as well as temperature extremes and mass movements (heat and cold waves, etc.), thereby including climate change related events **(Kreft, *et al*., 2016).** The indicators that the GCRI measure are: number of deaths per 100,000 inhabitants, sum of losses in USD, purchasing power parity, as well as losses per unit of Gross Domestic Product **(Kreft, *et al*., 2016).** According to this Index, the LAC region includes some of the most vulnerable countries in the world, such as Honduras.

This index is not only about climate change but in general about climate risk. As the Germanwatch **(2016)** report points out, even though "*there are certain weather events which relationship with climate change is still a frontier in science*", there are studies such as the IPCC reports, "*which show that anthropogenic climate change increased the likelihood of extreme weather events*" **(p. 9),** meaning that even if they are not produced by climate change, its occurrence might increase because of it.

I took the results of the Climate Risk Index (called "CRI" for the purpose of this research) for two years (2009 and 2015) to analyse to what extent the extreme events that happened in 2009 and 2015 influenced the allocation of public expenditure labelled as climate change in 2010 and 2016 in the 21 countries selected. Countries with higher score means they were less

affected by climate events and lower score means countries were more affected. The scores can be found in Table 3.2.

Table 3. 2 CRI scores for LAC countries (in 2009 and 2015)

Countries	CRI2009	CRI2015
Argentina	49.83	63.67
Bolivia	56.67	47.0
Brazil	36.83	76.17
Chile	90.50	25.17
Colombia	78.83	45.67
Costa Rica	87.50	77.5
Cuba	NA	NA
Dominican Republic	69.17	74.83
Ecuador	41.67	69.17
El Salvador	4.33	53.0
Guatemala	55.17	45.0
Honduras	58.67	52.17
Jamaica	62.67	124.5
Mexico	56.67	56.33
Nicaragua	56.50	40.83
Panama	87.50	104.83
Paraguay	51.33	47.5
Peru	55.00	45.5
Trinidad and Tobago	71.33	124.50
Uruguay	31.33	97.5
Venezuela	70.00	124.50
NA: Not Available		

Sources: Own elaboration based on information of the GCRI provided to the years 2009 **(Harmeling, 2010)** and 2015 **(Kreft, et al., 2016).**

The scores show that the level of climate risk in the countries changed from 2009 to 2015. While in ten countries the climate risk score increased, meaning that these countries were

less affected by climate events in 2015 than 2010 (including: Argentina, Brazil, Dominican Republic, Ecuador, El Salvador, Jamaica, Panama, Trinidad and Tobago, Uruguay and Venezuela); in the other nine countries the score decreased, meaning they were more affected by climate events (including: Bolivia, Chile, Colombia, Costa Rica, Guatemala, Honduras, Mexico, Paraguay and Peru).

The results also show that some countries remained stable, while others saw significant changes such as Chile, its score falling from 90 in 2009 to 25 in 2015, meaning that in 2015 it faced severe impacts related to climate events. According to the GCRI **(2016),** this was because "*Exceptional rainfalls occurred in the northern part of the Atacama Region in Chile at the end of March 2015… At least 31 people died*" **(p. 8).**

2) *Official development assistance received*

The UNFCCC has established in its Article 4 that "*the developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country*" **(UNFCCC, 1992).** It has been assumed that the inclusion of the word "additional" referred to the provision of financial resources beyond the Official Development Aid agreed by developed countries.

Back in 1972, the ODA target aimed to transfer 0.7% of the GDP of developed countries to developing countries to help them in key areas of their development. This target was based on the work of the Nobel Prize winning economist in 2018, Jan Tinbergen, who estimated the inflows required for developing economies to achieve desirable growth rates **(Tinbergen, 1996)**. The OECD points out that Development Assistance Committee members generally accepted the 0.7% target, with some exceptions, such as Switzerland, who did not adopt the target, and the USA who did not adopt the timetable. Nevertheless, 15 European countries have re-endorsed this goal in the Conference of Sustainable Development Goals celebrated in 2015 **(OECD, n.d.1).**

As mentioned in Chapter 1, the use of climate finance as ODA is a contentious topic in the climate negotiations, because negotiation groups such as the G7 + China have replied that this is not "*new and additional"* as the UNFCCC asked **(Roberts & Weikmans, 2015).** Since there is a lack of clarity about how many OECD countries include climate finance as part of their ODA,

this condition was chosen to analyse if general aid (including or not climate finance) has an influence in the allocation of domestic resources in recipient countries.

I used the data provided by the annual report of OECD called "*Geographical Distribution of Financial Flows to Developing Countries*" **(OECD, 2017b),** using the Total ODA Net in 2009 and 2015 for the 21 countries selected. The results are shown in Table 3.3. The highest numbers mean that countries receive more ODA, while lower numbers indicate the opposite.

Table 3. 3 ODA received in LAC countries in millions of USD (in 2009 and 2015)

Countries	ODA2009	ODA2015
Argentina	127.7	-23.3
Bolivia	725.8	786.7
Brazil	338.5	998.7
Chile	79.7	50.2
Colombia	1060.2	1347.5
Costa Rica	109.3	108.7
Cuba	116.4	553.0
Dominican Republic	119.8	277.7
Ecuador	208.6	311.1
El Salvador	276.7	88.2
Guatemala	376.2	408.5
Honduras	457.1	537.0
Jamaica	149.6	56.8
Mexico	185.5	308.9
Nicaragua	774.0	454.1
Panama	65.5	8.8
Paraguay	148.3	56.2
Peru	441.9	331.8
Trinidad and Tobago	6.9	0
Uruguay	50.6	19.2
Venezuela	66.8	37.1

Sources: Own elaboration using data from the OECD-DAC reports for 2011 and 2017, extracting information for 2009 and 2015 respectively **(OECD, 2011, 2017b).**

The analysis of the data shows that the levels of ODA vary significantly among countries. In nine countries the ODA allocation increased from 2010 to 2015 (Bolivia, Brazil, Colombia, Cuba, Dominican Republic, Ecuador, Guatemala, Honduras, and Mexico). Meanwhile in 12 countries the support was reduced (Argentina, Chile, Costa Rica, El Salvador, Jamaica, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay and Venezuela).

The country that received the most ODA support in 2010 and 2015 was Colombia, while the countries that received the least were Trinidad and Tobago in 2010 and Argentina in 2015.

3) *Levels of Human Development*

Measuring the progress of countries is complex due to the inability to define what constitutes progress. In order to measure the level of healthy economies, countries use the gross domestic product (GDP), which measures the monetary value of final goods and services produced in a country in a given period; that can also include some nonmarket production, such as defence or education services provided by the government, although does not include, activities such as unpaid work and activities in the informal sector **(Callen, 2018)**.

Callen **(2010)** points out that GDP is important because it gives information about the size of the economy and how an economy is performing. Nevertheless, GDP has been criticized because it does not measure the overall standard of living or well-being of a country. For instance, it does not measure the environmental damage or other externalities produced by economic activity and it does not count the depletion of non-renewable natural resources **(Neumayer, 2013).**

For that reason, another global measurement was created, the Human Development Index (HDI) **(UNDP, 2019b).** This measurement analyses long and healthy life (Life expectancy index), knowledge (Education Index) and decent standard of living (GNI Index) in 169 countries and establishes a score that ranges from 1.000 as the highest and 0.000 as the lowest.

Although not an official measure, the ranking created by the UNDP was chosen as the condition to analyse to what extent human development influences the allocation of public budget on climate change, as this is a problem that threatens such development. The information used for the analysis was the score for 2009 and 2015 given to the 21 countries selected, which results are in Table 3.4. As close to the 1.000 they are, means that they have high levels of human development, and the opposite if they go close to 0.000.

Table 3. 4 HDI scores for LAC countries (in 2009 and 2015)

Countries	HDI2009	HDI2015
Argentina	0.772	0.827
Bolivia	0.637	0.674
Brazil	0.693	0.754
Chile	0.779	0.847
Colombia	0.685	0.727
Costa Rica	0.723	0.776
Cuba	NA	0.775
Dominican Republic	0.660	0.722
Ecuador	0.692	0.740
El Salvador	0.655	0.680
Guatemala	0.556	0.640
Honduras	0.601	0.625
Jamaica	0.686	0.730
Mexico	0.745	0.762
Nicaragua	0.562	0.645
Panama	0.751	0.788
Paraguay	0.634	0.693
Peru	0.718	0.740
Trinidad and Tobago	0.732	0.780
Uruguay	0.760	0.795
Venezuela	0.696	0.767
NA: Not available		

Sources: Own elaboration based on data from the HDI **(UNDP, 2010, 2016)** with information for 2009 and 2015.

The analysis of the HDI scores shows that most Latin American and Caribbean countries are in the mid-high and mid-low levels of human development. The scores in all countries improved in 2015 compared to 2010, which suggests some progress in this regard. In 2010 and 2015 the country with highest HDI was Chile. In 2010 the country with the lowest level was Guatemala and in 2015 it was Honduras.

4) Governance effectiveness

According to Lemos and Agrawal **(2006)**, governance is not the same as government but "*it includes the actions of the state, in addition, encompasses actors such as communities, business, and NGOs*" **(p. 298).** The authors mention that international accords, national policies, local decision-making structure, and environmental NGOs are examples of environmental governance **(Lemos & Agrawal 2006, p. 299; Börzel & Risse, 2010).**

However, the case of climate governance has strongly focused on the role of the state as being responsible for the economic activity that produces GHG emissions. Although there is a debate about this state-centric vision, scholars point out that the role of the state remains important in confronting global problems such as climate change **(Eckersley, 2004; Lemos & Agrawal, 2006)**, but that it is necessary to build multilevel governance to deal with the problem effectively **(Rabe, 2007).**

For the World Governance Indicators **(WGI, n.d.)** project, governance "*consists of the traditions and institutions by which authority in a country is exercised*" **(Online)**. This includes, among other things, the process by which governments are selected, monitored and replaced, the capacity of the government to effectively formulate and implement policies, and the respect of citizens and the state for the institutions that govern economic and social interactions.

To measure governance is no easy task, however, the WB created an index that measures the level of governance in 200 countries. The six indicators that this Index measures are: voice

and accountability; political stability and absence of violence; government effectiveness; regulatory quality; rule of law; and control of corruption **(Kaufmann, *et al.,* 2010).**

This Index was chosen because it presents a comprehensive database with information for all the selected countries from 1996 until 2015. This research uses the scores given in 2009 and 2015 to the 21 selected countries in each of the indicators to calculate a general governance score (averaging the six indicators) to measure the effectiveness of the governance. The aim was to analyse to what extent the effectiveness of governance influences the allocation of public budget on climate change in the 21 countries - the scores are shown in Table 3.5. The closer the number to 100 the better the qualification of the indicators and the higher the effectiveness, while lower scores close to 0 mean the opposite.

Table 3. 5 Governance scores for LAC countries (average) (in 2009 and 2015).

Countries	GOV2009	GOV2015
Argentina	38.2	37.51
Bolivia	29.0	28.09
Brazil	53.8	46.66
Chile	83.4	80.34
Colombia	47.1	40.78
Costa Rica	68.3	71.39
Cuba	34.7	37.02
Dominican Republic	37.5	43.15
Ecuador	20.1	29.01
El Salvador	47.8	45.64
Guatemala	31.7	28.62
Honduras	29.8	28.37
Jamaica	49.2	55.55
Mexico	46.2	41.89
Nicaragua	28.6	30.92
Panama	55.8	59.22
Paraguay	26.4	32.87
Peru	41.4	43.92

Trinidad and Tobago	56.2	54.81
Uruguay	74.3	78.33
Venezuela	11.3	8.46

Sources: Own elaboration with information from the Worldwide Governance Indicators project for 2009 and 2015.

In general, the region has low governance effectiveness. There are 10 countries whose effectiveness increased in 2015 over 2010: Costa Rica, Cuba, Dominican Republic, Ecuador, Jamaica, Nicaragua, Panama, Paraguay, Peru and Uruguay. Meanwhile, 11 countries did not improve over this period: Argentina, Bolivia, Brazil, Chile, El Salvador, Guatemala, Honduras, Mexico, Colombia, Trinidad and Tobago and Venezuela. In 2010 and 2015 the country with the lowest levels of governance effectiveness was Venezuela, while the country with the best scores in both years was Chile.

5) Number of Climate Change Policies

The fifth condition is the number of climate change policies and legal instruments in these countries. Currently, there is no ranking or index that analyses the climate policy performance in all selected countries. For that reason, a new condition was built that measures the number of climate instruments in these countries to analyse the extent to which the number of policies dedicated to tackle climate change influence the allocation of public budget on this matter.

In order to measure this condition, the climate legislation study by Globe International and the Grantham Research Institute on Climate Change and the Environment of the London School of Economics and Political Science (LSE) was used **(Nachmany, *et al.*, 2017**). It assesses the existence of laws, policies and institutional arrangements in countries. I used the results of the study published in 2017 aggregating all the policies. However, since this study does not have information for Honduras, Nicaragua, Panama, Paraguay and Uruguay, I added other information by including the number of national communications submitted by the countries to the UNFCCC in 2009 and in 2015[10] **(UNFCCC, n.d.3).** National communications are the

[10] UNFCCC (nd3), ***National Communications and Biennial Reports portal***, Available from: https://unfccc.int/national-communications-and-biennial-reports

reports that include all the activities that countries do related to climate change as a way to be held accountable for their actions. The calculations for the 21 countries selected are included in Table 3.6. The higher the score, the higher the number of climate policies in place in the country, the lower is it, represents the opposite.

Table 3. 6 Number of climate instruments in LAC countries (in 2009 and 2015)

Countries	CCPI2010	CCPI2015
Argentina	4.0	3.0
Bolivia	2.0	2.3
Brazil	5.0	4.3
Chile	3.7	4.3
Colombia	4.3	3.7
Costa Rica	2.7	3.7
Cuba	2.0	3.0
Dominican Republic	1.0	3.0
Ecuador	1.7	3.0
El Salvador	0.3	2.7
Guatemala	2.7	3.0
Honduras	0.3	0.3
Jamaica	3.0	1.7
Mexico	6.3	3.7
Nicaragua	0.3	0.3
Panama	0.3	0.3
Paraguay	0.3	0.3
Peru	4.0	4.0
Trinidad and Tobago	0.3	2.3
Uruguay	1.0	0.0
Venezuela	1.7	1.3

Sources: Own elaboration with information from the UNFCCC **(ndc)** and the Grantham Institute of LSE **(Nachmany, *et al.*, 2017**) data for 2010 and 2015.

The Table 3.6 shows that there are changes in the number of policies in place in the countries. While eleven countries had more policies in 2015 than in 2010 including: Bolivia, Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, and Trinidad and Tobago; others had fewer policies in 2015 than 2010, including: Argentina, Brazil, Colombia, Jamaica, Mexico, Uruguay and Venezuela. However, some countries had the same number of policies including: Honduras, Nicaragua, Panama, Peru and Paraguay.

In the case of national communications, it is important to point out that the goal is to submit at least one every five years. The capacity of countries to do so, however, varies. When this dissertation was written, each of the countries analysed had submitted their first communication, 20 countries had submitted their second, 7 countries had submitted their third, 2 countries had submitted four, and only 1 had submitted six communications, when Mexico submitted the sixth in 2018 **(UNFCCC, n.d.3).**

The number of policies could reflect the level of interest in the topic, the aim is to understand if that is related to the allocation of public budget to deal with the problem.

3.2. Operationalization of the QCA method

3.2.1. Gathering of raw data

The aim of the research was to analyse public expenditure, which reflects the final use of the resources, but because of the lack of information in all countries, it was decided to use budget data that is more readily available. Therefore**,** this analysis was conducted reviewing public budget allocation data sets in the 21 countries for 2010 and 2016. The information collected was publicly available on websites of the finance ministries. However, the information varies in format and level of desegregation. Some countries have developed accessible online platforms to clearly present the information, such as Peru and Brazil. Others do not have up-

to-date information or have missing data for the years under analysis or no data at all, including Cuba and Ecuador[11].

Because of the differences in the presentation of the data, budget data was used from those documents or formats that present information by function, institution or program, and included in an excel sheet for analysis. In order to have a comprehensive set of information to compare, five elements of the public expenditure were analysed:

1. Total public budget labelled as climate change within the environmental sector or environmental function, when it was not possible to identify the budget of the ministry (converted: percentage of climate change budget out of the total budget of environmental ministries).
2. Total budget of the environmental ministry or environmental function, when it was not possible to identify the budget of the ministry (converted: percentage of the environmental ministry's budget out of the total budget of the central government).
3. Total public budget of the central government or the national government (converted: percentage of the environmental ministry's budget out of the total budget of the central government.
4. Total budget labelled as renewable energy within the energy ministry or the energy function, when it was not possible to identify the budget of the ministry (converted: percentage of the renewable energy budget out of the total budget of the energy ministry).
5. Total budget on fossil fuels within the energy ministry (related to exploration and production of oil, gas and coal) (converted: percentage of the fossil fuel's budget out of the total budget of the energy ministry)

3.2.2. Coding and calibration of data

In order to classify the information, all the data was included in an excel spread-sheet and was coded as shown in Table 3.7.

[11] Even though public expenditure information in these two countries was not available, they were included in the analysis since they are major emitters of GHGs and the goal is to analyse conditions that might be relevant to explain the absence of information in this case.

Table 3. 7 Codes allocated to the outcomes and conditions

Outcome	Codes
The presence of public budget labelled as climate change in the environmental ministries.	CCEM
Total public budget of the environmental ministries in relation to the total budget of the central government.	EBT
The presence of public budget labelled as renewable energy in the energy ministries.	REB
Public budget labelled as fossil fuel in the energy ministries (fossil fuel exploitation and production mainly)	FFEM
Conditions	
Climate risk	CRI
Overseas development assistance	ODA
Human development	HDI
Governance	GOV
Climate policies	CCPI
The letter c after the denominations means calibrated	c
The letter cs after the denomination means crisp set	cs
The number 09, 10, 15, 16 after the denomination means the year of analysis.	09, 10, 15, 16
Absence	~

Source: Own analysis

Once the data was collected, I proceeded to calibrate it. Calibration is the process that translates the data gathered into the language of the QCA in order to conduct the analysis. According to Ragin, in QCA the calibration of data is "*especially important in situations where one condition sets or shapes the context for other conditions*" **(2008, p. 72).**

For the purpose of this research, I applied a calibration for both outcomes and conditions. The outcomes were calibrated in crisp sets while the conditions were calibrated in fuzzy sets. The operationalization of the calibration was done both directly in the fsQCA software as well as manually in order to avoid errors; the differences in the result between these methods were minimal. Based on the calibration of the information, the outcomes and conditions were denominated as follows:

Outcomes. Since the levels of public budget labelled as climate change are very low in many of the countries, the information was organized in a crisp set language, distinguishing the presence or absence of a public budget labelled as climate change in the environmental ministries (yes is 1 and no is 0), and the presence or absence of a renewable energy budget in the energy ministries.

Climate risk. To calibrate the condition, the lowest score was denoted as 1, indicating a country with highest climate risk, and 0 for countries with lowest climate risk. The sum of the lowest and the highest score was then divided to get the mid-point, which is 0.5 for the fuzzy set analysis.

ODA. 1 was denoted as the highest number, indicating a major recipient of ODA, and 0 as the lowest, indicating a minor recipient. Both numbers were added together then divided to get 0.5 for the fuzzy set analysis.

Human development. 1 was denoted as the highest number that represents a country with the highest level of human development, and 0 representing the lowest score, indicating a country with poor human development. Both were then summed and divided to get 0.5 for the fuzzy set analysis.

Governance. 1 was denoted as the highest score, indicating a country with a effective governance, and 0 as the lowest score, indicating a country with poor effectiveness of governance. Both were then summed and divided to get 0.5 for the fuzzy set analysis.

Climate policies. 1 was denoted as the highest score, indicating a country with the highest number of climate policies, and 0 represented the lowest score, indicating a country with a low number of climate policies. Both were then summed and divided to get the 0.5 for the fuzzy set analysis.

Tables 3.8 and 3.9 show the calibrated data for 2010 and 2016 respectively - the information was also coded by colour in order to better track each of the conditions, as shown in Table 3.8 and 3.9. The boxes that are empty indicate that no information was available.

Table 3. 8 Calibrated information for 2010

País 2010	CCEM10cs	EBT10c	REB10cs	FFEM10c	ODA09c	HDI09c	GOV09c	CRI09c	CCPI10c
Argentina	0	0.4	0	0.0	0.1	1.0	0.4	0.5	0.6
Bolivia	1	0.0	1	0.1	0.6	0.4	0.2	0.4	0.3
Brazil	0	0.0	0	0.2	0.3	0.6	0.6	0.6	0.8
Chile	0	0.0	1	1.0	0.1	1.0	1	0.0	0.6
Colombia	1	0.2	1	0.1	0.9	0.6	0.4	0.1	0.7
Costa Rica	1	1.0	0	0.1	0.1	0.7	0.8	0.0	0.4
Cuba					0.1		0.3		0.3
Dominican Republic	0	0.2	0	0.0	0.1	0.5	0.4	0.2	0.2
Ecuador					0.2	0.6	0.1	0.6	0.3
El Salvador	0	0.1	1	0.0	0.2	0.4	0.5	1.0	0.1
Guatemala	1	0.0	1	0.6	0.3	0.0	0.3	0.4	0.4
Honduras	1	0.1	0	0.0	0.4	0.2	0.3	0.4	0.1
Jamaica	0	0.0	0	0.0	0.1	0.6	0.5	0.3	0.5
Mexico	1	0.1	0	0.2	0.2	0.8	0.5	0.4	1
Nicaragua	0	0.1	1	0.1	0.7	0.0	0.2	0.4	0.1
Panamá	0	0.1	0	0.0	0.1	0.9	0.6	0.0	0.1
Paraguay	0	0.1	0	0.0	0.1	0.3	0.2	0.4	0.1
Peru	0	0.0	1	0.0	0.4	0.7	0.4	0.4	0.6
Trinidad & Tobago	0	0.0	0	0.0	0.0	0.8	0.6	0.2	0.1
Uruguay	0	0.4	0	0.0	0.0	0.9	0.9	0.7	0.2
Venezuela					0.1	0.6	0	0.2	0.3

Sources: Own elaboration with calibrated data.

Table 3. 9 Calibrated information for 2016

Countries 2016	CCEM16cs	EBT16c	REB16cs	FFEM16c	ODA15c	HDI15c	GOV15c	CRI15c	CCPI15c
Argentina	0	0.1	0	1.0	0.0	0.9	0.4	0.6	0.7
Bolivia	1	0.2	1	0	0.6	0.2	0.3	0.8	0.5
Brazil	1	0.1	0	0	0.7	0.6	0.5	0.5	1.0
Chile	0	0.0	1	1	0.1	1.0	1.0	1.0	1.0
Colombia	0	0.0	1	0.1	1.0	0.5	0.5	0.8	0.9
Costa Rica	1	0.4	0	0	0.1	0.7	0.9	0.5	0.9
Cuba					0.4	0.7	0.4		0.7
Dominican Republic	0	0.6	0	0.5	0.2	0.4	0.5	0.5	0.7
Ecuador					0.2	0.5	0.3	0.6	0.7
El Salvador	1	0.3	0	0.1	0.1	0.2	0.5	0.7	0.6
Guatemala	1	0.1	1	0.5	0.3	0.1	0.3	0.8	0.7
Honduras	1	0.1	0	0	0.4	0.0	0.3	0.7	0.1
Jamaica	1	0.4		0	0.1	0.5	0.7	0.0	0.4
Mexico	1	0.2	1	0.3	0.2	0.6	0.5	0.7	0.9
Nicaragua	1	0.2	1	0	0.3	0.1	0.3	0.8	0.1
Panama	0	0.3	0	0	0.0	0.7	0.7	0.2	0.1
Paraguay	0	0.1	0	0	0.1	0.3	0.3	0.8	0.1
Peru	1	0.1	1	0	0.2	0.5	0.5	0.8	0.9
Trinidad & Tobago	0	0.0	0	0	0.0	0.7	0.6	0.0	0.5
Uruguay	1	1.0	0	0	0.0	0.8	1.0	0.3	0.0
Venezuela	0	0.4	0	0.5	0.0	0.6	0.0	0.0	0.3

Sources: Own analysis with calibrated data.

3.2.3. Use of the fuzzy set software

To conduct the analysis, I used the fuzzy set software[12] **(fsQCA, n.d.).** This is a tool that was created to assess conditions and combinations of conditions to identify necessity and sufficiency **(Ragin, 2006)**. It allows the analysis of different possible configurations of conditions to explain the outcome. It is expressed as 2^k, where *k* denotes the number of sets in the study. For instance, two causal conditions result in four possible configurations, three could lead to eight possible configurations and so on. This is due to the inclusion of negative configurations in the analyses.

The software also analyses the consistency and the coverage of each configuration. The *necessity* values conditions, examining the one(s) necessary to explain the outcome according to the levels of consistency and the levels of coverage. The *truth table* is the tool that analyses all possible combination of conditions, including the analysis of the presence and absence of the conditions **(Ragin, 2008, p. 125).** This allows for a better understanding of the extent to which a certain combination of conditions is sufficient to explain the outcome according to the levels of consistency and coverage.

According to Ragin **(2008)** "*consistency gauges the degree to which the cases sharing a given combination of conditions agree in displaying the outcome in question*", while coverage "*assesses the degree to which a cause or causal combination accounts for instances of an outcome*" **(p. 44).** Ragin **(2008)** explains that consistency, like significance in traditional quantitative methods, signals whether an empirical connection merits the close attention of the investigator, while coverage, like strength, "*indicates the empirical relevance or importance of a set-theoretic connection*" **(p. 45).**

According to Thomson cited in Schneider and Wagemann **(2012),** a sufficient condition will have a higher consistency score the more necessary it is for the outcome. Similarly, a necessary condition will have a higher coverage score the more sufficient it is for the outcome. On the other hand, necessary and sufficient conditions that have high consistency, but low coverage scores demonstrate that, while important, these explanations are either rare or too broad to be helpful. However, calculations of coverage usually only make sense in the event

[12] fsQCA sofware available from http://www.u.arizona.edu/~cragin/fsQCA/software.shtml

of a subset relationship being found. So, checks on consistency usually precede checks on coverage.

Ragin **(2008)** suggests that perfectly consistent set relations are relatively rare in social research because of the number of potential conditions that can influence the outcome. In this sense, it is recommended that the consistency threshold should be set to 0.75. A consistency level below this mark suggests a weak relationship between the configurations and the outcome. As Ragin **(2008)** points out, a configuration with a high level of consistency (above 0.75) may have a low coverage value, because significant configurations may only be found in a small number of cases. In other words, in set-theoretic analysis it is possible to have a set relation that is highly consistent while low in coverage.

According to Schneider and Wagemann **(2012)** there are two different coverage measures. The first is "*raw coverage*," which shows the percentage of all the cases in the outcome covered by a single sufficient path of an equifinal solution term. The second is "*unique coverage*," which shows the percentage of cases that are uniquely explained by that solution **(2012, pp. 332-334).** In the analysis I use the raw coverage.

3.3. Results based on the fsQCA software

The fsQCA software was used to identify which conditions or combinations of conditions are necessary or sufficient to explain the presence and absence of the final outcomes: CCEM, EBT, REB, FFEM and ~CCEM, ~EBT, ~REB and ~FFEM.

Many observations were obtained through the fuzzy set software; however, in the next section I report in tables the results that have high consistency, which mean that are more meaningful to explain the outcome. The tables present the results by condition, which analyses which condition (presence or absence) is necessary to explain the outcome, as well as by combination of conditions based on the true table analysis.

In the column of results, I only include those conditions (or combination of conditions) that are high in consistency (more than 0.75). In the column of observations, I included the narrative description of the results. It is important to say that when the words presence or absence are use, they can also mean "low" and "high" levels of. This is mainly for the case of

the conditions, which are expressed in fussy set terms. For instance, **~ODA means absence or low levels of ODA.**

1) *Conditions that explain the presence of public budget labelled as climate change in the environmental ministries (CCEM).*

Table 3.10 resumes the results of the analysis of necessity and sufficiency to explore what condition or combination of conditions explains better the presence of public budget labelled as climate change in the environmental ministries of the 21 countries.

Table 3. 10 Conditions to explain the presence and absence of public budget labelled as climate change in environmental ministries (CCEM) in 2010 and 2016

Outcome: *What conditions explain the presence or absence of budget labelled as climate change within environmental ministries (CCEM) in 2010 and 2016?*			
Results 2010			
Results per condition	Type of condition	Results	Observations
	Positive or negative conditions that explain the **presence** of the outcome	No positive or negative condition higher than 0.75	None of the conditions are necessary to explain the presence of the outcome (presence of climate change budget within environmental ministries, CCEM)
	Positive or negative conditions that explain the **absence** of the outcome	One negative condition appears high in consistency: **~ODA** **Consistency (0.82)**[13] **Coverage (0.74)**	***The absence of ODA is a necessary condition and almost sufficient to explain the absence of the outcome (absence of climate change budget within environmental ministries, ~CCEM).***
Results based on the truth table analysis	Combination of conditions that explain the **presence** of the outcome	No combination of conditions is higher than 0.75	No combination of conditions is necessary or sufficient to explain the presence of the outcome
	Combination of condition that explain the **absence** of the outcome	One combination of conditions appears high in consistency in the intermediate solution: **~CCEM = ~ODA09c*HDI09c*GOV09c*CRI09c*~CCPI10c** **Consistency (0.86)** **Coverage (0.25)** Parsimonious solution:	The absence of ODA in conjunction with the presence of human development, governance effectiveness, and climate risk, and in absence of climate policies is sufficient to explain the absence of the outcome. However, the coverage is low, which only explains the case of Uruguay.

[13] The results present round numbers, 0.81666= 0.82.

		~CCEM = CRI09c*~CCPI10c Consistency (0.76) Coverage (0.34)	Climate risk in conjunction with the absence of climate policies is sufficient to explain the absence of the outcome in few countries.
Results 2016			
Results per condition	Type of condition	Results	Observations
	Positive or negative conditions that explain the **presence** of the outcome	No positive condition higher than 0.75	None of the conditions are necessary to explain the presence of the outcome.
	Positive or negative conditions that explain the **absence** of the outcome	One negative condition appears high in consistency: **~ODA Consistency (0.82) Coverage (0.45)**	The absence of ODA is necessary to explain the absence of the outcome. However the coverage is low.
Results based on the truth table analysis	Combination of conditions that explain the **presence** of the outcome	No combination of conditions is higher than 0.75 in the intermediate solution. One positive condition appears high in consistency in the parsimonious solution: **ODA Consistency (0.90) Raw coverage (0.33)**	The existence of ODA is sufficient to explain the existence of the outcome. However the coverage is low, and only explains the cases of: Colombia, Brazil and Bolivia.
	Combination of condition that explain the **absence** of the outcome	No combination of conditions is higher than 0.75	No combination of conditions is necessary or sufficient to explain the absence of the outcome

In the analysis of conditions, it is relevant that none of the conditions appears higher than 0.75 to explain the presence of the outcome, but the absence of ODA appears high in consistency to explain the absence of climate budget in 2010 (0.82) and in 2016 (0.86). The most relevant observation is that in 2010, the coverage of that condition was 0.74 – very close to the 0.75. This means that ***in 2010 the absence of ODA was necessary and almost sufficient to explain the absence of climate budget***, while in 2016 the coverage went to 0.45, which means that ***in 2016 the absence of ODA was necessary but not sufficient to explain the absence of climate budget***.

The analysis of the truth table in 2010 and 2016 revealed that there is no combination of conditions sufficient to explain the presence of the outcome. However, in 2010 there is a combination of conditions that explains the absence of the outcome that is high in consistency

(0.86) in the intermediate solution (which, according to Ragin is preferred because they are often the most interpretable), which is:

~CCEM: ~ODA09c*HDI09c*GOV09c*CRI09c*~CCPI10c

The absence of ODA in conjunction with the presence of human development, effective governance, climate risk and the absence of climate policy explain the absence of climate budget in 2010. However, the *coverage* of this combination is low and only explains the case of Uruguay.

A relevant observation in that solution is that the ***absence or low number of climate policies results in the absence of climate budget***, because it shows that policies are important to allocate budget, although the presence of policies is not a guaranty of budget allocation. In 2016, ODA is the condition that appears highly consistent (0.91) in the parsimonious solution, although the coverage is low and only explains the cases of Colombia, Brazil and Bolivia. This suggests that ***the presence of ODA is sufficient to explain the presence of public budget for climate change in the environmental ministries of these three countries***.

In both years the most relevant condition is ODA, which shows that there is a correlation between this condition and the outcome. However, although the model shows that ODA is necessary to explain the outcome, in 2016 was not sufficient enough, which means that other factors also played a role to explain the absence of the outcome.

2) Conditions that explain the levels of environmental budget in relation to budget of central governments (EBT).

Table 3.11 resumes the results of the analysis of necessity and sufficiency to explore what condition or combination of conditions explains better the levels of environmental budget in relation to the total budget of central governments (EBT) in the 21 countries.

Table 3. 11 Conditions to explain presence and absence of environmental budget in the central governments (EBT) in 2010 and 2016

Outcome: ***What conditions explain the levels of environmental expenditure in central governments (EBT) in 2010 and 2016?***
Results 2010

Results per condition	Type of condition	Results	Observations
	Positive or negative conditions that explain the **presence** of the outcome	Two conditions are high in consistency: **GOV** **Consistency (0.92)** **Coverage (0.50)** **HDI** **Consistency (0.84)** **Coverage (0.45)**	The presence of effective governance is necessary to explain presence of the outcome. Presence of human development is necessary to explain presence of the outcome.
	Positive or negative conditions that explain the **absence** of the outcome	One condition appears high in consistency **~ODA** **Consistency (0.76)** **Coverage (0.87)**	***The absence of ODA is necessary and sufficient condition to explain the absence of environmental budget.***
Results based on the truth table analysis	Combination of conditions that explain the **presence** of the outcome	No combination of conditions appears higher than 0.75	None of the combination of conditions appears as necessary or sufficient to explain the outcome
	Combination of condition that explain the **absence** of the outcome	One combinations appears high in consistency after reducing paradoxical conditions (when one condition appears negative and positive in the same combination*): Intermediate solutions: **~ODA09c *~CRI09c= ~EBT** **Consistency (0.75)** **Coverage (0.60)**	The absence of ODA and absence of climate risk are sufficient conditions to explain the absence of the outcome. However the coverage of this combination is not higher than 0.75. The cases that are part of the solution are: Chile, Uruguay, Costa Rica, Brazil, Panama, Trinidad and Tobago, Bolivia, Guatemala, Honduras, Nicaragua, Paraguay, Colombia and Peru.
		*The combinations were: 1. ~ODA09c*HDI09c*GOV09c 2. ~HDI09c*~GOV09c*~CRI09c*~CCPI10c 3. HDI09c*~GOV09c*~CRI09c*CCPI10c	
Results 2016			
Results per condition	Type of condition	Results	Observations
	Positive or negative conditions that explain the **presence** of the outcome	Two conditions appear high in consistency: **HDI** **Consistency (0.85)** **Coverage (0.40)** **GOV** **Consistency (0.90)** **Coverage (0.40)**	The presence of human development is necessary to explain the presence of the outcome. The presence of governance is necessary to explain presence of the outcome.
	Positive or negative conditions that explain	One negative condition appears high in consistency: **~ODA** **Consistency (0.80)**	***The absence of ODA is necessary and sufficient to explain the absence of the outcome.***

	the **absence** of the outcome	**Coverage (0.79)**	
Results based on the truth table analysis	Combination of conditions that explain the **presence** of the outcome	One combination of conditions appears high in consistency: **~EBT = HDI15c*CRI15c*~CCPI15c** **Consistency (0.79)** **Coverage (0.41)**	The presence of human development in conjunction with climate risk and absence of climate policies are sufficient to explain the presence of the outcome. There are no cases that explain this outcome.
	Combination of condition that explain the **absence** of the outcome	One combination appears high in consistency (after reducing the paradoxical conditions) in the intermediate solutions: **~EBT= ~ODA15c *~GOV15c** **Consistency (0.76)** **Coverage (0.52)**	The absence of ODA and absence of governance effectiveness is sufficient to explain the absence of the outcome. Countries that explain this are: Panamá, Uruguay, Venezuela, Guatemala, Honduras, Nicaragua, Chile, Argentina and Mexico.

Table 3.11 shows that in 2010 and 2016 two conditions were necessary to explain the outcome: governance effectiveness (0.92, 0.90) and human development (0.84, 0.85), although the coverage was less than 0.75, which means that those conditions were necessary but not sufficient to explain the outcome.

On the other hand, the most relevant finding to explain the absence of the outcome was the absence of ODA, in 2010 and in 2016; this condition (~ODA) appeared high in consistency (0.76, 0.80), and also high in coverage (0.87, 0.79). ***This means that the absence of ODA is a necessary and sufficient condition to explain the absence or low levels of environmental budget in central governments.***

Regarding the results of the truth table, it shows that in 2010 and 2016 there are two combinations that are high in consistency but low in coverage. In 2010 is:

~EBT= ~ODA09c *~CRI09c

The *absence of ODA and absence of climate risk are sufficient to explain the absence of environmental public budget in relation to the central government budget.* While in 2016 is:

~EBT=~ODA15c *~GOV15c

The absence o*f ODA and the absence of governance effectiveness are sufficient to explain the absence of the outcome.* Both shared the absence of ODA as an important condition.

3) Conditions that explain the presence of public budget labelled as renewable energy in the energy ministries (REB).

Table 3.12 resumes the results of the analysis of necessary and sufficiency to explore what condition or combination of conditions explains better the presence of public budget labelled as renewable energy in the energy ministries (REB).

Table 3. 12 Conditions to explain presence and absence of renewable energy budget in energy ministries (REB) in 2010 and 2016

Outcome: ***What conditions explain the presence or absence of renewable energy expenditure in the energy ministry (REB) in 2010 and 2016?***			
Results 2010			
Results per condition	Type of condition	Results	Observations
	Positive or negative conditions that explain the **presence** of the outcome	No positive or negative conditions higher than 0.75	There are not conditions that are necessary to explain the presence of the outcome.
	Positive or negative conditions that explain the **absence** of the outcome	One negative condition appears high in consistency: **~ODA** **Consistent (0.86)** **Coverage (0.71)**	***The absence of ODA is a necessary condition to explain the absence of the outcome.***
Results based on the truth table analysis	Combination of conditions that explain the **presence** of the outcome	No combination of conditions is higher than 0.75	None of the combination of conditions appears as sufficient to explain the outcome
	Combination of condition that explain the **absence** of the outcome	No combination of conditions is higher than 0.75	None of the combination of conditions appears as sufficient to explain the absence of the outcome
Results 2016			
Results per condition	Type of condition	Results	Observations
	Positive or negative conditions that explain the **presence** of the outcome	One condition appears high in consistency: **CRI15c** **Consistency (0.81)** **Coverage (0.54)**	The presence of climate risk is necessary to explain the outcome.

	Positive or negative conditions that explain the **absence** of the outcome	One condition appears high in consistency: **~ODA** **Consistency (0.85)** **Coverage (0.68)**	The absence of ODA is necessary to explain the absence of the outcome.
Results based on the truth table analysis	Combination of conditions that explain the **presence** of the outcome	No combination of conditions is higher than 0.75	None of the combination of conditions appears as sufficient to explain the outcome
	Combination of condition that explain the **absence** of the outcome	Two combinations of the parsimonious solution appear high in consistency: **~CRI15c** **Consistency (0.82)** **Coverage (0.56)**	The absence of climate risk is sufficient to explain the absence of the outcome. Cases that explain this: Panama, Uruguay, and Venezuela.
		HDI15c*~CCPI15c **Consistency (0.84)** **Coverage (0.34)**	The presence of human development in conjunction with the absence of climate policies is sufficient to explain the absence of the outcome. Cases that explain this: Trinidad and Tobago, Venezuela, Panama, and Uruguay.
		One combination appear high in consistency in the Intermediate solution: **~ODA15c*HDI15c*~CRI15c*~CCPI15c** **Consistency (0.86)** **Coverage (0.33)**	The absence of ODA in conjunction with human development, absence of climate risk and absence of climate policy is sufficient to explain the absence of the outcome.

Table 3.12 shows that in 2010 no condition is high in consistency to explain the outcome, but in 2016 the condition that appears highly consistent is the presence of climate risk (0.80), however, the coverage is below 0.75. In order to explain the absence of the outcome, the condition that is high in consistency for 2010 and 2016 is the absence of ODA (0.86, 0.85), both with coverage below 0.75, although in 2010, the coverage was 0.71.

This means that the absence of ODA is necessary but not sufficient to explain the absence of public budget labelled as renewable energy in the energy ministries.

The analysis of the truth table shows that in 2010 there is no combination of conditions that is sufficient to explain the outcome; however, in 2016 there are three combinations of

conditions, two in the parsimonious solution and one in the intermediate solution, this last one is according to Ragin **(2008)** the most relevant:

~REB= ~ODA15c*HDI15c*~CRI15c*~CCPI15c

It suggests that ***the absence of ODA in conjunction with human development, absence of climate risk and absence of climate policy is necessary to explain the absence of the outcome***, although the coverage is below 0.75. This analysis also suggests that ODA, climate risk and human development are important to explain the absence of renewable energy budget.

4) Conditions to explain fossil fuels budget in energy ministries (FFEM)

Table 3.13 shows the results of the analysis of necessity and sufficiency to explore what condition or combination of conditions explains better the levels of public budget allocation on fossil fuel in relation to the budget of energy ministries (FFEM).

Table 3. 13 Conditions to explain the presence and absence of fossil fuels in energy ministries (FFEM) in 2010 and 2016

Outcome: ***What conditions explain fossil fuels expenditure in the energy ministry (FFEM)?***			
Results 2010			
Results per condition	Type of condition	**Results**	Observations
	Positive or negative conditions that explain the **presence** of the outcome	One condition appears high in consistency: **GOV** **Consistency (0.87)** **Coverage (0.23)**	The presence of governance effectiveness is necessary to explain the presence of the outcome.
	Positive or negative conditions that explain the **absence** of the outcome	Two conditions appear high in consistency: **~ODA** **Consistency (0.77)** **Coverage (0.90)** **CCPI** **Consistency (0.75)** **Coverage (0.26)**	***The absence of ODA is necessary and sufficient to explain the absence of the outcome.*** The presence of climate policies is necessary to explain the absence of the outcome.
Results based on the truth table analysis	Combination of conditions that explain the **presence** of the outcome	No combination of conditions is higher than 0.75	None of the combination of conditions appears as sufficient to explain the outcome

	Combination of condition that explain the **absence** of the outcome	One combination appears high in consistency (after reducing the paradoxical conditions) in the intermediate solution: **~FFEM= ~ODA09c*~CRI09c** **Consistency (0.89)** **Coverage (0.62)**	The absence of ODA in conjunction with the absence of climate risk is necessary to explain the absence of the outcome. Coverage lower than 0.75. Cases that explain this solution: Chile, Uruguay, Costa Rica, Brazil, Panama and Trinidad and Tobago, Bolivia, Guatemala, Honduras, Nicaragua, Paraguay, Colombia and Peru.
Results 2016			
Results per condition	Type of condition	Results	Observations
	Positive or negative conditions that explain the **presence** of the outcome	Four conditions appear high in consistency: **HDI** **Consistency (0.85)** **Coverage (0.30)** **CCPI15c** **Consistency (0.87)** **Coverage (0.35)** **CRI15c** **Consistency (0.77)** **Coverage (0.35)** **~ODA** **Consistent (0.95)** **Coverage (0.26)**	The presence of human development is necessary to explain the presence of the outcome. The presence of climate policies is necessary to explain the presence of the outcome. The presence of climate risk is necessary to explain the presence of the outcome. The absence of ODA is necessary to explain the presence of the outcome.
	Positive or negative conditions that explain the **absence** of the outcome	One condition appears high in consistency: **~ODA** **Consistency (0.77)** **Coverage (0.79)**	***The absence of ODA is necessary and sufficient to explain the absence of the outcome.***
Results based on the truth table analysis	Combination of conditions that explain the **presence** of the outcome	No combination of conditions is higher than 0.75	None of the combination of conditions appears as sufficient to explain the outcome
	Combination of condition that explain the **absence** of the outcome	One combination of conditions appears high in consistency in the intermediate solution:	The absence of ODA in conjunction of absence of governance effectiveness is sufficient to explain the absence of the outcome. Coverage lower than 0.75. Some cases that explain this solution:

		~FFEM16c= ~ODA15c*~GOV15c: Consistency (0.90) Coverage (0.54)	Panama, Uruguay, Venezuela, Guatemala, Nicaragua, Paraguay, Honduras, and Argentina.
		Parsimonious solution: **~GOV Consistency (0.86) Coverage (0.52)**	The absence of governance effectiveness is necessary but not sufficient to explain the absence of the outcome.
		~CRI Consistency (0.94) Coverage (0.54)	The absence of climate risk is necessary but not sufficient to explain the absence of the outcome.
		~CCPI Consistency (0.89) Coverage (0.50)	The absence of climate policies is necessary but not sufficient to explain the absence of the outcome.

Table 3.13 shows that in 2010 the condition that appears highest in consistency to explain the outcome was the presence of governance effectiveness (0.87), which explains some countries but might not describe the case of one of the major producers of fossil fuels in the region, Venezuela, which invests in fossil fuels but has low levels of governance effectiveness.

In 2016, four conditions appear consistent: human development (0.85), climate policies (0.87), climate risk (0.77) and the absence of ODA (0.95), all of them with coverage below 0.75. Of these it is relevant to highlight that while in 2010 governance effectiveness was necessary (although not sufficient) to explain the outcome, in 2016 other conditions intervene. As it was explained in chapter 2, many countries in the region rely on fossil fuels to increase income, which could explain that in the absence of ODA they are more susceptible to invest in fossil fuel.

However, to analyze the absence of the outcome in 2010, two conditions appear high in consistency, the absence of ODA (0.77), and the presence of climate policies (0.75). It could be said ***that the absence of ODA and the presence of climate policies is a necessary condition to explain the absence of fossil fuel investments,*** although the coverage is low, at 0.26. In 2016 the condition that appears high in consistency to explain the absence of the outcome is the absence of ODA, which is also high in coverage (0.79), which means that in this year ***the absence of ODA was necessary and sufficient to explain the absence of the outcome.***

This might be a contradiction considering that the same condition appears in the presence of the outcome, however, it can be also read as in some cases the presence of ODA is also a

promoter of fossil fuel investments, since ODA includes all sorts of cooperation, not only on environmental matters; while in other countries the existence of ODA disincentives fossil fuel investments, which will be further discussed.

In the analysis of the truth table, there is one combination that is high in consistency in 2010 as it shows Table 3.13, although it has coverage below 0.75:

~FFEM= ~ODA09c*~CRI09c

This means that the absence of *ODA,* ***in conjunction with the absence of climate risk, is necessary to explain the absence of the outcome***. While in 2016, the combination that is high in consistency (0.90) but low in coverage is:

~FFEM16c = ~ODA15c*~GOV15c

This means that ***the absence of ODA in conjunction with the absence of governance effectiveness is necessary to explain the outcome***. The most relevant finding is that in both combinations ODA appears as necessary, which confirms that ***the absence of ODA is necessary and sufficient to explain the absence of public budget on fossil fuels production,*** which was observed in 2010 and in 2016.

5) CCEM and other budgetary conditions

A final exercise in the truth table was conducted, to analyze the relationship between the four outcomes, with the aim to analyze which outcome influences more the allocation of climate change budget in the environmental ministries (CCEM). In 2010 and 2016 no positive condition explains the presence of the outcome, but in 2010 the absence of environmental budget (~EBT) appears highly consistent (0.88) and therefore necessary to explain the absence of CCEM, although the coverage is below 0.75 (0.69), this means ***that the absence or low levels of environmental budget is necessary to explain the absence of climate change budget.***

However, the absence of a fossil fuel budget appears also high in consistency in 2010 (0.89), although not higher than 0.75 (0.68) in coverage, but this could be read as: ***the absence or***

low levels of fossil fuels budget is necessary but not sufficient to explain the absence of the outcome.

While in 2016, the conditions that have high consistency are the absence of environment budget (~EBT16c, 0.81) and the absence renewable energy budget (~REB, 0.75) although no higher than 0.75 (0.47, y 0.54 respectively). This can read as ***the absence or low levels of environmental expenditure and the absence of renewable expenditure budget are necessary but not sufficient to explain the absence of the outcome***.

In the truth table analysis, there is no combination of conditions high in consistency in 2010, but in 2016 the combination high in consistency (0.80), although low coverage, in the intermediate solution that explains the presence of the outcome is:

CCEM= ~EBT16c*REB16cs*~FFEM16c

The absence or low levels of environmental expenditure in conjunction with the presence of renewable energy budget and the absence or low levels of fossil fuel budget are necessary but not sufficient to explain the presence of the outcome.

The analysis to explain the absence of the outcome shows that the combination with higher consistency in the parsimonious solution (0.95), although no more than 0.75 in coverage, is:

~CCEM= ~REB16cs*FFEM16c

The absence ***of a renewable energy budget and the presence of a fossil fuel budget are necessary but not sufficient to explain the absence of the outcome***.

This last analysis shows that the presence of environmental budget is important for the presence of a climate change budget. Another observation is that there is a correlation between the presence of climate budget and renewable energy budget, it seems that where there is a climate budget there is a renewable energy budget and vice versa to explain the absence.

Finally, the role of the fossil fuel budget is also important since it appears independently and in combination with other conditions highly consistent to explain the presence or absence of climate budget. There are three observations: 1) there are countries were the absence of fossil fuel budget explains the absence of climate budget; 2) there are countries where the presence of fossil fuel explains the absence of climate change budget; 3) there are countries where the absence of fossil fuel budget explains the presence of climate budget. In all cases this appears as necessary but not sufficient to explain the outcome.

3.3.1. Key conclusions about the necessity and sufficiency of conditions

The analysis of conditions and combinations of conditions provided four relevant conclusions. First, it is important to point out that no positive combination appeared as necessary and sufficient to explain the presence of the main outcomes; similarly, there was no combination of conditions necessary and sufficient to explain the presence. But there are five observations that deserve closer attention and that are of most relevance.

1. *In 2010 the absence of ODA is a necessary condition and almost sufficient to explain the absence of a climate change budget in environmental ministries*: this means that the absence of ODA was a critical condition, but not quite sufficient to explain the absence of climate budget.
2. *In 2010 and 2016 the absence of ODA is a necessary and sufficient condition to explain the absence of environmental budget in relation to the central government's budget*: this is a critical finding since it reflects that the absence of low levels of ODA impact the attention that countries provide to environmental issues as part of the central priorities. It suggests that countries tend to invest in the environmental agenda if they receive ODA in exchange, therefore the absence of it implies the absence of interest or even the absence of capacity to deal with such issues, a tendency that persists over time. This interaction suggests a level of conditionality that will be further explored in the case studies.
3. *In 2010 the absence of ODA is necessary and almost sufficient to explain the absence of a renewable energy budget in the energy ministry:* similarly, in 2010, the absence of ODA explained the absence of a renewable energy budget, but this tendency changed in 2016 when ODA became less relevant, which could be explained by the fact that in recent years is the private sector the one investing in the production and amplification of renewable energy around the world **(IRENA, 2016).**

4. *In 2010 and 2016 the absence of ODA is necessary and sufficient to explain the absence of a fossil fuel budget in the energy ministries:* absence of ODA is a critical condition to explain the absence of fossil fuel budget. This can be considered a paradoxical result, because ODA was created to deal with development problems, after related to the Development Millennium Goals, and recently with the Agenda 2030, the Sustainable Development Goals **(UN, n.d.),** where the production of fossil fuels is not desirable. However, ODA also reflects bilateral cooperation where the development of energy and mining activities could be included.
5. In 2010 and 2016 fossil fuel budget plays an important role, since it appears independently and in combination with other conditions highly consistent to explain the presence or absence of climate budget.

The key finding from the fuzzy sets method is that the existence or absence of ODA seems to condition the actual existence of budget in the environmental, climate change and renewable energy sectors, but also seems to be a condition to determine the levels of public investments on fossil fuels. In order to further analyse these results two case studies are chosen based on the fsQCA results.

3.4. Case study selection based on fsQCA method

The fsQCA studied the performance of the 21 major GHG emitters in Latin America and the Caribbean under the same conditions. However, in order analyse in more detail what factors promote or hinder mainstreaming climate change in the public budget, a small number of cases comparative analysis was applied. Lijphart recommends doing comparative analysis in comparative cases, meaning that they share similar characteristics **(1971, p. 687).**

In Latin America and the Caribbean countries share many cultural aspects, but the size of the economies, societies and territories varies considerably. To do a comparative analysis requires considering these differences and similarities among countries to avoid generalizations. For instance, the fsQCA showed that, even though most of the countries have developed several policies related to climate change, not all of them have integrated climate change as an explicit feature of the public budget.

Out of the 21 countries, twelve countries included specific resources in their public budget labelled as climate change in 2016, while six of them did so in 2010: Guatemala, Costa Rica,

Bolivia, Colombia, Honduras and Mexico. Therefore, based on the difference and agreement method of J.S. Mill, the cases were evaluated to identify any that are similar in profile, with different outcomes but characteristics that could be comparable.

As shown in the QCA analysis, one condition that was an important influence in the allocation of public budget labelled as climate change was the presence or absence of ODA. The major recipient of ODA out of the six countries is Colombia; while in the parsimonious solution the absence of ODA explains the absence of climate budget in Colombia, Brazil and Bolivia. Reason why, Colombia was chosen. Mexico was also selected because it is also one of the major recipients of ODA and climate finance, but in different scale than Colombia.

The comparison will analyse the degree of mainstreaming climate change in two key sectors, the environment and the energy sector in these countries, based on Daly´s levels of mainstreaming proposal **(2005),** explained in Chapter 1. The analysis will be presented in Chapters 4 and 5 for Mexico and 6 and 7 for Colombia.

3.5. Conclusions

The Qualitative Comparative Analysis in its fuzzy set format enabled the identification of two conditions that are relevant to explain the absence of climate and renewable energy budget, namely, the role of ODA and the influence of the fossil fuel budget. Although the method does not aim to create generalizations, the role of ODA as independent condition and in combination to others was relevant to explain the different outcomes analysed. In general, it can be said that countries that do not receive ODA do not tend to invest their national resources on climate change, although this condition is necessary is not sufficient, which means that other conditions play a role as well. The absence of ODA also explains the absence renewable energy budget in the energy ministries where it is also necessary but not sufficient. However, the absence of ODA is both necessary and sufficient to explain the absence of environmental budget in relation to central governments budgets, as well as is necessary and sufficient to explain the absence of fossil fuels. The last element, regarding the presence of fossil fuels, also influences the allocation of climate budget in different ways. These results will be further analysed in two case studies: Mexico and Colombia, that was possible to choose based on the findings of the fsQCA.

The Qualitative Comparative Analysis as a method aims to combine elements of qualitative and quantitative methods. It was used in this research is because the aim was to study a medium number of countries and to analyse different conditions rather than a single one, which is possible with the fuzzy set software.

This thesis is pioneering in the use of this method to explain the conditions or combination of conditions that are necessary or sufficient to explain the presence and absence of public budget dedicated to climate change in Latin American countries. However, the application of this method was challenging for various reasons, notably the difficulty in securing access to raw and disaggregated data for all countries, and in establishing the definition of outcomes and conditions.

Regarding the implementation of the method using the fsQCA software, which has been evolving, but it could further improve to facilitate the interpretation of the data, because it provides several observations, including positive and negative observations, which could be difficult to analyse. However, the rules proposed by Ragin, help to identify those that are more consistent and therefore more meaningful to answer the research question.

Ragin and supporters of the QCA method suggest, that this method is not only valuable for the results it can obtain, but also as a process, because it requires several steps to get a result, which makes is more robust than other methods. The next four chapters will further analyse these results to identify common findings that help to answer the research question.

CHAPTER 4. ASSESSING CLIMATE CHANGE MAINSTREAMING EFFORTS IN MEXICO

Introduction

Mexico was identified as one of the twelve major GHG emitters in Latin American and the Caribbean that explicitly allocate public budget on activities to tackle climate change, in

Chapter 3. Out of the twelve, Mexico is one of the lowest investors of public budget to tackle climate change in relation to the total environmental ministry budget. Due to its position as one of the major emitters of greenhouse gases in the region, as well as its vulnerability to the impacts of climate change, Mexico was chosen as a case study.

This chapter investigates under what conditions Mexico is willing to mainstream climate change in the public budget and expenditure to comply with national and international climate goals and what factors promote or hinders such efforts. It takes into consideration the progress that the country is making towards mainstreaming climate change in the planning process and analyses the challenges that Mexico is facing in successfully transitioning towards a low carbon future and climate resilience.

To do that, this chapter is divided into four sections. The first section assesses the climate change mainstreaming efforts of Mexico based on the methodology proposed by Daly (2005), which looks at the levels of climate change mainstreaming through discourse, at the institutional level, in tools used to make policy, the generation and use of new data, and the level of innovation to make policies. Based on this evaluation, Mexico's mainstreaming efforts can be placed into one of the following categories: 1) integrated approach, 2) mainstreaming in the form of limited transversality (mainstreaming light) or 3) highly fragmented climate mainstreaming.

Since the core of the analysis is the public budget, the second section analyses the nature of public finance in Mexico and the levels of climate change mainstreaming in the public budget of the country. The third section examines the conditions that were identified as promoting or deterring climate change mainstreaming in the public budget of Mexico, while the fourth and final section provides conclusions about the case study.

4.1. Mexico in context

Mexico has around 120 million inhabitants **(INEGI, 2015)** with a Gross Domestic Product (GDP) of around 18,583 USD per capita **(OECD, 2017).** Is the eleventh largest economy[14], and according to the Organization for Economic Cooperation and Development (OECD), in 2015,

[14] In terms of GDP measured according to the parity of purchasing power (OECD, 2017).

the national debt represented 53.3% of GDP. In the last three decades the country has experienced structural changes, going from an oil-dependent economy in the early 1990s, to a manufacturing-based economy in the same decade (1990´s). Mexico has increased its international trade capacity having signed twelve agreements. Although the economy has been improving in the last decade, Mexico has many social and environmental problems that impact the economy and the public finance system **(CEFP, 2014).**

The UNFCCC regards Mexico as a developing country, however, it is also member of the OECD, thus sharing an international space with the wealthiest economies in the world. Mexico is also a major GHG emitter. In 2015 the country emitted 446.3 MtCO2, which represented 1.38% of global emissions **(SEMARNAT, INECC, 2018),** occupying the 13th position at the global level, which main source of GHG is the use and burning of fossil fuels **(Mexican Government, 2015).**

At the same time, Mexico is considered highly vulnerable to the impacts of climate change, experiencing a growing number of events such as cyclones category 3 or higher on the Saffir-Simpson scale *"10 of which happened in the last 12 years*" **(Mexican Government, 2015).** Furthermore, there have been five significant droughts during the 21st century and substantial portions of the country have been affected. In 2011 the drought affected 90% of the territory **(Mexican Government, 2015).**

In this context, this chapter analyse the extent to which the country has been mainstreaming climate change in the planning and budgetary framework to respond to such events, based on the levels of mainstreaming proposed by Daly **(2005)** in her work on gender mainstreaming discussed in Chapters 1 and 2, such as: 1) Level of discourse or rhetoric analysis; 2) Level of institutional or structural change; 3) Innovation in the way that policy is made; 4) New data available and 5) Innovation in the tools used to make policy. However, as stated in Chapter 1, I also include a sixth level: levels of public budget allocated to tackle climate change.

4.1.1. Level of discourse or rhetoric

Mexico signed the UNFCCC on the 13th of June in 1992; approved by Congress in December of the same year, and ratified to the Convention in March 1993 **(SEMARNAT, 2017)**. However, the development of the architecture to tackle the problem began in 2005. President Vicente Fox from the National Action Party (PAN, *Partido Acción Nacional*) initiated the changes in climate policy and introduced the preparation of the National Strategy on Climate Change

(ENCC, *Estrategia Nacional de Cambio Climático*) **(CICC, 2006)** and its Special Program on Climate Change (PECC*, Programa Especial de Cambio Climático*) **(CICC, 2009).**

These initial actions started to frame the discourse on climate change in Mexico. By 2010 the country hosted the 16th Conference of the Parties of the UNFCCC, when climate change assumed unprecedented importance in the public discourse, including within the rhetoric of the government at international conferences **(Interviews 9CSM, 1FGM, 11CSM).**

As part of the growing interest in climate change, Senator Alberto Cardenas of PAN, proposed the creation of a climate change law in 2010. However, the debates among political parties and the opposition from entities in the private sector resulted in a delay in approval. Nevertheless, the Climate Change Law (LGCC: *Ley General de Cambio Climático*) was approved in "*record time*" **(Interview 4LPM)** in June 2012 **(DOF, 2012),** at the end of Calderon´s presidency cycle.

Although the approval of the LGCC is considered an achievement of the "Calderonismo" **(Interview 4LPM),** representatives from both governmental and non-governmental institutions, consider that the successful passage of this law resulted from the engagement of several stakeholders in its revision, discussion and finally its approval. It was not solely because of the leadership of the president, although it obviously helped **(Interviews 9CSM, 1FGM, 11CSM).**

In 2012, the PAN lost the elections and the previous governing party, Institutional Revolutionary Party (PRI, *Partido Revolucionario Institutional*), took the presidency under the mandate of Enrique Peña. According to different experts, this political change also altered the rhetoric related to climate change **(Interviews 10CSM, 11SCM).**

A representative from the federal congress mentioned that Calderon was personally interested in climate change and, as President, he included the topic in his discourses at national and international conferences. This included high-level discussions such as the G20 in 2012 **(Interview 4LPM).** This is also the perception of non-governmental stakeholders **(Interviews 15OIM, 9SCM).** In fact, Patricia Espinosa, former Foreign Affairs Minister during Calderon´s administration was chosen as the Secretary of the UNFCCC for her role in the COP16, hosted to show the leadership of Mexico **(Flores, 2012).** In contrast, President Peña

did not display the same interest in the topic, reflected in the lack of "*significant progress in climate policy*" during his mandate **(Interview 4LPM)**, which was confirmed later with the evaluation of the climate policy conducted by the INECC that will be mentioned later in this chapter.

Based on the discourse, the priorities of Peña were oriented towards economic growth **(Interview 17CSM).** Nevertheless, representatives of governmental and non-governmental entities recognized that the government of Peña could not deny the climate commitments because of the LGCC that established specific targets. In that sense, although the topic was not central in his rhetoric, actions did take place **(Interviews 14IOM, 16FGM).**

Another way to analyse the progress of the climate change agenda is by studying the National Development Plan (PND, *Plan Nacional de Desarrollo*), the most important policy instrument in Mexico according to the Political Constitution of Mexico **(CPEUM, 1917).** The PND dictates the actions of the state and its sectors during that governmental period, which in the case of Mexico are 6 years **(CPEUM, 1917, Article 26).**

For instance, the first explicit mention about climate change in the PND was in the period 2001-2006, which acknowledged that "*the expansion of industries that generate carbon emissions and other pollutants have a direct or indirect impact on climate change*" **(Mexican Government, 2001, p.13).** Although this was a small reference, it prompted future references on the topic, as the previous PND in 1996-2000 included some reference about the environment but nothing explicitly about climate change (**Mexican Government, 1996, p.133)**.

Later, and for the first time, in the PND of 2007-2012 (during Calderon´s mandate), there was a specific chapter about climate change under the umbrella of the environmental sustainability goal **(Mexican Government, 2007).**

Meanwhile, in the version of PND in 2013-2018 (during Peña´s period) there was, once again, no mention of climate change, although the program talks about sustainable development **(Mexican Government, 2013).** According to civil society representatives this reflected the lack of interest by Peña on the issue **(Interview 9CSM).** Along the same lines, in the PND 2019-2024 designed under the mandate of Andrés López, from MORENA (*Movimiento de*

Regeneración Nacional), elected in 2018, no reference about climate change was included. There was only one paragraph about sustainable development, but with more focus on social matters rather than environmental issues **(Mexican Government, 2019).** After years of progress, the latest PND version could be consider the weakest related to environmental issues in the last twenty years.

4.1.2. Level of institutional or structural change

The first institutional effort to deal with climate change in a structural and integral way was the creation of the Inter-Ministerial Commission of Climate Change (*CICC, Comisión Intersecretarial de Cambio Climático*) in 2005. This commission had the aim of mainstreaming climate change across different ministries beyond the environmental ministry.[15]

The main responsibilities of the CICC are to create and implement national policies related to the mitigation and adaptation to climate change and its incorporation in programs and sectorial actions, to promote compliance with the UNFCCC and to participate in the design and implementation of the PECC, among others **(LGCC, 2012).** Within the CICC, seven working groups were established[16] and in 2018, a new group was created for climate finance matters (GT-FIN), however at the time of writing this thesis it is not in operation **(GFLAC, 2018).**

Although the CICC was created in 2005, it was not until 2012 that the Commission was legally mandated to operate with the approval of the LGCC. With the recognition and establishment of the CICC, the LGCC mandated the creation of the National System on Climate Change (SINACC, *Sistema Nacional de Cambio Climático*), which "*aims to promote a cross cutting application of the national policy of climate change in the short, medium and long term between the authorities of the three orders of government (federal, sub national and the municipalities), as well as with other entities such as the Mexican Congress (Deputies and Senates)*" **(SEMARNAT, 2015a).**

[15] There are now 14 ministries that are members of the CICC: Energy, Governance, Foreign Affairs, Marine, Finance, Social Development, Economy, Agriculture, Livestock and Rural Development, Communications and Transport, Public Education, Health, Tourism, Rural and Urban Territorial Development, and Environment and Natural Resources (CICC, 2015).

[16] The group for the elaboration of the Special Programme on Climate Change (GF-PECC); the adaptation group (GF-ADAPT); the reduction of emission for deforestation and degradation group (GT-REDD); the mitigation group (GT-MITIG); the group related to the international negotiations on climate change (GF-INT); the Mexican Committee for the reduction of emissions and GHG Capture group (COMEGEI) and the group for the link with Civil Society (GT-VINC) (SEMARNAT, 2015).

The CICC participates within the SINACC, which was established for the first time in 2014, as well as the National Institute of Ecology, which changed its mandate and name to the National Institute of Ecology and Climate Change (INECC, *Instituto Nacional de Ecología y Cambio Climático*) to act as the technical arm of the federal government on climate change matters **(Mexican Government, 2015).**

To date, SINACC has been operating for five years. In an analysis that assesses the implementation of the law during this period, Averchenkova and Guzman **(2018)** found that one of the most difficult tasks that the country has faced is the coordination of SINACC because of the high number of entities involved. Former civil servants, who are now representatives of civil society, commented that SINACC´s operation is highly complex and that achieving full collaboration among all the entities is difficult **(Interview 24CSM).**

Regarding the CICC, neither an internal nor external assessment has been conducted on its operation. Based on interviews, there are at least three general perceptions about its work: 1) the mandate is not strong enough to ensure the compliance of all the ministries involved **(Interviews 9CSM, 17CSM, 11CSM);** 2) there are no periodic activities through which all the ministries can interact and work together, because legally they have to have only two meetings per year, which are protocol meetings, instead of technical ones **(Interview 5FGM).** In the few meetings held, "*only lower directors that do not have the capacity to take decisions attend*" **(Interview 1FGM);** and 3) besides the limited capacities bestowed on the environmental ministry with the creation of the Direction for Climate Change Policies in 2012, and recently in the Climate Change General Direction created by the agriculture ministry, there is a lack of capacity in other ministries regarding climate change **(Interviews 1FGM, 18AM).** There is thus a concern that there is a lack of strong leadership from SEMARNAT to guarantee the mainstreaming process in the rest of the CICC **(Interview 2LPM).** The ideal scenario, according to a high-level representative of the energy ministry is to delegate the coordination of the CICC to the Ministry of Government, who according to the LGCC could be also president **(Interview 5FGM).**

The INECC is an entity that, thanks to the approval of the LGCC, became more independent of SEMARNAT to provide technical support for the rest of the federal government and to the SINACC. However, according to civil society and a consultant, instead of developing an integral strategy to strengthen capacities of other ministries, INECC operates in isolation with a strong

dependency on SEMARNAT **(Interviews 9CSM, 25CEM),** which is hindering the mainstreaming process. An important fact is that INECC is now the one in charge of doing the assessment of the climate policy, which according to certain stakeholders that is a conflict of interest because the assessments need to be independent **(Interview 17CSM).**

4.1.3. Innovation in the tools used to make policy

The document called "*Towards a National Strategy on Climate Change*" was the first attempt to include multi-sectorial actions in 2005 **(CICC, 2006).** This was later published as the ENCC in 2007 **(CICC, 2007),** and renewed later in 2013 during the government of Peña **(Mexican Government, 2013).** The PECC was proposed to implement this strategy, defining specific targets and entities responsible to achieve such targets. The first Program was published in 2009 **(CICC, 2009).**

However, it is considered that the approval of the LGCC that was the most innovative tool to make climate change policies because it strengthened the existing institutional arrangements and policies such as the CICC, the ENCC and the PECC **(Interviews 19LPM, 20SGM).**

The LGCC established that the ENCC must have a vision for every 10, 20 and 40 years, which must be revised every 10 years, while the PECC must be elaborated every six years **(LGCC, 2012).** However, the PECC published for 2014-2018 was criticized for being a '*business as usual'* program and not innovative, as most actions are part of existing sectorial programs that were not designed to take into consideration a climate change perspective. For this reason, the measures included are rather forcedly ad hoc **(Interview 9SCM).** Governmental representatives consider the PECC a good driver for climate change mainstreaming in terms of policy development **(Interview 1FGM),** but former government, civil society and academic representatives believe that it is not effective due to the lack of technical engagement from other ministries and lack of additionality **(Interviews 4LPM, 9CSM, 18AM);** "*If the policies of the PECC are not included in the sectorial programs of other ministries is never going to be effective*" **(Interview 15OIM).**

Furthermore, the study conducted by INECC found that only 43% of the actions included in the PECC (2014-2018) were accomplished, even though the Programme was created based on existing sectorial measures with budget allocation **(INECC, 2018).** In this sense, "*even though there were no additional measures, PECC still failed on compliance*" **(Interview 9CSM).**

The other concern is that the PECC was the basis for the creation of the National Determined Contributions (NDCs) that Mexico submitted to the UNFCCC within the context of the Paris Agreement, which affects the ambition of the goals **(Interview 18AM).**

Another key criticism for both the PECC and the NDCs is the lack of an implementation route map, which clearly establishes how these measures will be implemented and financed. The LGCC includes a Climate Change Fund and other financial mechanisms, such as a carbon tax; however, there is no strategy to connect these to the actual implementation of these policies **(Interviews 2LPM, 1FGM, 4LPM, 10CSM, 11CSM; GFLAC, 2018; Averchenkova & Guzman, 2018).** In 2018 the LGCC was amended and harmonized with the Paris Agreement and the NDCs, however, the NDCs submitted by Mexico are not aligned to the goals of the Paris Agreement, creating a contradiction **(Averchenkova & Guzman, 2018).**

The long-term vision that the LGCC provides is considered an important tool for the future of climate policy in the country, because according to a congress representative, the law provides a level of certainty for the future, "*regardless which political party is in power, the law must be obeyed*" **(Interview 4LPM)**. However, the major problem recognized is that the LGCC does not include sanctions, in which case "*the lack of compliance could mean anything for the entities*" **(Interviews 2LPM).** In this sense, although innovative, the law needs to be strengthened for full compliance and allow for punitive measures.

4.1.4. New data available

Mexico is the only country in Latin America that has submitted six national communications to the UNFCCC. These are documents that were requested from the Convention to inform about the progress of policies and actions completed at the national level to deal with climate change, as well as the challenges faced to do so **(UNFCCC, n.d.3)**. The first one was submitted in 1997 and the last was submitted in 2018 **(INECC, 2018).**

The LGCC has also mandated the creation of the Information System on Climate Change, led by the National Institute of Geography and Statistic (INEGI, *Instituto Nacional de Geografía y Estadística*) **(LGCC, 2012).** INEGI has collected and compiled information on emissions and the impact on climate change but has yet to include data on the costs or other financial considerations for climate change.

In the case of financial data, there is no clarity on how much money is received to deal with climate change and how much money is allocated through public expenditure. This lack of transparency was identified as one of the conditions that is hindering the mainstreaming process in both planning and budgeting, since the responsible entities do not have enough information to decide how to deal with climate change **(Interviews 1FGM, 10CSM, 9CSM).** Although there is progress in the latter, there are challenges that will be further discussed.

4.1.5. Innovation in policy creation

The LGCC is considered an innovative tool to facilitate policy formulation. With it, Mexico is viewed in the international community as a country that is proactive and a leader for promoting policy innovation for climate change **(Interviews 4LPM, 9CSM).** Mexico has complied with the demands that come from the UNFCCC and has received credit at the international level. It was the first developing country to submit its NDCs in 2015 **(Interview 1FGM).**

Within the NDCs, an important step taken by the Mexican Government was the creation of an unconditional set of measures, which are those "*that Mexico will implement with its own resources*", and conditional actions that are "*those that could be implemented if a new multilateral climate regime was established from which Mexico would obtain additional resources"* **(Mexican Government, 2015).** This is relevant because Mexico has indicated its willingness, by 2030, to improve on its GHGs from 22% to 36% and black carbon reductions from 51% to 70%; this is even more ambitious than the goals established in the law of 2012.

As Daly **(2005)** proposed, to be truly innovative, besides the progress on policy and institutional arrangements, there should be public investments. In the next section I conduct an analysis that shows the extent to which climate change has been mainstreamed in the public budget in Mexico.

4.2. Assessing climate change mainstreaming in the public budget

The allocation of public budget is an important source of resources to invest on climate change matters, and it is a mandate that comes from the LGCC. In this way, the aim is to understand

to what extent climate change has been included and mainstreamed in the public budget and under what conditions that allocation has been taking place.

The cost of climate change and sources of climate finance

In 2009, SEMARNAT and the finance ministry (SHCP, *Secretaría de Hacienda y Crédito Público*) demanded an analysis of the costs of climate change in Mexico. Some of the main conclusions of the analysis stated that, by 2100, the cost of climate change in Mexico could be "at least three times more than the cost of mitigating 50% of the emissions" **(Galindo, 2009, p. 6).**

Although this analysis has not been updated since its publication, the debate about the economic and financial means to deal with climate change in Mexico has grown considerably. In 2018, the INECC made an estimation of the cost of 30 mitigation measures included n the NDCs in Mexico, pointing out that the cost would be about USD 126 billion during the period of 2015-2030, but that the cost of inaction could be USD 146 billion **(INECC, 2018).** This study suggests that Mexico could be investing public resources to cover part of the measures, but that the mobilization of further resources is important.

Mexico has been the beneficiary of international cooperation from the Official Development Assistant (ODA). Between 2011 and 2015, however, the amount of support received varied significantly, as shown in Table 4.1.

Table 4. 1 Evolution of ODA in Mexico in millions of USD (2011-2015)

Year	2011	2012	2013	2014	2015
Amount	973.2	407.9	562.4	814.9	308.9

Source: Own elaboration with OECD data for the period 2011-2015 **(OECD, 2017b)**

The ODA support is dedicated to different areas and based on the information provided by the OECD in the ODA report, it is difficult to know how much of that cooperation is related or dedicated to climate change. However, there are other studies that have estimated the amount of climate finance received in Mexico.

According to GFLAC, in the period 2014-2018, Mexico received around USD 3,232 million from international mechanisms, including cooperation in the form of grants and finance in the form

of loans, to finance 75 projects **(GFLAC, 2018).** Meanwhile the Climate Funds Update, points out that Mexico and Brazil are the major recipients of climate funds, receiving close to half of the support. According to the 2018 update, Mexico received USD 705 million **(Watson & Schalatek, 2019).**

From the point of view of former and current representatives of government, the evolution of climate policies in Mexico has been possible with the interest and support of international cooperation and that many projects have been dependent on such contributions, including the design of national policies **(Interviews 15OI, 14OIM, 1FGM, 16FGM).**

In order to diversify these financial resources, and based on the LGCC, other fiscal, market, financial and economic mechanisms were proposed to invest in climate change activities. The most relevant are the climate change fund, the carbon tax and the carbon market.

The Climate Change Fund (FCC, *Fondo de Cambio Climático*), created by the LGCC, aims to collect and channel financial resources to support the implementation of climate change activities, with adaptation actions being the priority **(LGCC, 2012, Article 80).** The law says that the Fund could have several sources of income, including budget allocation every year and other public funds, as well as international grants, the resources that come from carbon bonds and certificates, among others **(LGCC, 2012, Article 80).** This Fund operates through a national development bank, which serves as a trustee: Nacional Financiera (NAFIN). A technical committee was established by SHCP and is presided by SEMARNAT **(LGCC, 2012, Chapter VII).**

Although the Fund is considered an innovation in the country, civil society, legislative and international organization representatives consider the operation of the Fund unsuccessful because of the lack of actual financial resources at its disposal **(Interviews 11CSM, 14IOM, 4LPM).** Since one source of income is a public expenditure, the allocation of funds has been done mainly through the budget that SEMARNAT has (including money that the ministry did not use), but not from additional sources **(Interviews 17CSM, 2LPM).**

Moreover, this Fund is not considered transparent because of the lack of information to assess its effectiveness **(Interview 4LPM);** and because the Committee, which includes members of civil society, does not operate as planned **(Interview 11CSM).**

In addition, a carbon tax was created in the fiscal reform in 2013. According to President Peña **(2017)**, the amount of money raised from the carbon tax by 2017 was USD 1.3 billion. Although there was support for the creation of this instrument, the main concern from civil society representatives is that it has served only as a revenue collection instrument, because the revenues goes to the general budget and has not been allocated to environmental projects **(Interview 9CSM);** because according to a finance ministry representative, is not possible to make direct allocations **(Interview 12FGM).**

At the same time, the LGCC established that the federal government must create, authorize, and regulate emission trading **(LGCC, 2012: Article 94).** The first exercise to have a voluntary emissions' trade was proposed in 2017 and, during 2018, there were piloting models to prepare the market in Mexico **(Alarcón, 2018)**, the base of which was finally published in November 2019 **(DOF, 2019).**

The LGCC highlights the need to promote mechanisms to raise and re-allocate funds for these actions **(LGCC, 2012)** and, in Article 34, emphasizes the necessity to have a public budget to implement climate policies.

4.2.1. Public finance in Mexico: General context

It is important to analyse the public finance system in general, to understand the function of the public budget. As it was stated in Chapter 2, the balance in the public finance cycle is a relevant aspect that determines the economy of a country.

4.2.2. Revenues

Mexico's public finance system has not been able to fulfil the needs of its population. A study conducted in 2003 showed that one of the elements that makes Mexico's public finance system vulnerable is its high reliance on revenue from goods whose value is volatile such as fossil fuels **(CIDE, ITAM, 2003).** The study explained that the price of these goods used to be reliable, but with the reduction of reserves in the country, such as oil, and fluctuating international pricing, the scenario has changed in recent years and that the country needs to create structural reforms to increase income and create better redistributive policies. Ten years after this study was completed, the country approved structural reforms aiming to redefine the revenue policies in the country through the fiscal reform in 2013 **(SHCP, 2013).**

This reform aimed to tackle the changes in the pricing of goods, but also other problems such as the low level of tax collection as the country only collects around 10% of taxes in relation to its GDP. Comparatively, this is more than countries such as Haiti and Guatemala, but less than countries like Chile with 19%, Brazil with 35%, Argentina with 30% **(CEFP, 2014)** and far below other advanced economies and members of the OECD which collect, on average, 40% taxes on GDP **(CIDE & ITAM, 2003, p. 40).** The two principal reasons why Mexico's tax collection is the low rate of contributions from the population and the wide scale of its informal market.

According to the Centre for Public Finance Studies **(2014)** (CEFP*, Centro de Estudios de las Finanzas Públicas*), except for the state of Chihuahua in the north of Mexico, all federal states have 50% of their population working in the informal economy **(p. 33).** Cumulatively, this represents 35% of the GDP of the country **(CEFP, 2014).** There is also a problem with regulation coupled with a complex administrative process. Of note, only 32.87% of the population is registered in the fiscal system and even less (20%) pay taxes **(CEFP, 2014).**

On the other hand, the fiscal reform also strengthened the national oil company, Mexican Petroleum (PEMEX, *Petróleos Mexicanos*), and enabled a modern and efficient fiscal regime **(SHCP, 2013).**

The revenue in Mexico by 2015 was 23.7% of GDP (USD 146,387.97) having increased constantly during the most recent years **(OECD, 2017).** The main two sources of revenue in Mexico are oil revenue[17] and non-oil revenue[18], and Table 4.2 provides shows the proportion of these revenues in relation to the GDP.

Table 4. 2 Revenues perspective as percentage of GDP (2015-2019)

Concept	2015	2016	2017	2018	2019
Total	21.77	22.59	23.32	24.04	24.60
Oil revenue (Federal	6.88	7.58	8.20	8.81	9.22

[17] The two main sources in the category of oil revenue since the reform are: 1) Special tax on production and services (IEPS) to gasoline and diesel, and 2) PEMEX's own revenues and oil rights (SCHP, 2014).
[18] This category includes: 1) Tax revenue, which is the contributions of companies and citizens; and 2) Non-tax revenue, which is the payment of rights and concessions for the use of goods and services. The third source of revenue comes from the income of entities that contribute to the revenue and control the budget directly, such as the Federal Commission of Electricity (SCHP, 2014).

Government and PEMEX)					
Non-oil revenue (tax and non-tax revenue)	14.89	15.01	15.12	15.23	15.38
Entities revenue	3.58	3.57	3.56	3.54	3.53

Source: SHCP, 2013, p. XIX

Although there was a reduction in the state dependence on oil revenue, Mexico's exploitation, production, and exportation of oil is still important. The projections for such contributions show an increase to more than 9% by 2019, according to SHCP **(SHCP, 2013)**.

An interesting element of the reform in 2013, is that it created a fiscal space for ecological and consumption taxes that could improve revenue collection and the quality of life of the population **(SHCP, 2013).** As was noted, a carbon tax was created which costs 43.77 Mexican pesos per ton of CO_2. Other taxes imposed on higher-pollutant fuels were gasoline (10.38 cents of MXP/liter), diesel (12.59 cents of MXP/liter) and others, but not to natural gas, which according to experts, it could be the biggest source of income because of the growing exploitation of this resource **(MexiCO$_2$, n.d.).**

Beyond revenue collection, this reform promoted positive incentives such as the removal of tax on machinery and all equipment for the generation of renewable energy; the exemption of taxes on the acquisition of hybrid and electric cars continued; and the exemption of payment for the import of natural gas - which was highly criticised because it incentivises the use of this fossil fuel **(Interview 9CSM).** The reform also produced a reduction in the fiscal charges to PEMEX.

According to the former Minister of Finance, the fiscal reforms were having positive impacts because they helped raise funds. The carbon tax and taxes on sugary beverages generated income of USD 1.7 million by 2014. Meanwhile the reduction of subsidies in gasoline and diesel raised an additional USD 3 million in 2014 **(SHCP, 2013: III)**. Although the fiscal reform

was successful in collecting more tax revenue, "*is impossible to know the destination of the money"* **(Interview 1FGM).**

In addition, another element that reduces the capacity to raise taxes and is creating further pressure to the government is the external credits, which also creates external debts, a topic that will not be further analysed in this research but which creates additional pressure on the finance system **(Tello & Hernández, 2010, p. 41).**

4.2.3 Public budget and expenditure

Article 31 of the Constitution of Mexico articulates that, "*all Mexicans have to contribute to the public expenditure, of the Federation, the Federal District, or the State where they are residents, in a proportional and equitable way according to the specific laws in place*" **(CPEUM, 1917, Article 31st).**

As noted earlier, public budget and expenditure are linked to revenue generation. In Mexico, from 2013 to 2017, the difference between revenue and public expenditure is negligible as shown in Table 4.3. The table presents information from the Budgetary Transparency Platform[19] created by the Finance Ministry.

Table 4. 3 Comparison between revenue and public expenditure in millions of USD (period 2014-2018)

	2014	2015	2016	2017	2018
Revenue	224,552	235,986	243,568	245,748	264,842
Public expenditure	224,552	235,986	270,326	245,748	264,842

Source: Own elaboration based on the Budgetary Transparency Platform version for 2013, 2014, 2015, 2016 and 2017
* Budget approved for 2017.

One of the major debates regarding public expenditure is the limitation of the resources that will be allocated and the destination of such resources. Chapter 2 depicted this as a highly politicised debate, particularly when the resources are limited. Table 4.4 provides a brief

[19] The Budgetary Transparency Platform is available from https://www.transparenciapresupuestaria.gob.mx/

comparative analysis on the allocation of public budget in key sectors such as energy and the environment in the period of 2014-2018.

Table 4. 4 Allocation of public expenditure in selected sectors in millions of USD (period 2014-2017)

Public expenditure	2014	2015	2016	2017	2018
Economic development (fuels and energy)	41,314.10	42,758.90	38,188.51	43,485.81	47,458.32*
Social development (Environmental protection)	1,711.40	1,691.81	1,407.81	1,079.20	1,134.67*
Central government (Environmental Ministry)	3,297.63	3,409.89	2,863.98	1,804.78	1,858.30*
Central government (Energy Ministry)	162.747	154.942	138.399	118.464	120.907*
Direct control entities (PEMEX)	26,168.61	27,116.93	23,991.94	19,661.01	19,661.02*
Direct control entities (CFE)	15,353.03	15,774.02	15,021.41	16,676.74	19,442.51*

Source: Own elaboration with information from the Budgetary Transparency Platform 2014, 2015, 2016, 2017 and budget projection for 2018.

Notably, the allocation of money for the environmental protection sector is considerably lower when compared to the allocation for the fuel and energy sector. In the project of the federal budget for 2018 the relationship was USD 1,134.67 million for the environmental protection sector versus USD 47,458.32 million for the fuel and energy sector. Therefore, the fuel and energy sector have a budget that is 41 times greater that the environmental protection sector.

Paradoxically, when the allocation of the budget is analysed through the institutional component, the findings indicate that the budget for the environmental ministry (SEMARNAT, *Secretaría de Medio Ambiente y Recursos Naturales*) was USD 1,858.30 million versus USD 120.907 million allocated to the Energy Ministry (SENER, *Secretaria de Energía*) in 2018, which is considerably less. While SENER has a lower budget than SEMARNAT, my analysis of the budget shows that the main recipients in the energy sector are the major state-owned

companies, PEMEX and the Federal Commission of Electricity (CFE, *Comisión Federal de Electricidad*), with USD 19,661.02 million provided to PEMEX and USD 19,442.51 million for CFE in 2018. This relationship will be further analysed in the next section and in Chapter 5 where the energy sector is discussed in detail, but in the next section I explain what this means for the attention on climate change.

4.2.4. Public budget for climate change

In Mexico, and according to the LGCC, the federal government as well as local governments and municipalities are responsible for elaborating and proposing the budgetary provisions for adaptation and mitigation actions **(LGCC, 2012, Articles 7 and 8).** At the same time, in order to finance the main instruments of climate policy, such as the PECC, the law states that the program must include a budgetary estimation to implement the proposed goals and targets. Specifically, Article 70 says that:

> …the projects and other actions contemplated in the Program... shall be executed according to the resources approved in the Federal Income Law. Additionally, they will depend on the budgetary availability that is approved for these purposes in the Budget of Expenditures of the Federation… **(LGCC, 2012, Article 70).**

As a way to know the budgetary provisions related to climate change, a tool was created called the Transversal Annex on Mitigation and Adaptation of Climate Change of the Federal Public Expenditure, call it AT-CC. It was created due to pressure from civil society that demanded more transparency on climate budget allocation (**Interview 10CSM, 11CSM).**

The Transversal Annex on Mitigation and Adaptation of Climate Change, AT-CC

In 2009, a labelled budgetary classification about climate change was included in the public budget for the first time (in the programmatic classification of the environmental sector)[20]. This category corresponded to the PECC operated by SEMARNAT. In 2010 the amount of money received in this category was USD 4,799,570, more than triple the sum when compared to 2009 (see Table 4.5). Representatives from civil society and Congress believed this was

[20] Analysis conducted based on the Federal Public Expenditure, Available from https://www.finanzaspublicas.hacienda.gob.mx/es/Finanzas_Publicas/Paquete_Economico_y_Presupuesto

because COP16 took place in Mexico in 2010, and the Congress wanted to show a compromise to the international community, approving extra resources for the program during that year **(Interviews 9CSM, 4LPM).**

However, in 2011 after COP16, the budget allocated for the PECC dropped 8-fold, indicating a possible loss in financial support. Nevertheless, in the same year, a new entity called Program for Mitigation and Adaptation of Climate Change (PMACC, *Programa de Mitigación y Adaptación al Cambio Climático*) was created, which is a program implemented by INECC.

The PMACC received USD 27,197,100 in 2011, including an extra allocation of USD 14,749,500 approved by the Congress as part of "*the spirit of COP16*" **(Interview 11CSM**), and as part of the debate that was taking place previous to the approval of the LGCC **(Interview 10CSM).** However, in 2012, the budget dropped to less than half of the amount received in 2011.

There is no clarity on the amount allocated in 2013 because the information does not appear in the Federal Budget. But, in 2014, the PECC and the PMACC were replaced by two new categories, "*Research on climate change, environmental sustainability and green growth*" (ICCSACV*, Investigación en Cambio Climático, sustentabilidad ambiental y crecimiento verde*, ICCSACV) and the category "Research Policies on Climate Change" (PICC, *Políticas de Investigación de Cambio Climático*). While the ICCSACV received more resources in 2014 than 2015 (USD 11,996,900 and USD 11,918,500 respectively), PICC received less over the same period (USD 254,940 and USD 256,966 respectively). In 2016 and 2017, these categories disappeared, as the Table 4.5 shows.

Table 4. 5 Evolution of the public labelled as climate change

Year	Program	Amount in USD
2009	PECC	1,021,160
2010	PECC	4,907,120
2011	PECC	568,365
	PMACC	27,806,500
2012	PECC	484,182
	PMACC	10,629,800
2013	-	-
2014	ICCSACV	12,265,700
	PICC	260,653
2015	ICCSACV	12,185,500
	PICC	262,724

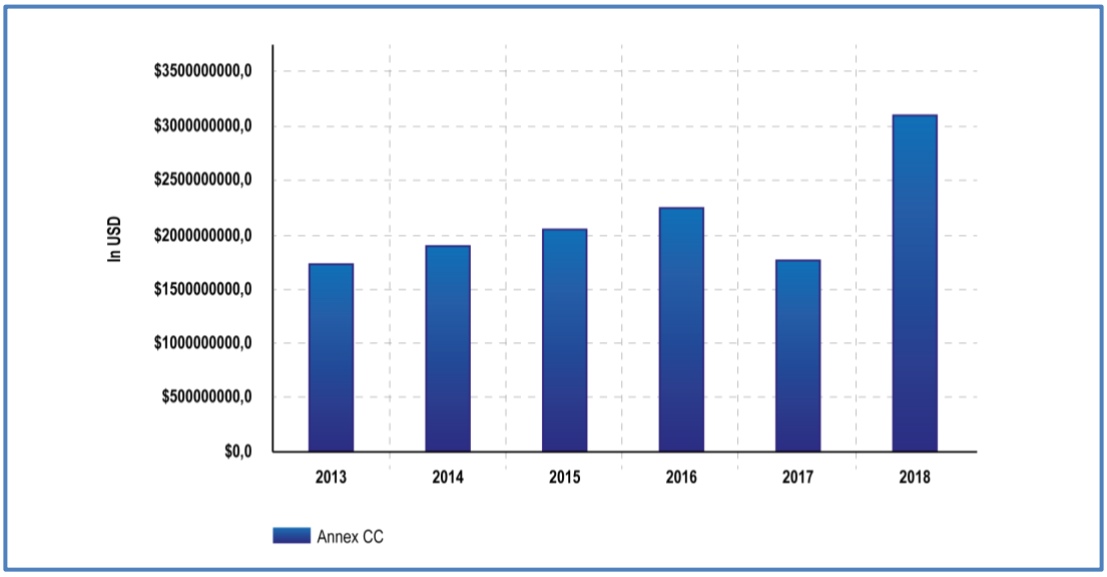
2016	-	-
2017	-	-

Source: Own elaboration with information of the Federal Public Expenditure for the period 2009-2017.

In order to track these movements and after the approval of the LGCC in 2013, it was created the AT-CC. The creation of cross-sectorial annexes included in the PEF was established in 2008. According to the Federal Budget and Fiscal Responsibility Law (LFPRH, *Ley de Presupuesto Federal y Responsabilidad Hacendaria)* published in 2012, the annexes were created to provide information about programs that include the participation of different ministries **(INECC, 2017a, p. 19).**

In this case, the informative annex about climate change, was labelled as the Annex 16 in 2015, with the goal to identify the amount of public expenditure allocated to deal with climate change in the responsible entities (the members of the CICC) **(Interviews 4LPM).** The amount of money reported from 2013 until 2017 has been between USD 1,696,880 and USD 1,813,100, with the lowest amount identified in 2017 as can be seen in Figure 4.1. Although in 2018 the amount increased to USD 3,234,622 million, in 2019 a significant reduction is seen to USD 1,847,622 million **(GFLAC, 2018).**

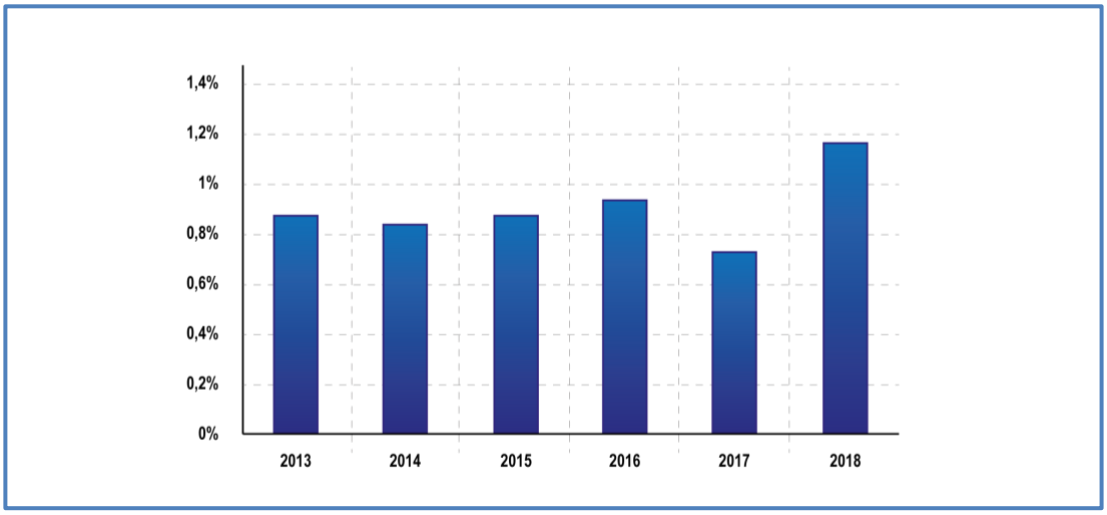
Figure 4. 1 Allocation of public expenditure in the AT-CC in USD (period 2013-2018)



Source: GFLAC, 2018.

The amount of money reported in the Annex 16 is limited; in relation to the Total Public Federal Expenditure it has gone from 0.84% in 2014 to 1.16% in 2018, as shown in Figure 4.2, which means that explicit climate change programs play a limited role in the whole budget **(GFLAC, 2018).**

Figure 4. 2 Representation of the AT-CC resources in regards to the total public expenditure, in percentage (period 2013-2018)



Source: GFLAC, 2018.

In 2017, the INECC conducted an assessment about the function of the AT-CC. Based on this assessment, three key aspects, amongst others, were identified. First, there is no methodology to clearly define what constitutes climate change activities, a reason why the implementation of the AT-CC raises high levels of uncertainty regarding the information provided.

Secondly, there is no correlation between what was included in the AT-CC, and the measures included in the PECC. This means that not all the programs included in the AT-CC are part of the PECC, and other programs included in the PECC are not part of the AT-CC **(INECC, 2017a, p. 27).**

Thirdly, the SINACC and the CICC - the two bodies with mandates to define the guidance for the mainstreaming of climate change within the national planning processes - have not provided guidance to mainstream climate change within the public expenditure, and therefore such an exercise has not been integrated in the At-CC. Similarly, the Congress as the

entity with oversight responsibilities to approve the budget has not executed its mandate in this regard.

The assessment of the INECC emphasized that, in order to comply with the climate policy goals, it is necessary to allocate public expenditure according to national priorities established in the LGCC. According to INECC, public expenditure "*is the most important financing instrument for the fulfilment of the PECC*" **(INECC, 2017a, p. 11).**

The Former President of the Climate Change Commission within the Deputies Chamber conducted another study to identify the methodology that the entities used to provide information to the AT-CC.[21] The Commission analysed 66 measures that were included in the Annex in 2016. Out of the 66 measures or programs, only one was labelled as climate change and corresponded to the programme "*Research on climate change, sustainability and green growth".*

An important element that this study highlighted was that, while many of the activities included in the AT-CC were not related to climate change, the main concern is that activities that can exacerbate the problem were included, such as measures related to PEMEX, namely "*infrastructure maintenance*", and "*economic infrastructure of hydrocarbons projects*". The first does not mention what type of infrastructure it refers to, and the second clearly refers to infrastructure of hydrocarbons. The possible explanation of this is that the Annex has to be incremental, this means that the resources included there cannot be less than the previous years, which can explain why ministries are included any activity to comply with that rule **(Interview 17CSM).**

The analysis of the public expenditure shows that the topic of climate change is still in its very early stages of integration in the public finance system in Mexico **(Interviews 3LPM).** According to non-governmental representatives, the creation of the Annex is an important transparency tool for revealing the amount of money that the different entities have allocated in the public expenditure related to climate change **(Interviews 10CSM, 11CSM).** Yet, the evidence shows that the Annex is not a tool that aims to redistribute expenditure or redefine the planning processes to mainstream climate change **(Interviews 9CSM);** although it could be if better methodologies are created **(16FGM).**

[21] In this exercise, 16 entities were identified that provided information to the Annex 16 in 2016 and 2017.

4.3. Discussion about levels of climate change mainstreaming in the planning and budgetary process in Mexico

Mexico has progressing mainstreaming climate change in the planning and budgetary process. However, the levels of mainstreaming vary depending on the political momentum that a country is experiencing.

For instance, when analysing the mainstreaming climate change in the rhetoric or discourse – it was observed that the discourse changes along the time, depending on the interest of the person in power, which is not necessarily associated to the political party, although conservative parties appear to be more progressive in the climate agenda. The concern here is that political changes such as the arrival of Lopez in 2019 presented a dramatic change, bringing policies that go in the opposite direction. Dr Gay points out that for instance, *"the energy strategies are not coherent with the climate policy*" **(Dominguez, 2019)**, although during Lopez´s campaign there was presented a plan for environmental policy that included climate change actions **(NaturAMLO, 2019).**

For the second level of analysis regarding institutional arrangements and systemic change, the creation of the CICC and SINACC are the most relevant attempts to mainstream climate change in different ministries of the federal government. However, the concrete mainstreaming activities within institutions is very limited. Only two out of the fourteen ministry members of the CICC (the environmental and the agricultural ministries) have areas dedicated to climate change. Although there was a consolidation of entities, such as the National Institute of Ecology and Climate Change (INECC) dedicated to the topic, this has not resulted in engagement with the rest of the sectors.

Regarding the third level of mainstreaming related to innovative tools to make policies, it was observed that, according to most of the interviews, the publication of the LGCC created a new stage for climate policy in Mexico. The Law is considered an innovative tool to make policy, among other things, because it established goals. However, the policies included in the Law, such as the ENCC and the PECC, are not progressive and innovative enough, but rather are seen as 'business as usual' instruments. Besides that, the Law does not include a strategy to ensure the adequate implementation of the measures, such as a national strategy on climate finance.

In the fourth level regarding new data, Mexico has produced some information to improve its international reports to the UNFCCC. Missing information is related to the cost of all measures (mitigation and adaptation), as well as information on the amount of money available and needed, to comply with these measures. In the absence of this information, climate planning is difficult.

The final level looks at innovation in the way that policy is made which, according to Daly, should have a broader range of official actors involved in the policy process, shows that recently under the mandate of Lopez, limited mention of climate change and a growing interest in fossil fuel is observed, nevertheless at the non-governmental level further efforts to tackle climate change is observed.

Regarding the sixth level, related to public budget to tackle climate change, it was observed that there are public resources used to deal with the problem, the creation of the annex in the public expenditure was an important progress in terms to transparent these resources. However, the amount is still limited, and the annex is guiding entities to a better decision-making process.

This analysis of the levels of mainstreaming allows us to understand that Mexico´s efforts to mainstream climate change in the planning and budgetary processes are in a form of "limited transversality" in terms of Daly´s **(2005)** descriptions, which means that the progress is not ideal to achieve the commitments that the country has. The analysis also allowed identifying key conditions that according to interviews and literature review are major promoters and hinders of the mainstreaming climate change in planning and budgeting processes.

4.4. Conditions that promote or hinder climate change mainstreaming in the public budget of Mexico.

Public budget is seen as an important vehicle to drive the development of climate actions. Most of the stakeholders interviewed agreed that there is limited public money to achieve all the necessary changes. Nonetheless, the allocation of money rather than the amount of money is what matters most. Scarce resources must be used strategically and investing in actions that will exacerbate the problem must be avoided. It is also recognized that the allocation of public money can send a signal to private and international financial mechanisms

to show the interest that exists in the climate field. Therefore, exogenous and endogenous factors were identified that promote or hinder mainstreaming climate change in the budget of the country. In this section, I highlight the most relevant conditions found in the analysis.

Conditions that promote climate change mainstreaming in the public budget of Mexico

My analysis has shown that there are several conditions that promoted the incorporation of climate change in the policy and budgetary process in Mexico. The main condition that promotes climate action in Mexico is **the creation of the General Climate Change Law**, which, according to all interviewees, is the instrument that has served to strengthen institutional arrangements, policy instruments, such as the ENCC and the PECC, and to design tools such as the Climate Change Fund and the Carbon Market. Nevertheless, there is still a perception that further inclusion of sanctions for incompliance is needed to ensure effectiveness **(Interview 14OIM).**

Many stakeholders believe that the law, and other instruments, were created in response to international pressure from the UNFCCC that has pushed for **the adoption of international commitments**, which is another important condition that promotes the action **(Interview 16FGM).** The proposal to reduce 30% of GHGs by 2020 and 50% by 2050 is included in the Law, and the reduction of 22% of GHGs by 2030 is included in the NDCs. This guides the action of the government, however, according to stakeholders, the incompliance of such goals must be punishable **(Interview 9CSM).**

In the same way, governmental representatives consider that climate action has been possible **thanks to international cooperation and support**, which has come in form of ODA and climate finance **(Interview 8FGM). The active participation** of the country at the international level has sent an important signal to donors, regarding the willingness of the country to act (Interview 15OIM).

This has allowed Mexico to become one of the major recipients of climate finance in the region, thanks to which many actions have been implemented, which would not have been possible with the budgetary restrictions that exist nationally. Regarding budget allocation, **the creation of the Transversal Annex on climate change** in the federal public expenditure has also been useful to identify where these limited resources are allocated. In this sense, this

transparency has served to better identify gaps, although not all actors use it as a decision-making tool, since it does not have a methodology for operation **(Interviews 10CSM, 11CSM).**

Conditions that hinder climate change mainstreaming in the public budget of Mexico

The major condition that constrains the country in general is **the limited budget with which it must operate**, including negative adjustments due to the limited resources that the country has raised **(Interview 8FGM).** The reduction of budget is even more prominent in the environmental sector **(Interview 16FGM, 4LPM),** particularly with the arrival to power of Lopez in 2019 **(Milenio Digital, 2019).**

A key concern is that the budget reduction from the Lopez administration not only affected the environmental sector, but the money collected from the reduction was used **to invest in the operation of the fossil fuel industry (García, 2018; Fariza, 2019).** The tendency to increase the budget in this industry is due to their reliance in fossil fuels to raise revenue, a major source of income.

The last point is important due to **the limited capacity of the country to raise taxes**, which is another major condition that hinders progress. This is due in part to the growth of informal jobs where taxes are not paid and, indeed, Mexico is one of the lowest collectors of taxes in the OECD countries. In addition, **illegal activities, such as drug trafficking, are growing and there are changes in remittances,** another important source of income. For instance, in 2006, remittances were the third source of income, reaching USD 23,000 million **(OCDE, 2009, p.44).** Ten years later, in 2016, the amount was almost USD 26,970 million **(González, 2016).** A representative of the Mexican government pointed out that the border policies of Trump in USA could affect remittances **(Interview 13FGM).** However, in 2019, USD 36,048 million were transferred to Mexico **(Saldívar, 2020).** The uncertainty and fluctuation of these sources demand a new and more comprehensive fiscal reform in the country **(Maldonado, 2020).**

Another condition that hinders the allocation of public budget in climate change activities is **the distribution of limited resources**, where the central government must provide resources to local governments, which also reduces its capacity to operate. By 2009, the federal government was the main source (90%) of finance of the sub-national states **(OECD, 2009:**

29), a tendency that is changing with the state potentially able to increase their resources, but this must be better implemented **(Interview 6FGM).**

All of this is faced with one additional, negative condition, which is **the level of corruption.** Mexico has major problems with this and, although Mexico is part of agreements such as the Open Government Partnership, institutions are still behind with their compliance **(Interview 10CSM).**

Another condition that directly impacts climate action is the reduction of budget in the environmental sector because **the environment agenda, as well as the climate change agenda, is always on the bottom of the list of priorities (Interviews 2LPM, 4LPM).** This lack of interest is reflected by the limited institutional capacity that exists to deal with the problem within the ministers that are part of the CICC, even within the environmental sector.

Out of the 24 interviewees, only 3 considered climate change a priority in Mexico. While it received attention during the mandate of Calderon, this pattern did not continue with other governments. Moreover, even during the Calderon government, interest in fossil fuels remained strong **(Interviews 2LPM, 14IOM.** Therefore, **the lack of political will to tackle climate change** is another major constraint. "*If the head of the state is not convinced, then there won't be effective actions*" **(Interview 4LPM).**

Furthermore, there is a lack of articulation at the institutional level, which is also reflected in the creation of policy instruments, such as the PECC, which is a **business-as-usual document that is not built under the lens of climate change**. This is reflected in the lack of correlation between policy and the allocation of public budget.

Along the same lines, a major constraint is **the limited engagement of the finance ministry** in climate change and the lack of willingness to conduct fiscal reforms to reduce dependency on fossil fuels. Other ministries believe that the finance ministry must lead **(Interview 5FGM, 2LPM)** while the finance ministry thinks that allocation and cuts in the budget is the responsibility of the thematic ministries **(Interview 6FGM, 12FGM).** This is because the finance ministry sets the cap but does not decide which funding areas need to be reduced or increased amongst the ministries **(Interview 3LPM).** In this context, engagement of the legislative power is desirable because they play a major role in budget approval, although

some legislators consider that what they can do to change the budget once is approved by the main ministries, is limited **(Interview 2LPM).**

Another major problem is that, in Mexico, **there is limited understanding about the consequences of climate change in terms of costs and needs,** particularly at the local level **(Interview 2SGM).** There is limited knowledge about the economic and social losses that will occur as well as the costs to implement actions (mitigation and adaptation) that will lead the country to the trajectory of 1.5° C warming as today's scenarios are insufficient to tackle climate change. For some stakeholders, climate change is still a new topic in the country **(Interview 3LPM).**

4.5. Conclusions

The analysis of the levels of mainstreaming using Daly's methodology shows that Mexico has neither fully mainstreamed climate change into its planning processes, nor in its public budget. Rather, Mexico is still in its early stage of integrating climate change in some sectorial policies, or what Daly **(2005)** calls "a limited transversality".

Based on the literature review and interviews, it can be concluded that mainstreaming climate change at the discourse and rhetoric level has been progressing, but it depends heavily on the government in place, which means that progress has been inconsistent. Regarding the levels of institutional or structural changes, Mexico has progressed significantly towards the creation of a national architecture to deal with climate change, with the creation of the SINACC and the CICC, but still with few active members.

Although the LGCC is considered an innovative tool for climate policy formulation, the lack of sanctions for incompliance puts into question the effectiveness of the instrument. Furthermore, the instruments, such as the ENCC and PECC, are not innovative enough to produce structural changes, and that explains the limited allocation of public budget to tackle climate change.

Finally, while a growing flow of international cooperation is arriving in Mexico, promoting climate action and supporting the creation of policies and instruments, such as the climate change law, the concern is that Mexico is still highly dependent on revenue from fossil fuels. These energy sector policies are therefore contradictory and dissociated to the climate change

goals. This dependency is a major hindrance and, in addition to the high level of corruption and lack of institutional articulation, is dragging Mexico to the carbon lock-in scenario.

To further analyse the dynamics of the energy sector, the next chapter presents an analysis of the levels of climate change mainstreaming for the energy sector in Mexico.

CHAPTER 5. ASSESSING CLIMATE CHANGE MAINSTREAMING IN MEXICO'S ENERGY SECTOR

Introduction

In Chapter 4 the levels of mainstreaming climate change in the planning and budgetary process of Mexico were introduced, leading to the observation that limited federal government actions are happening in the context of the Environmental Ministry, however in order to assess if these efforts are being extended to other sectors to achieve the mainstreaming process in an integral way, this chapter introduces the analysis of climate change mainstreaming in the energy sector, because it is the major source of greenhouse gas emissions in Mexico.

Although the synergies between the energy and the climate agendas are huge, there are major challenges in harmonizing both sectors, through the climate change mainstreaming process because Mexico is a country highly dependent of fossil fuels in its public finance system, however as a vulnerable country to the impacts of climate change, is urgent accelerate the energy transition. This chapter analyses what factors promotes and hinders such climate mainstreaming process that is relevant to achieve climate national and international commitments.

To do so, this chapter is broken in sections. The first section assesses the levels of climate change mainstreaming in the energy sector following Daly´s **(2005)** methodology; the second section assesses the levels of climate change mainstreaming in the public expenditure of the energy sector by performing a comparative analysis between investments on renewable

energy and fossil fuels. The third section analyses key conditions that promote and hinder mainstreaming climate change in the public expenditure of the energy sector, building on the conditions found in Chapter 4. Finally, the fourth section provides further conclusions about the levels of mainstreaming climate change in the energy sector.

5.1. Assessing climate change mainstreaming in the energy sector of Mexico

The role of the energy sector in the GHG emissions is highly relevant because, according to the Mid Term Strategy that Mexico submitted to the UNFCCC, the emissions from the sector (transport and power generation) have experienced the largest growth of any other sector between 1990 and 2010, with an annual growth rate of 2.3%, growing 63% in that period, as shown in Table 5.1. **(Mexican Government, 2013, p. 59).**

Between 2002 and 2012 GHG emission growth was 2.5%, while Mexico's GDP grew by 2.4% in the same period, which, according to the strategy, is an example of the correlation between emissions and economic growth **(Mexican Government, 2013, p. 60).** The energy sector is therefore a strategic sector for economic growth.

Table 5. 1 GHG emissions by economic sector (in Gg CO2eq)

GHG emissions by economic sector (Gg de CO_2)

Total: 665, 304.92

SECTOR	Total GHG	CO_2	CH_4	N_2O	HFC	PFC	SF_6
Mobile sources	174,156.53	169,863.14	273.16	1334.66	2,685.59		
Electricity Generation	126,607.66	125,966.81	110.29	530.56			
Industry	114,949.19	97,864.44	9910.3	518.7	6,464.06		191.69
Oil and Gas	80,455.26	4,9510.6	30,944.66				
Residential and Commercial	25,639.35	23,028	2,281.06	330.28			
Agriculture	80,169.09	376.99	54,620.3	25,171.79			
LULUCF[1]	32,424.86	31,461.6	633.51	329.75			
Waste[2]	30,902.99	1,630.11	27,391.44	1881.44			
Total emissions	665,304.92	499701.68	126,164.73	30.097.18	9,149.64		191.69
Permanences USCUSS[3]	-172,997.61	-172,997.61					
Net emissions	492,307.31	32,6704.07	126,164.73	30.097.18	9,149.64		191.69

Mexico´s GHG emissions by sector baseline year 2013

Source: Mexican Government, ENCC, 2013: 59

In Mexico there is a strong interest in understanding the relationship between climate policy and the energy sector to better align these policies **(Villarreal & Tornel, 2017).** In the following sections, I will analyse the extent to which there is a climate change mainstreaming process

in the planning and budgeting process of energy sector based on Daly´s methodology described in Chapters 1 and 2.

5.1.1. Level of discourse or rhetoric

The discussions related to the innovation of the energy sector in the context of climate change started in 2007 when an important energy reform took place. During this period, a National Strategy on Energy was published for the first time that included an environmental consideration as part of its goals: "*to plan the provision of energy resources to improve the quality of the population in a responsible way and in harmony with the environment and sustainable development*" **(SENER, 2011).**

This Strategy included both the impacts of climate change, as well as the important role of the energy sector in reducing GHG emissions, providing the Energy Ministry (SENER, Secretaría de Energía) with a mandate to protect the environment and to reduce emissions **(SENER, 2011).** This happened during the mandate of Felipe Calderon, who, as previously explained in Chapter 4, had a particular interest in including climate change in its agenda.

As part of this debate, another important legal framework was approved, the Law to Use Renewable Energy and Financing the Energy Transition (LAERFTE*, Ley para el Aprovechamiento de Energía Renovable y el Financiamiento de la Transición Energética*). The aim of this Law was to regulate the use of renewable energy and clean technologies, with the goal to cut the use of fossil fuels in electricity generation by 65% in 2024, 60% in 2035 and 50% in 2050 **(LAERFTE, 2012).** The LAERFTE was also created to regulate the participation of private entities in the production of electricity and they created the Fund for the Energy Transition (FTE, *Fondo para la Transición Energética*).

In general terms, the 2007 reform established the explicit relationship between the energy sector and climate change, which was part of Jordy Herrera's discourse, the Minister for Energy in Calderon's administration. During various events, including the World Economic Forum for Latin-American (WEF in 2012) and the COP16 in 2010, the Minister pointed to Mexico as a positive example for sustainability, citing the importance of tackling climate change and mitigating GHG emissions in the sector **(ExpokNews, 2012; Interview 9CSM).**

Years later, the energy reform that was approved in 2013 during the administration of Enrique Peña produced an important change in the sector that also impacted the progress related to climate change. Ever since the oil expropriation executed by President Lazaro Cardenas in 1938[22], the oil industry was managed by the State. However, the 2013 reform opened up the energy sector, allowing oil production to be undertaken through private, national and international companies and investments.

According to the language of the reform, two arguments that drove energy reform were, 1) the modernization of the energy sector, and 2) the need to attract more investment **(SENER, 2014)**. Another argument put forward was the need to heal the public finance sector in Mexico, reducing its dependence on income from the production and export of oil, as was explained in Chapter 4 **(Mexican Government, 2013a).**

De la Fuente and Olivera **(2017),** however, state that the real explanation behind the reforms can be attributed to the decline in production from Cantarell, Mexico's main oil reserve. With the decline of Cantarell, "*the era of cheap and accessible oil in Mexico ended*" **(Interview 5FGM).** Although the country still produces and exploits oil and gas, the production went from 3.4 million barrels per day in 2004 to 2.5 million in 2013 **(Mexican Government, 2013, p. 4).**

Here a new debate and a new discourse started to appear in the political arena, the inclusion of the "cheap and clean energy" concept, referring to the necessity to transit towards renewable energy but also related to the use of less carbon intense resources such as nuclear energy and gas. According to the Federal Government "*natural gas is four times cheaper and emits 68% less carbon dioxide than fuel oil, one of the main fuels with which we currently generate electricity*" **(Mexican Government, 2013, p. 20).**

Ever since the 2013 reform, this definition of "clean energy" has been an important and contentious debate, because it introduced a new topic on non-conventional resources. SENER pointed out "*the future of the oil will come from the non-conventional resources that are in shale basins and deep water*" **(Mexican Government, 2013, p. 4).**

[22] The oil expropriation was a decision that the President Lázaro Cardenas made because private companies were not providing good salaries and employment conditions to the people that created unions to demand this. After manifestations and the cessation of activities, which had economic impacts, the President decided to expropriate in order to fix the debate between the union and the companies. For more information http://www.industriapetroleramexicana.com/2011/03/expropiacion-petrolera/

In this sense, with the reform in 2013, the LAERFTE was cancelled. But in order to promote the energy transition, a group of actors within congress, with the assistance of civil society, promoted and achieved the creation of the Energy Transition Law (LTE, *Ley de Transición Energética*). It was the last law approved as part of the energy reform package of 2013 **(Interviews 9CSM, 4LPM).**

The LTE achieved an important step, building an explicit connection between the energy and climate change agendas. This Law established the goal: *"to provide support to the goals of the LGCC, related to the reduction of greenhouse gases emissions and components, and the generation of electricity that comes from clean energy*" **(LTE, 2015, Article 2).** This is the only explicit mention of climate change among all the laws created in the reform. According to a high-level representative of the energy sector, the LTE was the contribution of the energy sector to the fight against climate change, although is not the direct mandate of the sector **(Interview 5FGM).**

The LTE includes the same definition of renewable energy as the LAERFTE, however, it also includes a definition of "*clean energy,"* based on the Electricity Industry Law **(LTE, 2015, Article 3),** that defines it as: "*the source of energy and electricity generation processes whereby emissions or residues, when they are produced, do not exceed the thresholds established in regulatory provisions that are issued for that purpose*" **(LTE, 2015, Article 3).** The LTE says that "*in order to be considered clean, the source has to produce less than 100kg of CO2 per MW/h*", which is not accomplished by the gas for instance **(LTE, 2015; Interview 9CSM)**, but the government still promoted gas as a clean source **(Interview 10CSM).**

Although the 2013 energy reform was criticized for opening the door to investors in the fossil fuel industry, it was crucial in including an explicit mention of the necessity to transit towards low carbon technologies such as renewable energy in order to tackle climate change **(Interview 4LPM).**

This debate continues with the government of Lopez, the president who arrived in 2018 who, in his first discourse as a president, pointed out: "*We will allocate more public investment to urgently produce oil, gas and electricity ... we will modernize six refineries and build a new one ... we will promote the development of renewable alternative energy sources such as wind, solar, geothermal and the tidal wave …*" **(Lopez, 2018, Online).**

However, in the next section I will analyse the transition towards low carbon energy technologies that appears to be going down an alternative path.

5.1.2. Level of institutional or structural change

In the energy sector, the problem of climate change has been included in its discourse in recent years, although at times not explicitly. However, at the institutional level, this process has had its fair share of complications, as I will explain in this section.

The reform approved in 2013 changed Articles 25, 27 and 28 of the Constitution of Mexico. These articles referred to ownership of the State over its lands and waters within the limits of Mexico's national territory, where the State used to have complete control. Although the reform maintains the government right to grant or veto concessions for the exploitation of hydrocarbons, it allows for the establishment of private contracts to companies **(Mexican Government, 2013)**. With the Reform of 2013, PEMEX (Mexican Petroleum) and CFE (Federal Commission of Electricity) received autonomy and a new character of productive entities, although, according to the Federal Government, they remain 100% Mexican public entities **(Mexican Government, 2013)**.

In this reform **(2013),** many institutions in the oil sector were strengthening, not only creating more private competition to expand the sector, but also giving more independence to PEMEX to improve its operation **(Interviews 9CSM, 22JM),** having partnerships where the entity does not have the capacity to operate alone **(Interview 5FGM)**, "*making the state company more competitive and cost-effective*" **(Mexican Government, 2013, p. 6).**

Along the same lines, other entities were created or strengthened to improve the sector such as the National Centre for Control of Natural Gas (*CENAGAS, Centro Nacional de Control de Gas Natural*), the National Commission for Hydrocarbons (*CNH, Comisión Nacional de Hidrocarburos*), and the National Agency for Industrial Security and Environmental Protection of the Hydrocarbons Sector (ASEA, *Agencia Nacional Industrial y de Protección al Medio Ambiente del Sector Hidrocarburos*), all of them with the aim to promote the extraction of hydrocarbons **(Interview 22JM)** but taking care of the "externalities" **(Interview 10CSM)**. According to civil society representatives, ASEA for instance, has been a validator of the fossil fuel industry instead of a regulator **(Interview 10CSM, 9CSM).**

Similar changes took place in the power generation sector but some of them related to the climate agenda. During the 2007 energy reform, the Organic Law of Public Administration (LAPF, *Ley de la Administración Pública Federal*) gave a mandate to the Energy Ministry to conduct the energy policy based on "*the energy security, energy diversification, energy saving, and the protection of the environment*" **(2011, p. 5);** in the reform of 2013, SENER remained the general coordinator of the public policy in the energy sector, but the CFE was put in charge of the supervision of power generation, who was now also obliged to generate clean energy certificates as part of the mandate of the LTE.

Other institutions were strengthened such as the National Centre for Energy Control (CENACE, *Centro Nacional de Control de Energía*) in charge of the operational control of the national electricity system (SEN, *Sistema Energético Nacional*). Among the goals of the Strategic Plan of CENACE (2017-2021), are to promote the efficient use of energy, and to promote the development of renewable energy **(CENACE, 2017, p. 14).**

The most relevant institution created in this regard was the National Institute for Electricity and Clean Energies (INEEL, *Instituto Nacional de Electricidad y Energías Limpias*), which oversees research, technological development and human resource creation to support the energy transition **(Interview 21FGM).**

Another body that was created was the Consultative Council for the Energy Transition (*Consejo por la Transición Energética*) **(SENER, 2016).** This council includes almost the same ministries as the CICC analysed in Chapter 4 but also includes all the relevant institutions of the energy sector and aims to evaluate key policy instruments of the sector **(SENER, 2015).**

The creation of these institutions in the context of the reform has been important in promoting renewable energy development in the country. Although the main mandate of the new entities does not mention climate change explicitly as part of their goals, their work has been highly relevant for energy transition towards low carbon technologies **(Interview 21FGM)**.

According to civil society, academia and experts in this area there is a contradictory message within this debate. On the one hand, there is a clear signal regarding the interest of increasing

the use of clean energy in the energy matrix. On the other hand, the inclusion of sources such as gas in the definition of "clean energy" will increase and not decrease GHG emissions. This creates uncertainty in the future of the energy sector in the context of climate change **(Interviews 18AM, 22PSM).** Furthermore, certain representatives of the energy sector consider that *"the obligation to lead the climate policy is not the role of SENER, but an obligation of SEMARNAT (the environmental ministry)"* **(Interview 5FGM, 7FGM).** This discussion remains as a problem in the government of Lopez, as will be further discussed.

5.1.3. Innovation in the tools used to make policy

According to civil society representatives **(Interviews 9CSM, 11CSM),** the energy sector has been adapting its policies based on specific national and international circumstances. The energy reforms have been a way to redefine priorities within the sector, considering international oil prices and international discussions such as the UNFCCC climate change negotiations. Although both energy reforms (2007 and 2013) have emphasized the interest that the government has in fossil fuels, they have not been consistent in the way they promote renewable energy, energy efficiency, and the attention given to climate change.

In the case of the 2007 reform, the inclusion of specific tools, such as the LAERFTE and the Energy Transition Fund, to promote the transition towards renewable energy, was recognized. Meanwhile the 2013 reform introduced the LTE, but also brought a debate about the necessity to have clean and cheap energy, arguing that gas (fossil fuel) was both clean and cheap. The Federal Government said that Mexico has multiple deposits of natural gas, although, according to De la Fuente and Olivera **(2017),** the production of this has declined, and today 30% is imported for consumption.

Nevertheless, former governmental representatives and civil society experts consider the LTE, is an innovative tool to develop and promote climate policy because it aims to support the compliance of the LGCC and its goals such as the generation of 35% clean energy by 2024, and 43% by 2030 **(LGCC, 2012, Article 35)**[23]**.** In this context, the National Program for the Development of the Electric System (PRODESEN) is considered an important tool, because it provides a prospective for the participation of renewable energy **(Interview 9CSM).**

[23] The Geothermal Energy Law was also created to promote this type of energy (2014).

Another important tool that, according to private sector and civil society representatives **(Interviews 23 PSM, 9CSM),** has played a major role in the promotion of renewable energy is the emission of Clean Energy Certificates (CEL, *Certificados de Energía Limpia*), which are vouchers issued by the government to verify that companies and CFE do what they have to do to reduce GHG emissions, and were included in the LTE and the Electricity Industry Law (reformed in 2013). This tool allows SENER to determine the percentage of energy that must be generated each year from clean and renewable sources.

CENACE promoted auctions to define the sources of energy that will participate in power generation in the medium term (15 years) and long term (20 years) **(CENACE, 2018).** In the first auction, for instance, there were offers for 6.36 TWh of clean energy, 6.36 million in CELs, and 500 MW of power annually **(PWC, 2016, p. 3).** In this auction 17 projects were selected, 12 of them for solar photovoltaic energy (2,180 MW of capacity). In 2018 the installation of this capacity had received an investment of 2,600 million USD **(PWC, 2016, p. 7).** The auction covered 84% of the CERs mandated by the CFE.

In the third auction, 100% of the projects approved were renewable energy projects. According to a civil society representative, "*generating electricity with renewable energy was 50% cheaper for CFE than using gas in the last auction*" **(Interview 9CSM).** "*These mechanisms have been the most effective way to allow the participation of renewable energy in the matrix*", including the participation of CFE, pointed out a private sector representative **(Interview 23PSM).** However, under the mandate of Lopez, there was an attempt to modify the regulation, to allow the participation of old technologies as CELs to allow CFE to comply with it, which has been disputed by NGO´s and private sector **(ICM, 2019).**

Although there are tools to help include climate change considerations in energy policies, changes in the application of these instruments impact its effectiveness and are creating an uncertainty about the future of the low carbon development. Besides that, it is recognized that climate change is not the main driver of such actions, but rather the profitability of renewable energy and market behaviour **(Interview 21FGM, 22JM).**

5.1.4. New data available

The energy sector is considered one of the most innovative sectors in terms of data available, because of the sheer number of studies analysing the projections of the sector **(Interview**

5FGM). In recent years, studies about the vulnerability and the GHG emission of the sector have been conducted (**INECC, 2018).**

In the National GHG Inventory it was found that the major emissions come from the consumption of fossil fuels (64%) **(INECC, 2015).** In 2013, the oil and gas sector accounted for 12% of total emissions, and the electricity sector for the 19% of the emissions **(INECC, 2013)**. The last accounted for the 20% by 2015 **(INECC, 2018, p. 53)**. The Mid-Term Strategy on climate change points out that this sector has experienced important technological changes in past years. For instance, between 2010 and 2013, a retirement of conventional thermal power plants and gas turbines occurred, with new combined cycle and wind plants being built. In terms of GHG emissions by 2015, the use of combine cycle contributed with 9.0% of the emissions; thermoelectric, 3.7%; coal power stations, 4.6%, turbo gas, 0.5% and internal combustion, 0.2% **(INECC, 2018, p. 53).**

There has been an evolution in the energy matrix that responds to national and international factors. According to SENER, "*the constant increase in energy consumption worldwide, together with the goals of mitigating the impact of climate change, have forced to take into account a greater participation of renewable energies in the energy matrix, and to cover this demand with environment-friendly sources*" **(SENER, 2017, p. 12).** At the same time, there have been encouraging projections regarding renewable energy. For example, the Atlas of Zones with High Potential of Clean Energy (AZEL: Atlas de Zonas con *Alto Potencial de Energías Limpias*) and the National Inventory of Renewable Energy (INEL: *Inventario Nacional de Energías Limpias*) are data that supports the energy transition. According to INEL, there is an inventory and corresponding maps to show the potential of solar, wind, geothermal, wave and biomass energy **(SENER, 2014a).**

The Prospective of Renewable Energies 2017-2031 is a policy instrument that contains both historical and prospective information on all those renewable energies considered in the Electricity Industry Law. These projections point out that "*renewable energy plays a very important role in the generation of electricity and in the transport sector* **(SENER, 2017).** This Prospective says that between 2017-2031, renewable energy will increase annually at a rate of 7.4%, with solar photovoltaic being the biggest participant, with 368 GMh by 2017 and 13,396 GWh by 2031 **(SENER, 2017, p. 13).** This tendency, however, needs be analysed, since

with the arrival of Lopez in 2018 the projections regarding renewable energy are not promising.

New data are available, but according to experts, the problem is not always the lack of information, but the use of this information to take better decisions. In addition, there is a clear interest among some politicians to keep fossil fuels as the main source of energy **(Interview 21FGM, 9CSM).**

5.1.5. Innovation in the way that policy is made

The reform approved in 2013 was an important process in defining polices in the energy sector. Although one of results of this reform was the creation of the LTE, experts from civil society, academia and the private sector have noted that the reform was heavily driven by the interest in producing fossil fuels, including non-conventional sources **(Interviews 9CSM, 10CSM, 23PSM, 22JM).**

The creation of the CELs and the celebration of auctions to allow further participation of renewable energy are innovative tools that support energy transitions. However, governmental representatives from the energy sector do not see climate change as being central to the process, but rather a co-benefit **(Interviews 5FGM, 21FGM),** while climate experts see this as a result of the LGCC **(Interview 9CSM).**

In other words, important steps have been taken to include climate change in energy policies, but they have yet to achieve mainstreaming within the process. To what extent this has been reflected on the public expenditure will be discussed in the next section.

5.2. Assessing climate change mainstreaming in the public budget of the energy sector

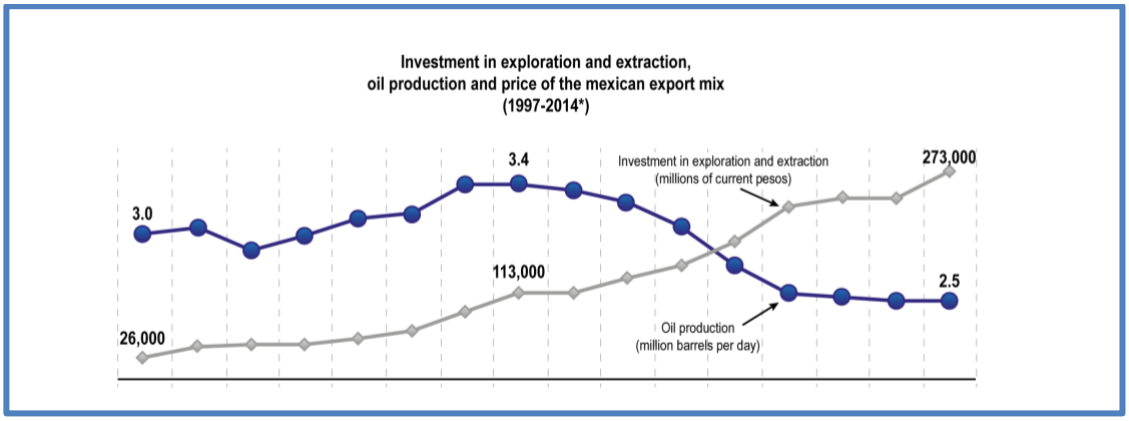
The role of the state in the energy sector is important because it has most control over the energy entities. Though the 2013 reform changed some of these roles, the state remains a principal player in the decision-making process. This is even more relevant under the Lopez administration, which plans to re-nationalize the oil industry.

Nevertheless, there is wide recognition that public money is not sufficient to fulfil the actions that the sector needs to modernize, which is why, according to the government, private

investment, is necessary. According to PEMEX, the cost of exploration and exploitation of the oil industry is approximately USD 60 billion. As the actual budget of the PEMEX is USD 27 billion, it could not cover the costs by itself, which is the reason the energy reform was useful from their point of view **(SENER, 2017, p. 5).**

Figure 5.1 shows the reduction in the production of oil (blue line) and the increase in extraction investment (grey line). This demonstrates that as investments increase, the results are decreasing.

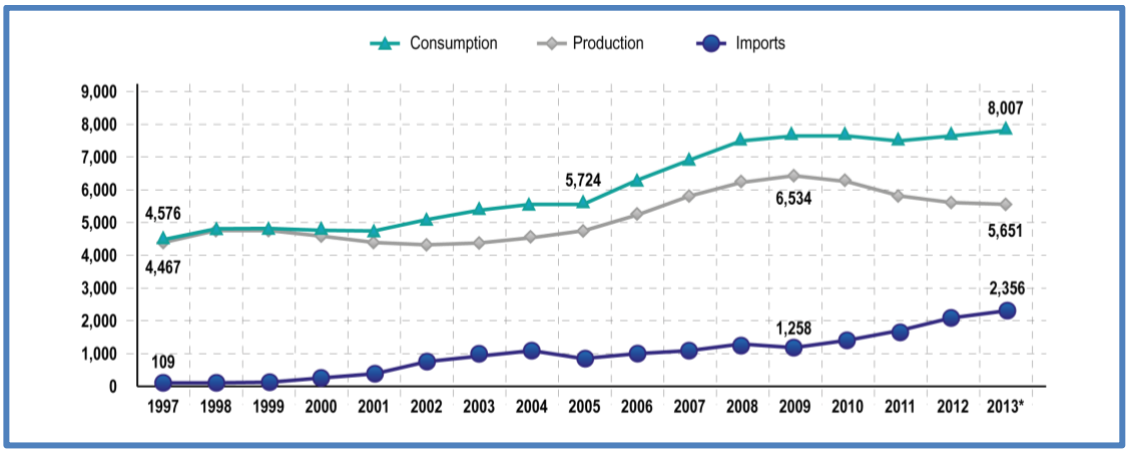
Figure 5. 1 Reduction of oil production (blue line) and the increase in the investment of oil production (grey line)



Source: SENER, 2017

In the case of gas production, Mexico used to be self-sufficient. However, in recent years the import of gas has been growing, as shown in Figure 5.2. According to the former government, this is because it is cheaper to import gas than to produce it **(SENER, 2014).**

Figure 5. 2 Consumption, production and importation of natural gas in millions of cubic feet per day (period 1997-2013)



Source: SENER, 2014

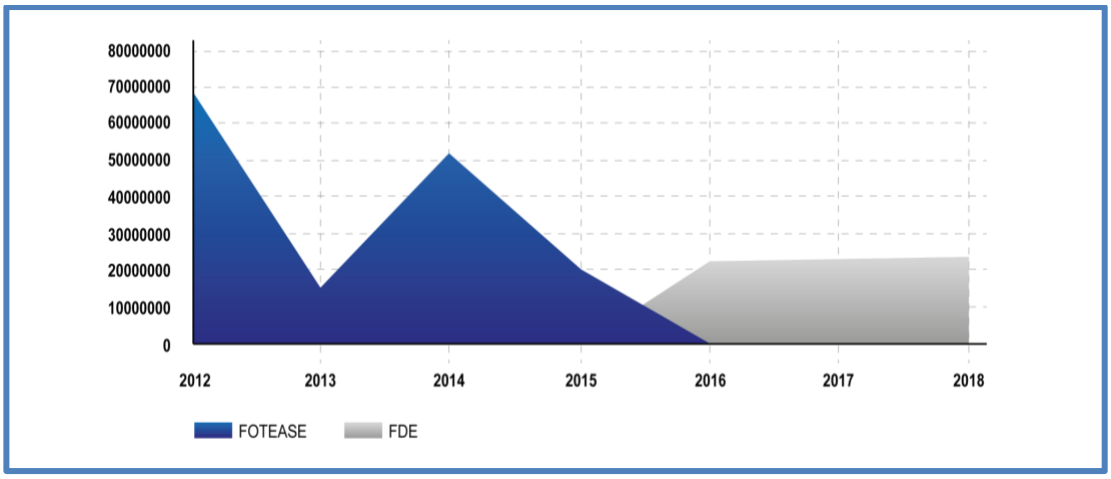
The cost of energy activities has changed, and with it the behaviour of public budget. In order to assess such behaviour, I conducted an analysis to understand to what extent climate related activities have been mainstreamed in the public budget (current and investment) of the energy sector from the 2012 until the 2018. Three factors within the public budget were analysed: 1) public budget allocated for the operation of SENER related to energy transition and sustainability; 2) public budget allocated to the funds that promote the energy transition; and 3) public budget allocated to activities such as oil exploration and exploitation within PEMEX, versus renewable energy projects within CFE.

In the first exercise, I analysed the allocation of public budget and the institutional arrangements related to sustainability within SENER. Changes in the amount given to certain areas within the SENER were observed. For example, there used to be a Vice Minister of Energy Planning and Technology Development, now called the Vice Ministry of Planning and Energy Transition, which was in charge of overseeing the policies related to renewable energy and energy efficiency, and whose budget has been decreasing in the last years going from USD 2,152,540 in 2012 to USD 1,552,040 in 2018. Other areas such as the General Direction related to Clean Energy and the General Direction for Research Development, Technology and Environment (later the General Direction of Energy Efficiency and Technological Innovation) were created. However, these areas also had budget changes. The first went from USD 777,299 USD in 2016 to USD 610,264 in 2018 and the second went from USD 522,375 in 2016 to USD 578,233 in 2018 **(SHCP, 2012-2018).**

This exercise shows that sustainability has been integrated in certain areas within the central sector, but that it still receives limited financial support in comparison to the institutions charged with fossil fuel activities. The allocation of budget to the Vice Ministry of Hydrocarbons for instance, has been fluctuating with an increase in the allocation of budget from USD 1,693,490 in 2010 to USD 1,930,690 in 2018.

The second exercise that I conducted was based on the allocation of budget to the energy transition funds. Back in 2007, the LAERFTE pointed out that "*in the federal public expenditure for the fiscal year in 2009, three billion pesos would be allocated to the Fund for the Energy Transition and the Use of Sustainable Energy, FOTEASE"* **(LAERFTE, 2007, Article Tenth Transitory).** The FOTEASE has received a budget since 2012, but with reductions in its allocation throughout the years. In 2015 the FOTEASE as a budget classification was removed from the budget and a new classification was created called, "*Funds for the Energy Diversification*" that, according to a representative of the Energy Ministry **(Interview 21FGM)**, is the same fund, but with significantly less budget than the first year of operation in 2012, as shown in Figure 5.3.

Figure 5. 3 Allocation of public expenditure for the Energy Transition Funds in USD (period 2012-2018)



Sources: Own elaboration with information from (**SHCP, PEF 2012-2018)**

Another important financial tool resulting from the 2013 reform was the Mexican Oil Fund for Stabilization and Development (FMPED, *Fondo Mexicano de Petróleo para la Estabilización y el Desarrollo*), which is under the control of the Finance Ministry. This Fund captures the income (other than taxes) received by the State for all hydrocarbon exploration and

exploitation projects developed by public or private state enterprises, both through allocations and contracts **(Mexican Government, 2013, p. 26).**

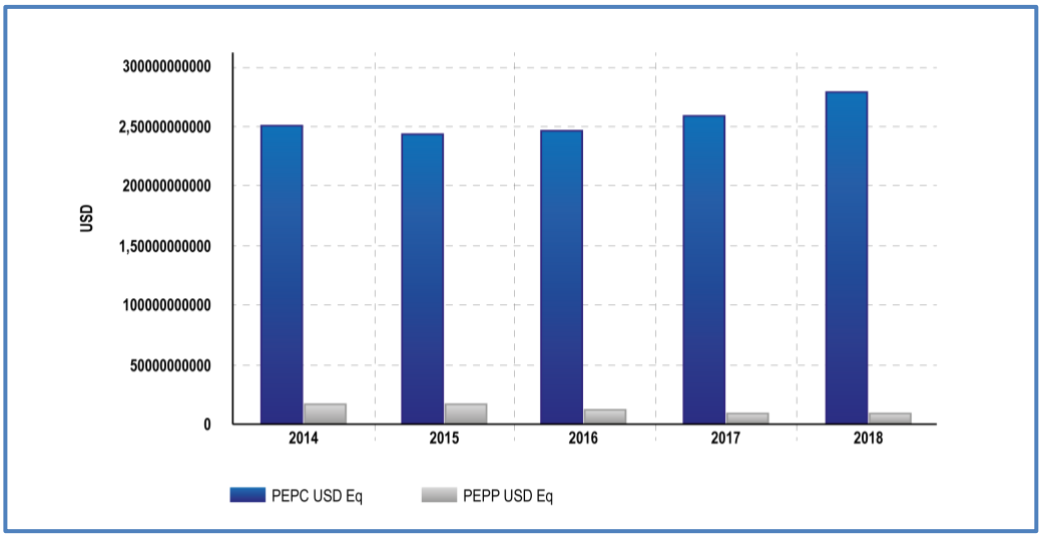
In order to reduce the dependence on income coming from oil exploitation, the energy reform established that the Fund would transfer up to 4.7% of GDP to the public budget, and the rest of the money raised will be saved. The Bank of Mexico, which has had a strict policy of saving, is the trustee of this Fund. An interesting element is that this Fund was also mandated to distribute some of its resources into different funds, such as the Hydrocarbons Fund and the Fund for Energy Sustainability -this one, managed by SENER and the National Council managed the last for Science and Technology (CONACyT, *Consejo Nacional de Ciencia y Tecnología)*-, however, according to budget information from 2017, most of the flows went to the Hydrocarbons Fund and none at all to the Energy Sustainability Fund **(FMPED, 2017).**

Until 2018 the Fund operated in a transparent way because, according to the official website, "*all the information related to the fund […] should be available to the population"* **(FMPED, 2017).** However, in 2020 the information was not found publicly.

Finally, in order to compare the budget allocation for sustainability in the energy sector, I analysed the budget allocated to oil exploration and production (analysing the pipeline of projects of PEMEX) and the budget allocated to renewable energy for power generation (analysing the pipeline of projects of CFE), both between 2014 and 2018.

In 2014 there were 76 exploitation and production projects, 80 in 2015, 68 in 2016, 87 in 2017, and 79 in 2018. This reflects the increase in the number of projects in recent years. Figure 5.4 shows the cost of these projects per year (blue bar), and the amount of budget that was allocated with public resources (grey bar).

Figure 5. 4 Cost and expenditure for oil exploitation and production (period 2014-2018)

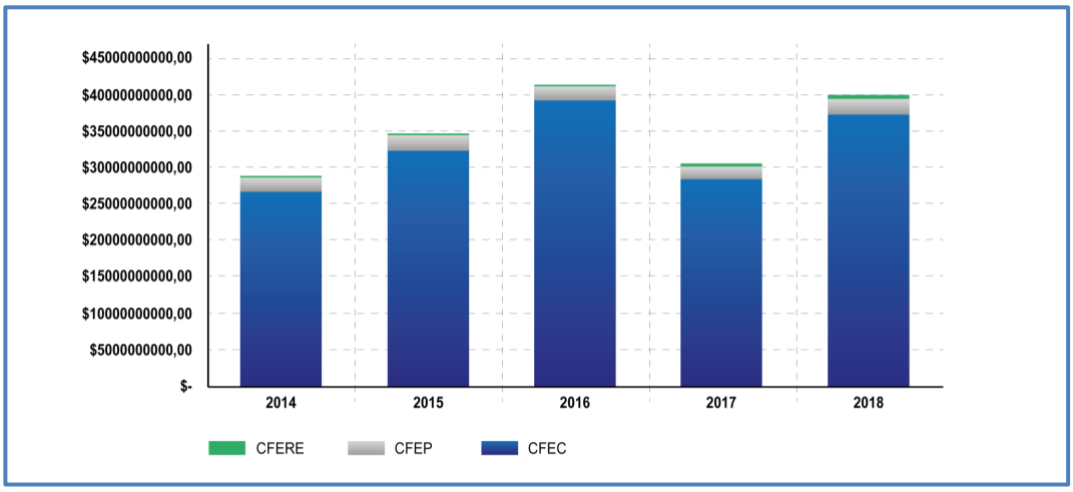


Sources: Own elaboration with information of PEF, 2014, 2015, 2016, 2017 and 2018.

Figure 5.4 shows the increase in the cost of exploitation and production of oil in recent years. As governmental and non-governmental representatives stated, in the case of Mexico, the cheap oil is depleted and new projects in deep water and through other, expensive techniques need to be used **(Interviews 1FGC, 9CSM, 10CSM, 22JM).**

Figure 5.5 shows the allocation of public budget. In the case of the power generation, the figure shows the total cost of projects per year (blue bar), the total budget allocated with public resources (grey bar), and the total amount of budget allocated specifically for renewable projects (green bar).

Figure 5. 5 Cost and expenditure for power generation including renewable energy projects in CFE (period 2014-2018)



Sources: Own elaboration with information of PEF, 2014, 2015, 2016, 2017 and 2018.

This shows that the cost of projects to generate electricity has increased in recent years. It also shows that public money invested to fulfil the projects has varied, with an increase observed in the past year. Meanwhile the amount of money used to support renewable energy projects was limited, and even decreased by 2017. In 2018, for instance, the allocation of money for renewable energy was 2.18% out of the total budget of power generation projects.

Table 5.2 shows the number of projects related to renewable energy and the budget allocated from 2014 until 2018. For instance, in 2014 out of 444 projects in the pipeline of CFE, 27 were related to renewable energy, and only 11 received public budget. A slight upward trend saw 14 out of 29 projects receiving public budget in 2016, before a decline in subsequent years.

Table 5. 2 Number of projects for power generation in CFE, including renewable energy projects (period 2014-2018)

Year	Number of projects in total	Number of renewable energy projects	Number of projects that received public sources
2014	444	27	11
2015	478	27	13
2016	441	29	14
2017	234	25	10
2018	319	19	7

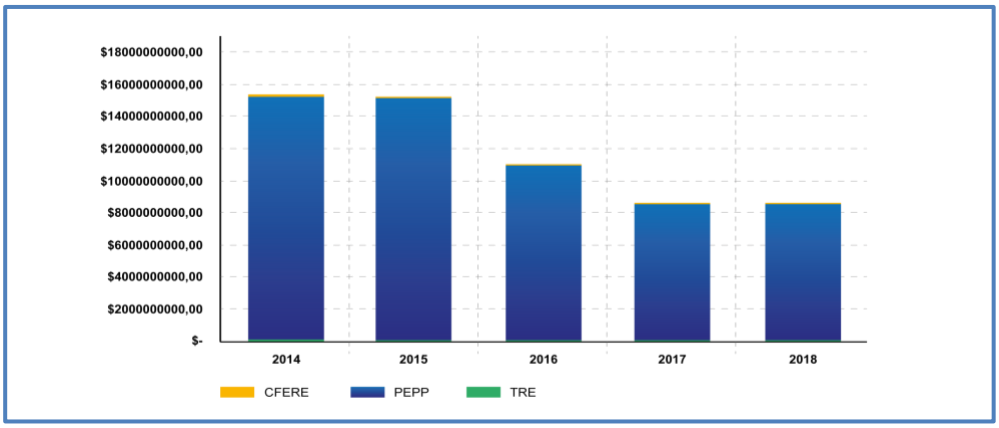
Sources: Own elaboration with information of PEF, 2014, 2015, 2016, 2017 and 2018.

It is important to emphasize that 2014 was the last year in which PEMEX and CFE received public sources as directly controlled entities of the government (during Enrique´s Peña Presidency). In 2015, both entities appear as productive entities of the state that are not within the public expenditure of the central sector. This was a direct result of the 2013 reform.

In this sense, we can conclude that during this period from 2014-2018 when renewable energy production grew, public money did not play an important role, and that mainly private investment took place. In Figure 5.6, a comparison between the total budget of the sector,

the budget for exploration and production of fossil fuel and the budget for renewable energy is shown to observe the general trend.

Figure 5. 6 Allocation of public expenditure: fossil fuels versus renewable energy in USD (period 2014-2018)



Sources: Own elaboration with information of PEF, 2014, 2015, 2016, 2017 and 2018.

Figure 5.6 shows that public money allocated to oil exploitation and production (blue line) is higher than the amount of money dedicated to the whole administration of the sector (green line), and much higher than investments in renewable energy projects in power generation (yellow line). As a reference, the investment in renewable projects represents 0.56% of the investment in oil exploration and fossil fuel production in 2018.

In other words, it is possible to say that, even though there has been progress in the allocation of public expenditure related to climate change in this sector, it is considerably lower in relation to the allocation of money that contributes to the generation of the problem itself. In conclusion, climate change has not been mainstreamed in the public expenditure of the energy sector, although there are policies and actions that can motivate its treatment in the short and medium term.

Although the trend towards fossil fuel investment is unchanged under the mandate of Lopez, the promotion of renewable energy is declining. As observed in an analysis of the budget in 2019, the budget allocated for the production of fossil fuel in the energy sector is 92.3% while the budget for other types of energies is 7.7%, which includes renewable energy but also hydropower and others **(SHCP, PEF, 2019).** A concern regarding this trend is that a large amount of public resources is now dedicated to shale gas and deep-water exploration, with

an allocation of USD 319,656,023 **(SHCP, PEF, 2019)**. This is despite AMLO pointing out that he would not allow fracking during this mandate **(Ramirez, 2018).**

The scenario for the future is uncertain because, in the Strategy for the Transition to Promote the Use of Clean Technologies and Fuels (*Estrategia para la Transición y Promoción del uso de Tecnologías y Combustibles limpios*) presented in January 2020, one of the goals is to "*Increase the generation of electricity with clean and renewable energy, and fulfill the commitments in relation to climate change and emission reduction, taking care of the adequate energy balance for efficient distribution and dispatch"* **(SENER, 2019, p. 4).**

5.3. Discussion of levels of climate change mainstreaming in the planning and budgeting process of the energy sector in Mexico

The analysis of the levels of climate change mainstreaming in the energy sector following Daly´s **(2005)** proposal, shows that there was progress in areas such as the inclusion of climate change in the rhetoric and discourse of the energy sector, however this varied depending on the government in power. For instance, during the period of Calderon´s Government (2006-2012) there was an explicit interest in climate change, while in the context of Peña´s Government (2012-2018), it was considered as a co-benefit, and recently in the case of Lopez´s Government (2018-2024), has not been considered as part of the discourse or rhetoric in the energy sector during the first year of operation.

Furthermore the limited progress in the discourse in previous governments was also complex, since the goals were not fully related to the transition towards renewable energy sources, but towards new technologies such as fracking and the extraction of resources such as gas, that some politicians insisted in calling "clean energy".

Regarding the mainstreaming process at the institutional level, it was found that, with the latest reforms, the institutions related to the oil sector have been strengthen, while the institutions of the electricity sector were also mandated to further promote renewable energy. There has been progress with the creation of arrangements such as the Vice Ministry of Planning and Energy Transition and other general directions that were created in the Energy

Ministry. Although the energy sector has been engaging more in seeking to reduce emissions, it is not always under the goal of dealing with climate change but is more related to the price of oil and other technologies **(Interview 5FGM).**

Furthermore, although there are tools that are helping to include climate change considerations in energy policies, such as the LTE, changes in the application of these instruments have impacted their effectiveness, creating uncertainty about the future of low carbon development promises, such as the case of the CELs.

Regarding the existence of new data, the energy sector has been progressing to produce more information about renewable energy, but how the information is used by different areas and entities within the energy sector presents a challenge. Moreover, there is a clear interest from some politicians in keeping fossil fuels as the main source of energy, which makes the energy transition highly difficult **(Interview 21FGM, 9CSM).**

This last point, in the case of the energy sector, shows there is very limited climate change mainstreaming progress, deemed a fragmented endeavour, the term Daly **(2005)** uses for the weakest mainstreaming effort. While some parts of the sector are trying to improve the efficiency of the energy transition, others (the politically stronger) are not interested in that pathway.

In this sense, there is no innovation in the way that the energy sector is making policy, and climate change has not been mainstreamed either in the planning process or in budget allocation. In this last point, it was observed that the amount of public resources allocated to fossil fuels represents close to the 90% of the budget of the energy sector in recent years, while it was demonstrated that progress in the promotion of renewable energy is not the result of public investments, but rather other types of resources, such as private investments.

The budget that CFE is investing in renewable energy projects is very limited (as low as 2.18% in 2018). Not only is the number of projects in CFE´s pipeline miniscule, but also around 40% of the renewable projects that are in the pipeline do not even receive public resources. If CFE does not prioritise investment in these projects, this could be harmful for the energy transition **(Interview 9CSM, 22JM).**

Nevertheless, is important to highlight that the role of the state remains key to achieve the energy transition, though the allocation of public sources to increase research and technology development, as well as to ensure a good the dispatch of the renewable energy with smart grids. In the next section I will discuss what conditions promote and hinder this limited progress in mainstreaming climate change in the energy sector, particularly in the public expenditure.

5.4. Conditions that promote or hinder climate change mainstreaming in the public budget of the energy sector in Mexico

In Mexico there are general conditions that promote or hinder mainstreaming climate change in the public budget that are similar to those analysed in Chapter 4. However, in this section, I will introduce those that are specific to the energy sector.

Conditions that promote climate change mainstreaming in the public budget of the energy sector in Mexico

One of the achievements of the energy reform that took place in Mexico in 2013 was the **inclusion of the LTE**. Although it was the last law approved in the entire reform, it allowed for the continuation of the debate regarding the role of the energy sector in the compliance of the Paris Agreement, and also recognized the existence of the Climate Change Law to further connect energy and climate policies **(Interviews 9CSM, 22JM).** A high-level representative of the energy ministry stated that this instrument will provide certainty to the private sector to continue working on renewable energy **(Interviews 5FGM).**

In addition, the reform has allowed for the **creation of specific areas within the energy ministry to work on energy efficiency and renewable energy** as well as other decentralized entities such as the Commission for the Efficient Use of the Energy (CONUEE, *Comisión Nacional para el Uso Eficiente de la Energía*). Although with the arrival of Lopez in 2019, there is little interest in these matters, another condition that promotes the development of renewable energy is the **recent drop in the prices of these technologies.** This last point has served as guidance to increase the participation of the **private sector**, which is now the major investors and promoters of renewable energy in the country. While the case of the international cooperation plays a minor role, focus mainly in energy efficiency programs **(Interviews 5FGM, 7FGM).**

Conditions that hinder climate change mainstreaming in the public budget of the energy sector in Mexico

The approval of the Energy Reform in 2013 served as well to incentivize **the participation of private and foreign capital in the expansion of the fossil fuel sector**, which is a major constraint for climate policy. The aim was to substitute the role of the national oil company with private investments, an idea that changed with the arrival of Lopez in 2019, who wants to **strengthen the role of PEXEM**. Both visions, however, are centred on the idea of producing more oil and even using non-conventional methods, such as fracking, to extract oil and shale gas, which has several social and environmental impacts **(Interviews 1FGM, 9CSM, 22JM).**

In this sense, the reform strengthened a sector that was already reluctant to transit towards a low carbon pathway. This produced a carbon lock-in within the Mexican economy, which is **highly dependent on fossil fuels** to generate revenue even though oil reserves are declining. The economy therefore sits in a fragile state. Producing electricity with renewable energy, meanwhile, has become more profitable in recent years and the government should take advantage and use this moment to diversify the energy matrix as well as the financial system in the country, but the **government is not sending the right signal to the private capital** that aims to invest more in these technologies **(ICM, 2019).**

The **growing interest in fossil fuels is also creating tension among major donors** that have been investing in climate policies in Mexico as well as other financial institutions that doubt the motivation of Mexico to tackle the problem. This **risks the access of Mexico to climate finance**, which is the source that has been supporting climate action at the national level.

5.5. Conclusions

The energy sector is the most important sector to analyse in the context of climate change because it is the main source of GHGs in Mexico. The analysis of the levels of climate change mainstreaming in the energy sector shows that there are limited efforts to integrate climate change in the sector, which is rather a fragmented endeavour.

Although climate change was included in the energy sector's lexicon for many years, particularly in the context of international agreements, this has been changing depending on the government in place; while some presidents were promoters of the energy transition,

such as Calderon, the more recent government under Lopez is highly focused on fossil fuels and fails to mention climate change.

Regarding the creation of institutions, progress has been made towards the creation of areas that work on energy efficiency and renewable energy, but power is also growing in areas that work in fossil fuels. In addition, policies and legal tools were created, such as the LTE, but compliance is struggling because of changes in the direction of the energy sector. Some innovative tools, such as the CELs, are now at risk because the energy ministry aims to change their initial purpose thereby derailing the goal to achieve the energy transition.

Regarding mainstreaming climate change in the public budget of the energy sector, the public budget does not play an important role in the energy transition. Rather, it is almost entirely focused on fossil fuel production. Although there are conditions that promote the climate change mainstreaming processes, such as the legal framework and the drop on the prices of the renewable energy technologies; there are conditions that hinder such a process, such as the high dependency on fossil fuels and the creation of new policies that aim to strengthen this sector, as well the high levels of corruption and lack of political will to transition towards a low carbon future.

Therefore, the energy sector, the most important sector in the achievement of a low carbon future, is far from mainstreaming climate change. This puts at risk the compliance of international commitments to support the goal of keeping the global temperature rise below $2^{o}C$.

CHAPTER 6. ASSESSING CLIMATE CHANGE MAINSTREAMING EFFORTS IN COLOMBIA

Introduction

Colombia is one the countries in Latin America that has been active at the international level in the context of the United Nation Convention Framework on Climate Change as well as progressing in the construction of an institutional architecture and policy framework to deal with climate change at the national level. In addition, Colombia is one of the main recipients of international cooperation in the form of Overseas Development Aid and one of the few countries that has been allocating public budget to tackle the problem in an explicit manner. Nevertheless, Colombia is also relying on the production of fossil fuels and other extractive activities that act in opposition to the climate goals.

In this context, this chapter assesses the extent to which Colombia has been mainstreaming climate change in the planning and budgetary process, in order to identify what conditions, promote or hinder this process. My argument is that, while Colombia is an active climate leader at the international level, its dependency fossil fuels and extractive activities is dragging the country towards a carbon lock-in, which must be rectified if the climate goals will be achieved.

As in the case of Mexico, Colombia is explored through a literature review and a set of elite interviews. To present the findings, this Chapter is broken into five main sections. The first section assesses the levels of climate change mainstreaming based on Daly´s **(2005)** methodology. The second section analyses the nature of public finance in Colombia and the levels of climate change mainstreaming in the public budget of the country and, particularly,

in the environmental sector. The third section discusses the findings related to the levels of mainstreaming. The fourth section analyses the conditions that promote or hinder mainstreaming climate change in the planning and budgeting process and, to close, the fifth section draws some conclusions.

6.1. Colombia in Context

Colombia is a country with a population of 48.2 million inhabitants **(DANE, 2020).** In 2017 it had a Gross Domestic Product (GDP) per capita of USD 6,301 **(World Bank, n.d.).** However, in recent years the country has experienced rapid economic growth as well as an improvement of social and economic policies. According to the Organization for Economic Cooperation and Development (OECD) **(2005)** "*the solid registered growth has been boosted by the oil and mining boom, foreign direct investment in the commodities sector, as well as investment in general*" **(p. 4).**

The history of Colombia over four decades, starting at the end of the 1960's, was characterized by significant episodes of violence and insecurity related to drug trafficking, armed conflict and other illicit activities, which have been concentrating the attention of the government **(Paez, n.d.).** Nevertheless, in economic terms, Colombia is growing. In the period 2010-2012, the state had an average growth rate of 4.2% per year and around 4.8% in the period of 2010-2014 **(Colombian Government, 2014, p. 656).**

In the context of the UNFCCC, Colombia is considered a developing country, part of the Non-Annex I countries. However, on the 25th of May 2018 the OECD approved the entrance of Colombia into the organization, becoming the 37th member among the major economies of the world **(OECD, 2018).**

Regarding climate change, Colombia is considered one of the most vulnerable countries in the world **(Florez *et al*., 2016).** In 2010 and 2011, the country experienced a severe winter period produced by "La Niña" effects, which impacted the economy and the population **(Florez *et al*., 2016).** The phenomenon affected 87.5% of the territorial departments and 93.03% of the municipalities **(Nuñez, 2016, p. 8).** The economic loss was approximately 0.6% of the GDP in the period 2011-2014, resulting in a state of emergency **(Florez *et al*., 2016).**

In 2015-2016, another meteorological phenomenon called "El Niño" impacted the country. The rains increased river levels, such as the Magdalena River, as well as affecting the "*páramos*", one of the most important and strategic ecosystems in the country **(Florez *et al*., 2016).**

Colombia is not only highly vulnerable to the impacts of climate change, but also contributes to GHG emissions. The National Determined Contributions (NDCs) submitted to the UNFCCC reported that, in 2010, the country produced 0.46% of global GHG emissions. The main sources of emissions are agriculture, forestry-silviculture and other land uses (130.36 MTon of CO_2eq), followed by the energy sector (71.21 MTon of CO_2eq), the waste sector (13.71 MTon of CO_2eq) and the industrial sector (8.69 MTon of CO_2eq) **(Colombian Government, 2015, p.1).**

Deforestation is a major source of GHG emissions in the country. According to the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM, *Instituto de Hidrología, Meteorología y Estudios Ambientales*), a total of 140,356 hectares were deforested in 2014, around 16% more than in 2013 (120,934 hectares) **(Florez *et al*., 2016, p. 48).**

These facts are important to understand the extent to which the country has been mainstreaming climate change in the planning policy framework in response to this. As with Mexico, this chapter analyses Colombia based on the five levels of mainstreaming proposed by Daly **(2005)** adapted to the climate change agenda as it was explained in Chapter 2: 1) Level of discourse or rhetoric analysis; 2) Level of institutional or structural change; 3) Innovation in the way that policy is made; 4) New data available and 5) Innovation in the tools used to make policy. However, as was stated in Chapter 2, I included a sixth level - the levels of mainstreaming climate change in the public budget - the core of this thesis.

6.1.1. Level of discourse or rhetoric

Colombia ratified the UNFCCC in 1994 through Law 164, with the aim of "*seeking alternatives to conduct actions to deal with climate change, […] based on the principles of common, but differentiated responsibilities…*" **(MADS, n.d.).** Since then progress has been seen in the discourse and rhetoric, particularly with the inclusion of the topic in the National Development Plan (PND, *Plan Nacional de Desarrollo*), the most important planning instrument.

The first PND that reflected environmental issues was the Plan 1990-1994, elaborated under the mandate of César Augusto Gaviria from the Liberal Party[24] **(Colombian Government, 1990).** During this period, the Environmental Ministry (MADS, *Ministerio de Ambiente y Desarrollo Sustentable*) was created.

Under the mandate of Ernesto Samper (1994-1998) the PND included a chapter related to sustainable development but no mention of climate change was included **(Colombian Government, 1994).** In the same way the PND 1998- 2002, developed by Andrés Pastrana from the Colombian Conservative Party, highlighted that increased levels of deforestation and environmental damage could affect the financial and commercial sectors as well (**Colombian Government, 1998)**.

The PND 2002-2006, under the mandate of Álvaro Uribe (first period), included a chapter promoting sustainable economic growth, declaring that the country had to work within the context of the UNFCCC and the Kyoto Protocol **(Colombian Government, 2002).** During the second period of Uribe, the PND 2006-2010 included a strategic line about environmental and risk management (**Colombian Government, 2006).**

Until this moment, the rhetoric and discourse of the government focused on an agenda of security and the necessity to re-establish peace in the country, mentioning in very short phrases the environmental agenda. However, during the first period of the government of Juan Manuel Santos (2010-2014), elements regarding climate change were included in the PND **(Colombian Government, 2010).** The same included the "Action Plan for the Attention of Emergencies caused by the Winter Wave 2010-2011" **(Colombian Government, 2010: 273),** as well as promoting the formulation of the National Adaptation Plan **(IDEAM, 2018a).**

All governmental representatives interviewed for this thesis believed climate change was included in the PND because of the impacts experienced with the "La Niña" effect. Representatives of the National Planning Department (DNP, *Departamento Nacional de Planeación*) pointed out "*by the time that Santos was taking the Presidency, the National*

[24] Gaviria took the power after the candidate, Luis Carlos Galán, was murdered in 1989. It was under the mandate of Gaviria that the National Assembly created the National Constitution of 1991, which now guides the country (1991 updated in 2016).

Development Plan was ready, but they had to change it to include the effects of La Niña because of its impacts" **(Interviews 15FGC).**

It was, however, during the second presidential period of Santos (2014-2018) when the PND explicitly included the topic of climate change as part of the "Green Growth Strategy". In this PND, the government not only included aspects relating to the reduction of vulnerability, but also the necessity to progress towards low carbon and sustainable growth. One of the goals of the PND was to create sectorial plans in seven ministries with adaption and mitigation goals for 2020 and 2030, in the context of the Colombian Low Carbon Development Strategy **(Colombian Government, 2018).**

Governmental and non-governmental representatives recognized that including climate change in the PND, the most important planning document of Colombia, allowed this topic to be discussed in high-level meetings **(Interviews 11CSC, 12OIC, 7FGC).**

President Santos attended different meetings, such as the high-level meeting organized in 2014 by the former General Secretary of the United Nations Ban Ki Moon, the COP21 of the UNFCCC, the One Planet Summit and others. The discourses highlighted the commitment of Colombia, pointing out *"climate change is a reality that many countries are already facing*" **(Santos, 2014).** During the COP21 the President presented the commitment to reduce 20% of GHG emissions by 2020 based on a business-as-usual scenario **(Santos, 2015).**

One of the main commitments that President Santos emphasised was to reduce deforestation, reflected in the plan, Amazonia Vision (*Visión Amazonía*). He also stressed that the main goal is to achieve domestic peace as a way to protect the environment **(Santos, 2015).**

Although Colombia's proactive role at the international level is recognized, which is also reflected in his speeches **(Interview 7CSC),** the criticism of the discourse of President Santos was that the levels of environmental regulation in general have been reduced. As well, other policies that are contrary to the environmental agenda have been prioritized. For instance, the increasing licences to the mining and oil sectors are inconsistent with the environmental and climate agenda **(Martinez, 2015; interview 6CSC).**

This is a problem that remains important with the government of Ivan Duque, who took the power in 2018. In his PND 2018-2022, goals were included to mitigate and adapt to climate change in an explicit way **(Colombian Government, 2018a).** However, a representative from academia explained that the problem in Colombia "*is that the discourse goes to a certain point, but the actions go to another*" **(Interview 6CSC**). This is because the country *"lives off mining and oil activities and we need to makeover what we do at the national level"* **(Interview 6CSC).** The expert suggests that, although Colombia has ratified international agreements related to sustainable development, their actions are still highly focus on fossil fuels and extractive activities **(Interview 6CSC).**

6.1.2. Levels of institutional or structural change

In 2016, the National System of Climate Change (SISCLIMA, *Sistema Nacional de Cambio Climatico*) was created through Decree 298. This was the first attempt to mainstream climate change at an institutional level in the federal government **(Interview 11 CSC).** The creation of SISCLIMA is based on policy mandate 3700, created by the National Committee of Economic and Social Policy (CONPES) in 2011. It is called "*Institutional Strategy for the Articulation of Policies and Actions on Climate Change in Colombia*" **(Colombian Government, 2018).** Representatives from MADS pointed out that CONPES 3700 was the basis for the institutional strategy to articulate policies and actions on climate change **(Interviews 9FGC, 1FGC).**

Nevertheless, the CONPES is a political guideline that does not have legal force. An academic representative stated that this "*is weak and does not have a long-term effect*" **(Interview 3AC)** because it is a mandate that comes from the Federal Government, but in terms of hierarchy, it is below a law. During the time of writing this thesis, Colombia was attempting to create and implement a law that can comprehensively mandate and regulate actions related to climate change **(Interview 1FGC),** which will be discussed later.

In general, SISCLIMA is the space *"to coordinate, articulate, formulate, follow up and evaluate the policies, norms, strategies, plans, programmes, projects, actions and measures on adaptation to climate change and mitigation of greenhouse gases"* **(Decree 298, 2016, Article 1)**. Within SISCLIMA the Inter-ministerial Commission of Climate Change (CICC: *Comisión Intersecretarial de Cambio Climático*) was created. The CICC is the entity that coordinates and guides the implementation of the national policy of climate change, integrated by eight

Ministers[25] **(Decree 298, 2016, Article 7).** The decree promotes the participation of Ministers and the director of the DNP, which "*empowers the mandate because it coordinates the work of the ministries*", according to governmental representatives **(Interviews 13FGC, 14FGC);** while the Minister of MADS is the coordinator of the CICC **(Decree 298, 2016, Article 7).**

In SISCLIMA, other governmental actors also participate who are relevant for the implementation of climate action, such as IDEAM, the territorial entities and the Regional Autonomous Corporations (CAR, *Corporaciones Autónomas Regionales*), which are the environmental authorities within the territorial departments. According to MADS the participation of CARs is important, and almost 100% of corporations included climate change in their planning process for the period 2016-2018 **(IDEAM, 2017, p. 397; Interview 13FGC).**

IDEAM is the technical arm of SISCLIMA that is in charge of producing information related to GHGs, vulnerability scenarios and other relevant technical information for the decision-making process. IDEAM is also responsible for producing the communications that are submitted to the UNFCCC **(Interview 13FGC).**

While governmental representatives recognize the need to engage different sectors in the mainstreaming process, there is major concern that the Climate Change Direction of MADS is dealing with most of the work, and that full engagement of other ministries is still needed **(Interview 11CSC).** The strategy of the Direction is to promote the creation of climate offices within different ministries, but it is still a work in progress **(Interview 9FGC).** A civil society representative explained that, if Colombia does not manage to include other ministries in a more structural way in the climate debate, is not going to be possible to tackle climate change "*because the Environmental Ministry does not have the political weight to do it*" (**Interview 6CSC).**

In terms of governance, both governmental and non-governmental stakeholders who were interviewed recognized the importance of the participation of the DNP. This is because the DNP is the entity that coordinates the whole public policy process and its involvement in the

[25] Members of CICC: Environment and Sustainable Development (*Ministro de Ambiente y Desarrollo Sustentable*); Interior *(Ministro del Interior*); Finance (*Ministro de Hacienda*); Agriculture and Rural Development (*Ministro de Agricultura y Desarrollo Rural)*; Mines and Energy (*Ministro de energía y minas*); Transport (*Ministro de Transporte*); Foreign Affairs (*Ministro de Relaciones Exteriores*); and the Director of the National Planning Department (*Departamento Nacional de Planeación*)

creation and implementation of climate policies is seen as an important step to achieve the mainstreaming goal **(Interviews 7FGC, 11CSC, 12OIC).**

A DNP representative explained that the Department is participating in climate policies because *"climate change has brought social and economic costs to the country and that demands a high level of attention*" **(Interviews 7FGC).** In this sense, DNP is leading the development of the "Green Growth Strategy, as well as is leading the Financial Management Committee (*CGF, Comité de Gestión Financiera*) created by the Decree 298 as well, to incorporate climate change criteria into the planning, execution and economic and financial evaluation cycles of Colombia. This Committee was created at the same time as the Foreign Affairs Committee (CAI, *Comité de Asuntos Internacionales*) under the coordination of the Foreign Affairs Ministry (**Decree 298, 2016, Article 8**).

The Committee is considered an important institutional arrangement because it joins not only governmental representatives (DNP, the Finance, Environment, Industry, Foreign Affairs ministries, the Presidential Agency for International Cooperation, IDEAM and the Adaptation Fund), but also makes an effort to include entities such as national development banks (Bancoldex, Findeter, Finagro) and the Green Protocol, which is an initiative to encourage commercial banks to engage with climate action **(DNP, 2018; Interview 15FGC).**

Although a division of work is observed among the different institutions of the Colombian government, the problem is the maintenance of the teams, because there is high staff turnover, which means previous knowledge is often lost. For example, in the Climate Change Direction, there are around 20 members of government, plus another 30 consultants, who can leave at any time without passing along their knowledge **(Interview 1FGC).** According to a former governmental representative, "*thankfully, the key people who have been involved in the creation of key policies have remained. This is also part of the reason why Colombia has been consistent in their position at an international level*" **(Interview 11CSC).**

6.1.3. Innovation in the tools used to make policy

Important policy instruments were identified that were created thanks to discussions, research and other tools that are helping to better understand the state of climate change in the country. The most relevant instruments developed in Colombia are:

1. The Colombian Low Carbon Development Strategy (ECDBD, *Estrategia Colombiana de Desarrollo Bajo en Carbono*);
2. The National Adaptation Plan (PNACC, *El Plan Nacional de Adaptación*);
3. The National Strategy for REDD+ (ENREDD+, *Estrategia Integral de Control a la Deforestación y Gestión de los Bosques);*
4. The National Plan of Disaster Risk Management and the Strategy of Financial Protection from Disasters (*Plan Nacional de Manejo de Desastres y la Estrategia Finaciera para Protección de Desastres*).
5. The National Strategy on Climate Finance (ENFC, *Estrategia Nacional de Financiamiento Climático*) was created in 2017.

Governmental representatives believe that the creation of these instruments was a major step forward thanks to improved information gathering, providing a better idea of what actions can be put in place to face the problem **(Interviews 13FGC, 14FGC).** Furthermore, the inclusion of the Green Growth Strategy into the PND (2014-2018) was a major, because this strategy aims to support productive sectors with the internalization of sustainable principles **(Interview 11FGC).**

However governmental and non-governmental stakeholders consider that the most relevant tool to make climate action possible is the Climate Change Law that was approved in 2018, after at least two years of discussion **(Interviews 11CSC, 13FGC, 14FGC, 17LPC).** The approval of the Law was relevant because in 2018 Colombia had elections and a new government took over, and the aim was to avoid a political change that could affect the evolution of climate policy **(Interview 15FGC).**

Although the Climate Change Law did not pass as quickly as the environmental ministry hoped, the peace process in Colombia helped to build a new narrative about the topic. President Santos received the Nobel Peace Prize for his work in constructing agreements with the armed groups to end the violence in the country **(Nobel Prize, 2016).** In that sense, although the environmental agenda was not considered at the beginning of the peace negotiations, the problem of deforestation became clear during the process, as the production of cocaine leads to the cutting of thousands of trees.

As a result, a fund called "Sustainable Colombia[26]" (*Colombia Sostenible*) was created with the support of the Inter-American Development Bank (IADB) **(Colombian Government, n.d.).** This was done in order to integrate both agendas with a strong focus on the reduction of deforestation. This topic will be discussed further on.

All those interviewed agreed that the peace process is the main concern of the government. However, the possibility to "*integrate climate change into the peace agenda is an opportunity for Colombia*" **(Interview 3AC).** If the country manages to do this in an effective way, it will be an example of an innovative approach to tackle climate change and to face other structural problems **(Interview 3AC).**

6.1.4. New data available

Governmental representatives acknowledge that one of the major challenges that Colombia has faced is producing and gathering data. Over time, however, it has been possible to gather enough information to establish goals and to define what is needed.

Colombia has submitted three national communications in the context of the UNFCCC as well as two Biannual Updated Reports. These tools have been the way to collect data regarding key sectors in the country. The update of the GHG inventory, which is guidance to determine the key sectors that need to reduce emissions, was included within these instruments. In addition to this, the country is making progress identifying vulnerable areas through vulnerability maps produced by IDEAM **(2017).**

On the other hand, each of the policy instruments that constitute the National Policy of Climate Change has their own processes to collect data. For example, the ECDBD was built based on eight sectorial plans. These identified the key measures that the country can implement in order to reduce emissions in productive sectors **(Interview 9FGC).** The analysis conducted also identified abatement cost curves, as well as National Appropriate Mitigation Actions (NAMAs).

Different policy instruments were also a part of the PNACC over the years. The identification of adaptation actions has been more complex, and representatives of the MADS

[26] Information about the Fund is available from http://www.colombiasostenible.apccolombia.gov.co/

acknowledges that, "*the construction of the PNACC will be a continuous process, which will be constantly fed back to the extent to which information about the threat posed by climate change*" **(MADS, 2018).**

The integration of the Colombian NDCs is another example of a process where data played a major role **(Interview 4FGC).** In collaboration with academia, in particular, the University of the Andes, the Federal Government managed to analyse several measures that could guide it towards a low carbon development pathway. A representative of the Foreign Affairs Ministry highlighted that "*this analysis of the measures helped to provide information to the central government to better decide which measures could be considered in the contributions*" **(Interview 4FGC).**

In addition, the Colombian government is working on a system to measure, report and verify (MRV) emissions, the reduction of emissions and a system to track climate finance. The purpose of these systems is to keep producing data about the status of emissions, actions and finance. This will allow the country to better define its progress and how far it is from its commitments **(Interview 14FGC).**

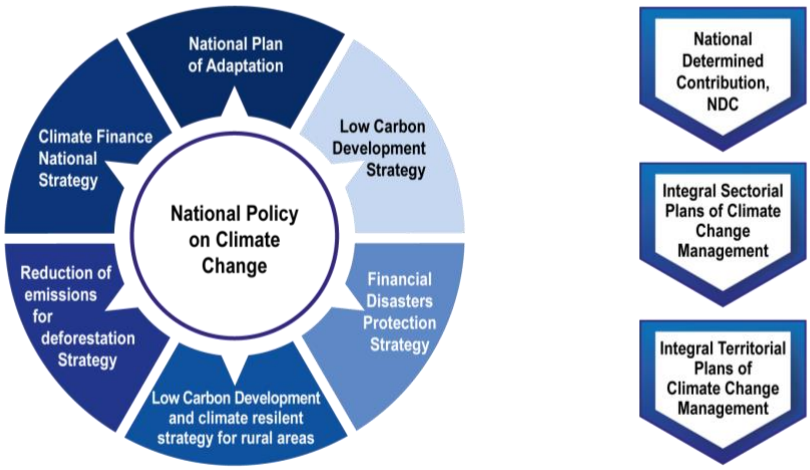
According to the third communication submitted to the UNFCCC, the MRV on climate finance, for instance, aims to provide better quality information related to the financial flows. This will allow better decisions to be made, relating to the management of public sources, and to a greater understanding of the need to leverage other international and private sources **(IDEAM, 2017, p. 431).** Therefore, the MRV could also be used as a tool to improve and innovate the way that Colombia creates policies.

6.1.5. Innovation in the way that policy is made

As stated earlier, Colombia has progressed in terms of climate policy because the topic is included in the most important policy instrument, the PND. Although the explicit mention of climate change was only integrated in the PND 2014-2018, climate change is a topic that has been treated by other instruments prior to this.

Based on that, Colombia has created instruments that aim to build a policy framework (Figure 6.1) to deal with mitigation, adaptation and means of implementation such as financial measures.

Figure 6. 1 Climate Policy Framework in Colombia



Source: Own elaboration using information from the Plan Integral de Cambio Climático del Department del Chocó **(2015),** and the Climate Finance National Strategy **(2017).**

IDEAM **(2016)** highlights that, "*to bring the country to be resilient to change climate and low in carbon, requires a robust inter-sectorial and inter-institutional coordination, more than sectored climate change… we have to take it towards mainstreaming to be able to respond effectively to the character multidimensional of the phenomenon*" **(p. 38).**

This assessment showed that Colombia has been creating instruments and policies to tackle climate change. In the words of IDEAM **(2016)** "*the Colombian Government has had a genuine interest in adding efforts, establishing coherences and articulating climate change management in an integrated way*" **(p. 47).** In its NDCs the Colombian government commits to reduce 20% of GHG emissions by 2030, but with the aim of cutting and additional 10% with international support **(Colombian Government, 2015).**

While there is innovation, further coordination and budgetary support is needed to fully complete tasks. The IDEAM points out *"in budgetary terms, the resources for climate change should increase, if that happens, other stakeholders will see the priority that the country gives to the subject*" **(IDEAM, 2016, p. 47).** In that sense, it's important to understand to what extent climate change is mainstreamed in the allocation of public sources to implement and to achieve the country's commitments, which will be discussed in the next section.

6.2. Assessing climate change mainstreaming in the public budget of Colombia

The aim is to understand to what extent climate change is mainstreamed in the public budget and under what conditions that allocation has taken place in Colombia.

Costs of climate change and sources of climate finance

The CEPAL, the DNP and the IADB conducted a study that found that, in the worst-case scenario, annual losses for climate change could be 0.50% of the GDP in Colombia. However, this analysis only considered economic sectors that represent 4.3% of the GDP **(CEPAL, *et al.*, 2014, p. 10).**

According to the National Strategy on Climate Finance, the cost of implementing key actions to reduce emissions by 20% (66.5 MtonCO2 eq.) could be around USD 17,109 million; this is USD 3.1 billion, annually **(CGF, 2016).** This amount considers the economic losses from the impact of "La Niña" 2010-2011 **(CGF, 2016).** In that sense, according to a DNP representative, tackling climate change requires the availability of economic and financial systems to deal with the impact of climate change and to invest in alternatives to achieve the green growth that the country has committed to **(Interview 9FGC).**

Colombia is one of the major recipients in Latin America of international cooperation from the Official Development Assistance (ODA). In recent years, international support from the OECD countries has increased as illustrated in Table 6.1.

Table 6. 1 Evolution of Total ODA Net in Colombia in millions of USD (period 2011-2015)

Year	2011	2012	2013	2014	2015
Amount	1017.7	764.2	857.5	1224.2	1347.5

Source: Own elaboration with OECD data (for the period 2011-2015)

It is not clear how much of this ODA is dedicated solely to climate change. However, the Climate Funds Update shows that Colombia was the fourth largest recipient of financing from climate funds in Latin America by 2015 and the third largest recipient by 2016 **(Bird, *et al.*, 2016; Bird *et al.*, 2017).**

According to all the government representatives interviewed, the financial support received from international cooperation is one of the most important drivers for climate action in the country, "*without it climate action would be limited*" **(Interviews 1FGC).** The First Biannual Updated Report submitted by Colombia to the UNFCCC pointed out that the support received from international cooperation was approximately USD 30 million over the period of 2010-2014 **(IDEAM, *et al.,* 2015).** However, a civil society representative claims that a lack of transparency makes it difficult to understand where the money is and how these resources have been used **(Interview 6CSC).**

Prior to the entrance of Colombia to the OECD, there was a debate about the potential risks that this could have in the access to funds. While some civil society representatives debated that being part of a rich group of countries could affect its access to grant aid **(Interviews 6CSC)**, government representatives feel that this will be positive step because Colombia can improve environmental standards that can help its performance and therefore access to more aid **(Interviews 4FGC).**

For instance, representatives from the government of Colombia consider that the Green Climate Fund is an important mechanism to fulfil the country's needs, since the Fund is already supporting different programs **(Interview, 15FGC).** However, most of the people interviewed agree that the role of public finance and the allocation of national resources is still necessary to guide and to leverage the participation of other financial sources **(Interviews 4FGC, 2FGC, 1FGC, 7FGC, 11CSC, 10AC, 12IOC, 13FGC, 14FGC).**

The next section focuses on the extent that climate change has been mainstreamed in the public budget, analysing the general context of the public finance system in Colombia.

6.2.1. Public finance in Colombia: General context

Since the global financial crisis of 2008, Colombia has experienced rapid economic growth based on trade and large flows of foreign direct investment, but also based on recovered domestic demand, driven by government consumption **(OECD, 2015).**

Global dynamics also affect the country. The global growth of China, the economic behaviour of United States, geopolitical risks and changing prices affect Colombian's mining, oil and coal

exports **(OECC, 2015, p. 14).** Although Colombia is better prepared for these changes, the country faces a constant issue, as do many Latin American countries: balancing the public finance system **(OECD, 2015)**. This is important to strengthen the capacity to generate revenue to cover all the expenditure needs in strategic sectors.

6.2.2. Revenues

The OECD **(2015)** claims that the fiscal policy framework in Colombia is robust. In 1991, the National Constitution, the most important legal document that guides the principles and actions of the country, included fiscal sustainability as one of the most important elements of public policy. Furthermore, there was a fiscal reform (integrated by three main laws[27] that aimed to balance the central government and adjust the economic cycle and the oil and mining prices **(Calvijo, *et al.*, 2013; OECD, 2015).**

In Colombia, the oil and mining sector have been important for revenue generation. The Mining and Energy Ministry (MinMinas, *Ministerio de Energía y Minas*) projected a boom in the energy-mining sector for the period of 2010-2020. The Ministry reported that the estimated direct foreign investment went from USD 1.3 million per year in 2000-2005 (1.2% of the GDP), to approximately USD 5.2 million per year from 2006-2010 (2.1 of the GDP) and USD 9.4 million per year from 2012-2014 (2.3% of the GDP) **(Calvijo *et al.*, 2013, p. 43).**

The projected number of oil barrels produced was estimated to be 1.6 million by 2020, representing a 46% growth **(Calvijo, *et al.*, 2013, p. 43).** However, by the beginning of the 2020, the production of oil was 883.872 barrels. Although the oil production decreased in comparison to other years, the gas production grew 5.6% in January 2020 compared to previous year **(El Tiempo, 2020).** According to the OECD, the challenge is to ensure efficiency in the future operation of Ecopetrol (the public company that also has private shares) so that permanent negative impacts are avoided. However, as in the whole region, the production of oil will decrease in the future **(OECD, 2015, p. 19).**

A Finance Ministry presentation illustrated that in 2013 the income from oil represented 3.3% of the GDP, but in 2014 it had reduced to 2.6% and in 2015 it had decreased further to 1.1% **(Minhacienda, n.d.).** Table 6.2 illustrates income projection for Colombia and shows that

[27] Law 1370 [2009]; Law 4825 [2010]; and Law 1430 [2010]; as well as tax law 1607 [2012]

dividends from Ecopetrol will not represent a significant portion from 2016 onwards **(OECD, 2015, p. 19).**

Table 6. 2 Income and budgetary projections of the Central Government in percentage of the GDP (period 2014-2025)

Income	2014	2015	2016	2020	2025
Tax Income	17.0	17.0	16.9	16.4	16.0
Other taxes	-	-	-	-	-
Dividends of Ecopetrol	1,4	1.0	-	-	-

Source: OECD, 2015.

Therefore, there is growing pressure to increase income collection in an effective and equitable way. The income of the central government is around 20% of GDP, which is low in comparison to the OECD countries, and even in relation to other Latin-American countries **(OECD, 2015).**

In general, there are three main challenges related to income collection: tax evasion, high exemptions and weak tax administration **(OECD, 2015, p. 20).** Tax evasion is close to 2% of the GDP. As well, the tax administration has limited control of customs because of the lack of personnel and other administrative limitations. Similar to Mexico, informal employment, for instance, represents between 50 and 70% of total employment **(OECD, 2015, p. 34).** Groups such as young people, women, less qualified workers and those displaced by political violence are more likely to work informally, which means that they do not contribute to the tax system.

Besides that, another issue is that local governments receive around 30% of their income from the central government. Although this has been reduced over time, it puts a lot of pressure on the system **(OECD, 2015, p. 15).**

In recent years, Colombia has implemented fiscal reforms that include measures related to the environment and climate change. The country approved a carbon tax, with revenues that represent 3.6% of the total income, in comparison to OECD countries with revenues of 5.7%. These taxes are for national consumption of fossil fuels, particularly liquid fuels and LPG gas **(Interview, 2FGC).** The established price per ton of CO_2 is 15,000 Colombian pesos, around

USD 5 per ton **(MADS, n.d.2).** The key concern is that the cost of taxes applicable to fossil fuels do not adequately account for the environmental impact **(Interview 11CSC).** However, the OECD **(2015)** considers fuel prices in Colombia to be closer to international standards in comparison to other oil producers in Latin America.

According to the Finance Ministry representative and others, the ideal scenario is to tax fuels based on their energy content, GHG emissions, and their environmental impact in terms of pollution **(Interview 2FGC; CEPAL *et al.,* 2014, p. 25).** The problem is that many activities are exempt from this tax, such as construction, electricity, transport, and financial services as well as other services. This causes an estimated income loss of approximately 2.4% of the GDP **(OECD, 2015).**

Another important element for the revenue is the royalties, which is the income that the country receives from mining and oil permits and licenses[28]. The Constitution established that all royalties are allocated to local governments and not to the central government, yet few municipalities benefited from these royalties **(Calvijo, *et al.*, 2013, p. 39).**

In order to better control these resources, a National Fund for Royalties and Autonomous Regional Corporations (CARs) was created. In 1994, the DNP was appointed to manage the Fund. However, the royalty system has been highly criticized because of alleged corruption and operational inefficiency **(Interview 10AC).** The aim of the Fund was to redistribute the resources to departments and municipalities that are not direct beneficiaries of royalties but this "*never happened efficiently*"(**interview 10AC)** and it was found that resources were sometimes reallocated to municipalities that already receive direct benefits **(Calvijo, *et al.*, 2013, p. 40).**

On average the royalties represent 1.1% of the GDP per year. Recently DNP has been working to integrate climate change in the allocation of funds from the Royalties System, but there is still resistance to making major reforms to the actual legislation to fully mainstream the climate perspective **(Interview 15FGC).**

[28] The National Constitution from 1991 ratified that subsoil is the property of the state, and approved compensation payment to local states (territories) for environmental damages incurred by exploitation of non-renewable resources **(Colombian Government, 1991, Articles 332 and 360).**

In 2017, as a result of additional income from royalties, an extra budget of USD 200 million (for the period 2017-2018) was allocated to climate action, which was a "*surprise*" **(Interviews 2FGC, 15FGC).** A representative from DNP commented "*the aim is not only to integrate new consideration for climate change, but to also establish a new framework to improve the investment of royalties by centralizing the planning and execution of projects, which will improve the investment framework*" **(Interview 15FGC).**

The topic of the country's revenue is complex, and this has a direct relationship with the amount of money that the country has to deal with all budgetary needs, including climate change, as it will be analysed in the next section.

6.2.3. Public budget and expenditure

According to the Finance Ministry the public expenditure, "*is the most important financial management instrument of fiscal policy and represents when public spending is programmed and recorded and the rules for its execution are established*" **(MisFinanzas, 2018).**

As stated previously, the level of expenditure relies on the levels of revenues and in Table 6.3 the relationship between these two areas is shown. Even though income was growing, the expenditure was controlled; it was not exceeding existing resources.

Table 6. 3 Comparison between revenue and public expenditure in millions of USD (period 2013-2017)

	2013	2014	2015	2016	2017
Revenue*	180,185	187,145	199,911	203,108	221,304
Public expenditure**	158,275	170,460	184,573	183,369	208,175

Source: Historic information- General Direction of Public Budget- Sub direction of Analysis and budget consolidation, Finance Ministry (MinHacienda), 2018.

*Information about the total revenue collected for the National Public Budget

**Information about the budget that includes function, debt and investment

In order to illustrate the strategic allocation of public resources, I conducted an analysis based on the allocation of budget for the last four years specifically for the environment, energy and planning sectors, which can be seen in Table 6.4.

Table 6. 4 The allocation of public budget in selected sectors in millions of USD (period 2014-2018)

Sector	2014	2015	2016	2017
Environment and sustainable development	425	458	463	508
Mining and energy	2,591	3,093	2,911	3,264
Planning	398	324	368	394
TOTAL of the country without debt	131,160	138,776	143,806	159,276

Source: Historic information- General Direction of Public Budget- Sub direction of Analysis and budget consolidation, Finance Ministry (Minhacienda), 2018.

The allocation of public budget in the environmental sector is around six times less than in the energy sector (average per year), while it is 1.2% more than the planning sector. The budget of the environmental sector has been growing constantly, while in the energy sector it decreased in 2016 but then increased again in 2017. The planning sector has been more or less constant although it decreased slightly in 2015 and 2016.

The public budget evolves as a reaction to national demands, and in the case of Colombia there are several social programmes that have been demanding more public resources. Notable examples include the peace agreement with armed groups, the provision of employment and the relocation of communities and families that relied on cocaine production, among others **(OECD, 2015, pp. 19-20).** Other areas such as investment in public infrastructure is expected to increase by 2020, however the challenge is to define where these needed resources will be found **(OECD, 2015).**

In general, the expenditure of the government went from 10% of the GDP in 1990 to 22% in 2005. However, there are other problems such as the internal and external debt that went from 14% of the GDP in 1995 to 50% in 2006 **(OECD, 2015).** For that reason, important policies must be implemented, and the cut of the public budget is one of the resources that the government considers in balancing the economy.

Colombia, like many other developing countries, faces pressure on the public budget. Nevertheless, the impacts of climate change here are evident and are also impacting the public finance system.

6.2.4. Public Budget for Climate Change

Asa result of the impacts of climate change in Colombia, such as the "La Niña" effect, the government has been spending public money to deal with the social and economic losses. With the creation of the PND of 2014-2018, the inclusion of a Green Growth Strategy as well as other risk management initiatives, the country allocated financial resources for climate change measures and created a number of financial mechanisms, operated primarily with public sources.

An analysis conducted by the UNDP as part of the Readiness Program of the GCF, pointed out that Colombia has been investing around USD 420,600 million (average per year) in climate-related activities **(IDEAM, 2017, p. 440).** From 2011-2015, the investments were divided as follows: the federal government provided 54% (USD 227,644 million per year), local governments provided 31% (USD 130,815 million) and the Royalties System provided 15% (USD 62,171 million) **(IDEAM, 2017, p. 441).**

In terms of the sectorial allocation, the analysis pointed out that the main sectors that allocate public resources associated with climate change are risk management and the environmental sector, which between both of them covered 70% of the expenditure (38% and 32%, respectively) **(IDEAM, 2017, p. 445).**

The analysis also identified other mechanisms that have been receiving pubic budget and that are relevant to deal with climate change. For instance, the National Adaptation Fund (*Fondo Nacional de Adaptación*) was created "*to attend the construction, reconstruction, recovery and economic and social reactivation of the areas affected by the events derived from the La Niña phenomenon of the years 2010 and 2011*" **(MinHacienda, n.d.).** This Fund is attached to the Ministry of Finance and Public Credit.

Between 2011 and 2013, the investments of this Fund were 36% of the total investment of the government during the period 2011-2015 (USD 13,284 million). Although the Adaptation Fund was created with a vision of reconstruction, the PND 2014-2018 gave the Fund the faculty to execute integral projects of risk management and adaptation to climate change in an explicit way. Its mandate is to operate with a multi-sectorial and regional approach and to mainstream climate change as an important strategic line (**MinHacienda, n.d.; Interviews, 7FGC, 5OIC).**

On the other hand, the Colombia in Peace Fund (*Fondo Colombia en Paz*) was created through in April 2017, "*to serve as a vehicle for implementing the peace programmes and projects to be implemented by the government*" **(Colombian Government, 2018).** According to the Finance Ministry, from October 2017 to April 2018, the fund received approximately USD 263,627 million. The main financial sources were the national budget, and other private and public resources. This fund has 13 sub accounts related to the peace agreement **(Colombian Government, 2018).**

An academic representative pointed out that this Fund represents an important instrument to watch, and that its success will depend on the levels of transparency and accountability **(Interview 3AC).** Importantly, financial flow information from the funds is published and can be accessed on the website of the Finance Ministry.

At the same time, the Sustainable Colombia Fund *(Fondo Colombia Sostenible),* was created as an important financial instrument to deal with environmental issues **(Interview, 12OIC).** The fund seeks "*to maximize the environmental dividends of the peace in Colombia, primarily in the territories that were affected for the armed conflict and that are rich in biodiversity*" **(Colombian Government, n.d.).** The operation of the Fund is under the operation of the *Colombia in Peace Fund,* to avoid duplication of efforts. This Fund did not receive resources from the Colombia in Peace Fund in the first years of operation while bilateral cooperation provided an important source of income. The expectation was to receive USD3.3 billion by 2020; the resources come from private sector, philanthropy, bilateral cooperation and national resources. Most of the bilateral cooperation comes from Norway, Germany, United Kingdom (join USD$14,250,000), Sweden (USD$1,575,437) and Switzerland (USD$2,750,000) **(Colombian Government, 2015; Colombian Government, n.d.)**.

With 13 lines of operation, this Fund is also called "*the Green Climate Fund of the Post-Conflict*", which is managed by the IADB, and is a result of the collaboration of governmental entities such as DNP, MADS, the Agricultural Ministry, the Presidential Cooperation Agency, and the High Counsellor for Post-Conflict (**Colombian Government, 2015; Interview 12OIC).** The aim is to use this fund to reduce 20% of the GHG emissions, reduce deforestation by 90 thousand hectares and reduce loss of natural forest, which are part of the NDCs; what is not clear in the second year of President´s Duque period is what is the future of these funds.

Finally, another important step was the creation of the MRV System for climate finance, being Colombia the first country in Latin America to create and operate a system to track financial flows **(DNP, 2019).**

The construction of this system was also part of the Readiness Program of the GCF that was implemented by the DNP with the technical support of WRI and GFLAC. The aim was to establish a tracking system than can show where the financial flows are allocated, including public expenditure, to better understand where the gaps and opportunities are to invest on adaptation and mitigation actions. According to DNP representatives, the MRV on climate finance is a tool that has instilled confidence in donors and other institutions, because it shows willingness of the country to act transparently on climate change **(Interviews 7FGC, 15FGC).**

6.3. Discussion about the levels of climate change mainstreaming in the policy and budget of Colombia

The analysis of mainstreaming based on Daly´s **(2005)** methodology shows that Colombia is progressing towards climate change mainstreaming in the planning and budgetary process; however, this is still in a limited transversality format.

In terms of discourse and rhetoric, climate change has been part of the discourse although this varies depending on the government in power. For instance, during the government of President Santos, particularly in his last period, climate change became a relevant topic on the public agenda; this was also thanks to the inclusion of climate change in the peace agenda and because, the government recognized the vulnerability of the country to climate events, such as the impacts of La Niña. The arrival of President Duque also continued the discourse regarding the importance of climate change but there is a perception that the topic that is dominating the public agenda is the peace agenda.

Regarding mainstreaming climate change at an institutional level, there is progress through the creation of specific entities to deal with the issue such as the SISCLIMA and the CICC. Although the ministry that remains central to policy development is the environmental ministry, one relevant condition that explains the progress of climate policy in Colombia is the involvement of the DNP in the environmental and climate agenda. This is because the NPD coordinates the work of the central government.

In relation to tools to make policies, there are policy instruments that aim to bring climate change to more sectors, such as the eight sectorial programs that were the base of the Low Carbon Development Strategy. Furthermore, the approval of the Climate Change Law in 2018 is also an important and an innovative tool to deal with climate change and to support the mainstreaming process, including the allocation of public budget. At the same time, Colombia has understood the importance of increasing financial resources, as a way to comply with policies and the creation of the Committee for Financial Management is one of the most relevant steps regarding climate finance.

Using innovative means to tackle climate change is evident through the bridging of issues, such as peace and security, with climate change impacts. For instance, while the production of cocaine leads to deforestation, the dissolution of criminal groups as part of security measures affects the creation of "jobs". The counter effect of this new situation is that communities are using forest resources to generate income, thereby increasing deforestation levels, which is one of the main sources of GHG emissions. In this sense, the aim is to create policies that consider these two connected agendas **(Interview 15FGC).** Under the mandate of President Santos, there were proposals to create a common agenda and new financial mechanisms, such as the Colombia in Peace Fund and the Sustainable Colombia Fund, but the President Duque's strategy to connect both agendas is still not clear.

Regarding mainstreaming climate change in the public budget and expenditure, there has been progress in understanding the amount of public investment flowing towards climate-related activities. The creation of a MRV system for climate finance is a major step to present, in a transparent way, the data to improve the decision-making process. The challenge, however, is to disseminate this information across sectors and entities to create a general understanding of what climate change means and how to tackle it more effectively.

Although this analysis is focused on the behaviour of governmental institutions, which could be considered technocratic, in the Third Communication submitted by the Colombian Government to the UNFCCC, it is recognized that the participation of non-governmental and foreign entities is necessary to achieve the mainstreaming goal, as Bacchi and Evelin **(2010)** and Dali **(2005)** suggest. In this sense, Bernal **(2018)** points out that the missing piece is to allow for the participation of non-governmental actors in governmental processes, noting "*besides the role of the private sector in the CGF, civil society does not play a role in the*

institutionalization of climate change in Colombia" **(p. 23).** Accordingly, no structural change is observed in Colombia regarding climate change, but rather limited transversality in sectors such as the environmental one.

6.4. Conditions that promote or hinder climate change mainstreaming in the public budget of Colombia

Most of the people interviewed agree that the public budget is the tool that will most effectively guide the private and international sources of finance towards more effective climate actions. This is because public expenditure is considered the tool that will dictate the priorities of the country, and if climate change is not a priority, then it will be very difficult to achieve any national commitment. This is particularly relevant because Colombia has made an unconditional commitment to reduce 20% of its emissions by 2030, using its own resources, while it is willing to increase the goal to 30% reduction of emissions with international support.

The analysis identified important endogenous and exogenous conditions that promote or hinder mainstreaming climate change in the planning and budgetary process.

Conditions that promote climate change mainstreaming in public budget of Colombia

The main condition that is promoting climate action in Colombia is **the presence of more climate events** such as the phenomena of La Niña, which has showcased the vulnerability of the country. In this sense, the response has been **the inclusion of climate change in the main planning instrument**, which is the National Development Plan, and which guides the action of the state **(Interview 7GFC, 13FGC).** This has led to **the creation of specific areas with technical expertise** dedicated to deal with the problem. In this sense, the **role of the DNP** has been highly relevant to achieve important changes with regards to the climate change agenda, because it plays a major role in the coordination of the government and particularly within the climate finance agenda **(Interview 15FGC).**

At the same time, there is evidence that Colombia has been progressing in the peace process, **improving its levels of governance**, after the crisis that spanned almost five decades (1960s-2000s). Important measures have been taken, including economic, social and environmental measures, those are now allowing the country **to regain trust from the international**

community. One leading example is Colombia's entry to the OECD **(Interview 1FGC).** Even though this is a contentious issue at the national level, it is considered an opportunity to keep building new and better governance and environmental standards **(Interview 4FGC, 6CSC, 3AC).**

This improvement is also reflected in **the growing reception of international cooperation.** Colombia is one of the main receptors of ODA and one of the five main receptors of climate finance in LAC, which, according to governmental and non-governmental stakeholders, is an important condition that has lead climate action at the national level **(Interviews 5OIC, 11CSC, 12OIC)**. In the same way, the creation of transparency tools, such as the construction of an MRV system on climate change, has increased donor confidence because it reflects a willingness to provide further information to improve effectiveness **(Interview 5OIC).**

The approval of the Climate Change Law was also relevant to build trust and to provide more certainty about the climate actions of the country beyond governmental periods. However, an important condition is **the political will** of governments to promote and incentivise the actions to tackle climate change. This was shown during the mandate of President Santos and the hope is that the recent participation of President Duque in events, such as the Climate Action Conference in 2019, would lead to a more responsive role in his remaining years in power. **Leadership,** as a condition, has also been shown in specific entities **(Interview 17LPC).**

Conditions that hinder climate change mainstreaming in the public budget of Colombia

There are important aspects that constrain the progress of the climate change mainstreaming process, such as **the weak attention that climate change** has in the public agenda in comparison to the peace debate. This influences the operation of the government where **there are no observed efforts to mainstream climate change beyond the environmental sector**, which limits the possibility to produce structural changes **(Interview 3AC)**. This is also complex in the context of the **role that regions and territories** have because, even though they included climate change in their regional plans, they do **not have enough resources to implement** them **(Interview 13FGC, 16SGC).**

In addition, there is a perception that, even though Colombia is improving data collection on climate change, **not all ministries or local governments understand** what constitutes climate

action and therefore are struggling to include them in their planning processes or public budgets **(Interview 14FGC).**

Furthermore, as with Mexico, Colombia is a country that **struggles with tax collection**, with fossil fuel and extractive activities being the main source of income (royalties) **(Interview 2FGC).** This produces **a path dependency on these activities that reduces the possibility to diversify the public financial matrix.** This is considered one of the major hindrances of climate change action in the country **(Interviews 6CSC, 8CSC, 10AC, 18OIC).** Furthermore, the resources collected from fossil fuel and **extractive activities are allocated in an unbalanced way**, where environmental and climate actions are not the main recipients or even on the list of priorities.

Finally, as with many other countries in LAC, Colombia suffers from **high levels of corruption** that hinders the efforts to improve transparency, even though the country is part of the Alliance for Open Governments and has adopted a Law for the "Transparency and Rights to Access to Public Information" (*Ley de Transparencia y del Derecho de Acceso a la Información Pública*). Further work must take place to build trust among national and international entities **(Interviews 6CSC).**

6.5. Conclusions

Colombia is a highly vulnerable country that has been experiencing the impacts of climate change producing important social changes and economic losses. Based on the analysis of climate change mainstreaming, developed from Daly´s work **(2005)**, it is possible to conclude that Colombia has been progressing at different levels to incorporate climate change in the planning and budgetary process, but it is still in a format of limited transversality. This means, according to Daly, that sectors have started to recognize the relationship with climate change to their activities, but not to the point that is needed to treat the problem in an integral way.

Colombia has been progressing in incorporating climate change in the discourse and rhetoric, as well as at the institutional level, and using tools to create policy, such as the Climate Change Law. The speed of this evolution, however, is dependent on the interests of the government in place, where climate change is not always seen as a main priority and other agendas, such as the peace process, dominates public attention. This was reflected in the levels of budget

allocation to tackle climate change, which are growing but are still not enough to face the country's challenges.

Conditions, such as active participation at the international level and the receipt of international cooperation, are major promoters of climate action at the national level. However, the reliance on fossil fuel and extractive activities to generate revenue and produce budget is a major constraint as well as the little amount of attention that the topic has received in the public agenda because of the security issues that the country faces.

CHAPTER 7. ASSESSING CLIMATE CHANGE MAINSTREAMING IN COLOMBIA´S ENERGY SECTOR

Introduction

In Chapter 6, I established that Colombia's economy had been steadily growing thanks to several conditions, including significant foreign capital in key sectors such as the energy sector. While the energy sector is an important part of the economy, it is also one of the main sources of greenhouse gas emissions, because it relies on hydrocarbons and extractive activities.

In this chapter, I conduct an analysis of Colombia's energy mix to understand the extent to which climate change actions and responses have been mainstreamed in this sector, based on Daly's **(2005)** work (see Chapters 1 and 2) applied to the climate change agenda. The aim is to analyse Colombia's efforts to transition from fossil fuels to renewable energy for electricity generation. The chapter also seek to identify conditions that promote and hinder the climate change mainstreaming in the planning and budgetary process of the energy sector as an important condition towards low carbon development, as discussed previously in this thesis.

The analysis in Colombia is based on literature reviews and interviews and in order to present the findings this chapter is broken into five sections. The first section analyses the levels of climate change mainstreaming in the planning process of the energy sector; while the second part analyses the levels of climate change mainstreaming in the public budget and expenditure. The third part provides a discussion on the findings. The fourth section analyses the conditions that promote and hinder mainstreaming climate change in the planning and budget of the energy sector and the fifth and last section provides key conclusions.

7.1. Analysis of climate change mainstreaming in the energy sector

In Colombia, approximately 78% of energy consumption comes from fossil fuel **(UPME, 2015a, p.22)**. This sector is the second largest source of GHGs, having steadily grown in the last decades **(IDEAM, *et al.*, 2017).** By 2014, the energy sector emitted 82.510 Gg of CO2eq while in 1990 it was 47.630 Gg of CO2eq, an increase of 73% in twenty years **(IDEAM, *et al.*, 2017, p.129).** These emissions came from the transportation (37%) and energy industries (24%)

mainly. In the energy industry sector, 49% corresponds to power generation. The categories related to the energy sector (transport, energy industries, solid fuels and other industries) represent 53% of the emissions **(IDEAM, *et al.*, 2017).**

While the energy sector is the second largest source of GHGs, it is also highly vulnerable to the impacts of climate change. According to IDEAM *et al.,* **(2017),** the reduced levels of precipitation has impacted the potential of hydroelectric power generation that generated close to 70% of the electricity in the country **(Rico, 2018; Interview 13FGC),** thereby increasing the demand for fossil fuels. There has been a variable increase in the consumption of coal, but gas has been growing faster, going from 6.180 millions of m^3 in 2004 to 14.635 millions of m^3 in 2014 **(IDEAM, *et al*., 2017, p.133).**

Since the energy sector plays an important role in GHG emission, this section analyses the levels of mainstreaming climate change in the energy sector with emphasis on the electricity generation subsector.

7.1.1. Discourse or rhetoric

In Chapter 6, I described the evolution of the climate agenda in the National Development Plan (PND for its name in Spanish), the most important planning instrument in the country. In the PND 2014-2018, a Chapter about "Green Growth" was included, which outlined the energy transition as an important part of sustainable development and the need to develop regulations and policies to better integrate alternatives and renewable sources that will generate electricity, primarily for non-connected areas **(Colombian Government, 2014, p. 182).**

Based on that mandate, "Vision 2050" was created in 2015 that promoted an urgent energy transition. According to the Energy and Mining Planning Unit (UPME*, Unidad de Planeación Energética y Minera*) this energy transition *"is characterized by a shift towards renewable energies as the main mean of energy production, progressively reducing production with fossil fuels*" **(UPME, 2015b, p.8).** The report mentions that the main motivation is "*the concern of developed countries for climate change and the production of carbon dioxide (CO_2) as the main contributor to the atmospheric concentration of greenhouse gases*" **(UPME, 2015b, p.8).** Adopting this narrative UPME acknowledged the relationship between the energy sector and climate change.

In the same line, in 2017, Colombia's Minister of Mines and Energy, Germán Arce, during the mandate of Santos (before the Director of the National Adaptation Fund), said that the incorporation of non-conventional renewable energies is key in the diversification of the energy matrix, and that the government created guidelines such as the Law 1715 (which will be further analysed), "*which ordered to incentivize these resources in the energy generation matrix*" **(Amat, 2017).**

However, further analysis of the PND also identifies important commitments and goals related to the production of fossil fuels in Colombia, which are contrary to such a goal. For instance, it says, "*the national government's medium and long-term objective is to increase hydrocarbon reserves and production… to increase the country's competitiveness*" **(Colombian Government, 2014, p.176).** The PND also says *"for the national government it is important that the development of the hydrocarbon sector continue to be in harmony with social development and the environment*" **(Colombian Government, 2014, p.176).**

Recently a major debate has erupted regarding the interest of the government on unconventional fossil resources, such as shale gas **(Interview 6CSC).** UPME argues that fracking can work in Colombia as they have elsewhere, such as the United States, affirming that this "*could mean an increase in fossil fuel production, depending on how their production costs evolve*" **(UPME, 2015b, p.10).** UPME also says that the use of coal is a good alternative for the country, since they have important reserves for the upcoming 70 years **(UPME, 2015b).**

This trend seems to repeat in the Duque government (2018-2022), since his Energy Minister pointed out that "*we need the gas, because the sun and wind sources are variable and we need to establish a matrix that responds to the demand*" **(Atl Noticias, 2020).**

This same discourse shows that while climate change has been incorporated in governmental policies, Colombia's preferences to harness non-renewable sources seem to conflict with sustainable energy plans articulated in the same development plans. This discrepancy has been cited by civil society representatives, which argues that President Santos has told the environmental community "*what they want to hear",* without radically changing plans regarding activities such as extractive and fossil fuel activities **(interview 6CSC),** which is also the case of Duque´s for whom "*the environment does not seem to be a priority*" **(El Libre**

Pensador, 2018).

7.1.2. Level of Institutional and Structural Change

The energy sector is a scheme that combines the division of activities - free market open participation, and regulation by the State **(XM, n.d.).** This sector modality has been in operation for the last 10 years, although the participation of the state has been changing, as will be explained in further sections.

The institution charged with regulation of the sector is the Energy and Mining Ministry (MinMinas, *Ministerio de Energía y Minas*). Located in the MinMinas is the UPME, which has a strategic role to "*plan in an integral, indicative, permanent and coordinated way the mining and energy sector entities… to produce and disseminate information required for policy formulation and decision making*" **(UPME, 2015b, p.148).**

The MinMinas also has an office that deals with environmental and social matters (OAAS, *Oficina de Asuntos Ambientales y Sociales*). According to the PND (2014-2018), this office has as a goal "*to strengthen the management of the national government, to mitigate the greenhouse gas emissions associated with the development and growth of the mining and energy sector, and to adapt to the effects of the climate changes at the global level*" **(UPME, 2015b).** In this sense, the OAAS is mandated to deal with climate change.

Since the 1990s there have been important reforms in the sector. In the case of the electricity sector, the Laws 142 and 143 of 1994 are considered foundational for institutional development, to increase investments to expand the generation and transmission of electricity and for the program for the expansion of the gas consumption **(UPME, 2015b).** The objectives of these reforms were multiple, including the decision of the State to withdraw from direct management of activities in the electricity subsector, and instead focus on the inclusion of private actors in all phases of the energy chain **(UPME, 2015b, pp. 154-156).**

In the case of hydrocarbons, there were also institutional reforms to increase oil reserves. During that period some institutions such as the National Hydrocarbons Agency (ANH, *Agencia Nacional de Hidrocarburos*) were created and the conditions of the country's oil contracts were modified, in order to make the exploitation of hydrocarbons more competitive and attractive to foreign investments **(UPME, 2015b).**

Later in 2010, the reforms were oriented towards the mining sector with the creation of the National Mining Agency (ANM, *Agencia Nacional de Minas*) and the restructuring of the UPME, to increase "*competitiveness of the mining sector to maximize its contribution to the development of the regions and the country"* **(UPME, 2015b, p.153).**

Institutional changes were also made in the renewable energy subsector. After the dissolution of the Institute of Nuclear Matters and Alternative Energy (INEA*, Instituto de Asuntos Nucleares y Energías Alternativas*) in 1992, the UPME remained responsible for leading the promotion of renewable energy.

Furthermore, with the creation of the CONPES 3700 from 2011, the Institutional Strategy for the Articulation of Policies and Actions on Climate Change promoted the participation of the MinMinas in the definition of climate policies creating the SISCLIMA, described in Chapter 6.

MinMinas has also been promoting non-conventional energy as a way to keep diversifying the matrix and reduce GHG emissions **(MinMinas, n.d.).** Although there is a process to mainstream climate change at the institutional level, the institutions are still highly focused on the production of fossil fuels and the development of mining activities **(Interview 17FGC, 3AC, 6CSC).**

7.1.3. Innovation in the tools used to make policy

As result of the PND 2014-2018, the first goal of the Green Growth Strategy was to "*Move towards sustainable and low carbon growth*", and to "*Promote the transformation of sectors towards more efficient and low-carbon pathway*s", outlining that progress would be made in the regulation and implementation of Law 1715 (of 2014) on unconventional sources of renewable energy and energy efficient management **(Colombian Government, 2014, p. 665).**

Besides the Green Growth Strategy, an important process that helped to engage the energy sector with the climate agenda was the Low Carbon Development Strategy (ECDBC, for its name in spanish), mentioned in Chapter 6. This is a short, medium and long-term strategy that aims to achieve economic growth without increasing GHG emissions and achieve the correct adaptation of the productive sectors **(MinAmbiente, n.d.; Interview 17FGC, 9FGC).** The process to consolidate this strategy in the energy sector was led by MinMinas.

This growing interest on the diversification of the energy matrix has been leading to the creation of other legal tools to make policies, such as the creation of the Law 788 that promotes the use of non-conventional energy **(UPME, 2015a, p. 8).** The Law was created by the Inter-sectorial Commission for the Rational and Efficient Use of Energy and Non-Conventional Sources of Energy (CIURE, *Comisión Intersectorial para el Uso Racionl y Eficiente de la Energía y Fuentes no Convencionales de Energía*), and allowed for the creation of a Programme that established the goal to generate 30% energy in non-connected areas by 2020 **(UPME, 2015a).** Another important tool was the Decree 2114 (2008) that regulated the creation of Financial Support for the Provision of Energy in Non-Interconnected Areas Fund (FAZNI, *Fondo de Apoyo Financiero para la Energetización de la Zonas No Interconectadas*).

However, the most important instrument to promote the use of renewable energy has been the Law 1715, created in 2014, that promotes the integration of non-conventional sources, mainly those from renewable sources, in the national energy system. In particular, the inclusion of wind projects, photovoltaic solar generation, geothermal energy and generation from biomass in the country's electric mix is sought **(Colombian Congress, Ley 1715, 2014).**

This Law is considered an innovative tool for the promotion of renewable energy because it considered both incentives and financial mechanisms that could enable the implementation of projects **(UPME, 2015a, p. 96).** Although currently solar and wind energy have a marginal share in electricity generation, according to representatives of the environmental ministry, new renewable energy projects will be possible thanks to the implementation of this Law **(Interviews 9FGC, 13FGC),** because it will incentive the participation of private sector as well **(Interview 8CSC, 2FGC).** Despite this, Roa **(2017)** suggests that the absence of the regulation of the Law is constraining the progress of renewable energy projects.

In addition, Colombia also included the energy sector in its National Determined Contributions (NDCs) that aim to reduce 20% of GHGs by 2030 **(Colombian Government, 2015).** Although the energy sector contributes 71.21% of the emissions of the country, a specific goal for electricity generation was not included. However, the UPME pointed out in relation to the NDC, "*that the mining-energy sector. . . should prepare itself with an increase in the sector's capacity to measure, monitor, verify and report its emissions*" **(UPME, 2015a, p. 94).**

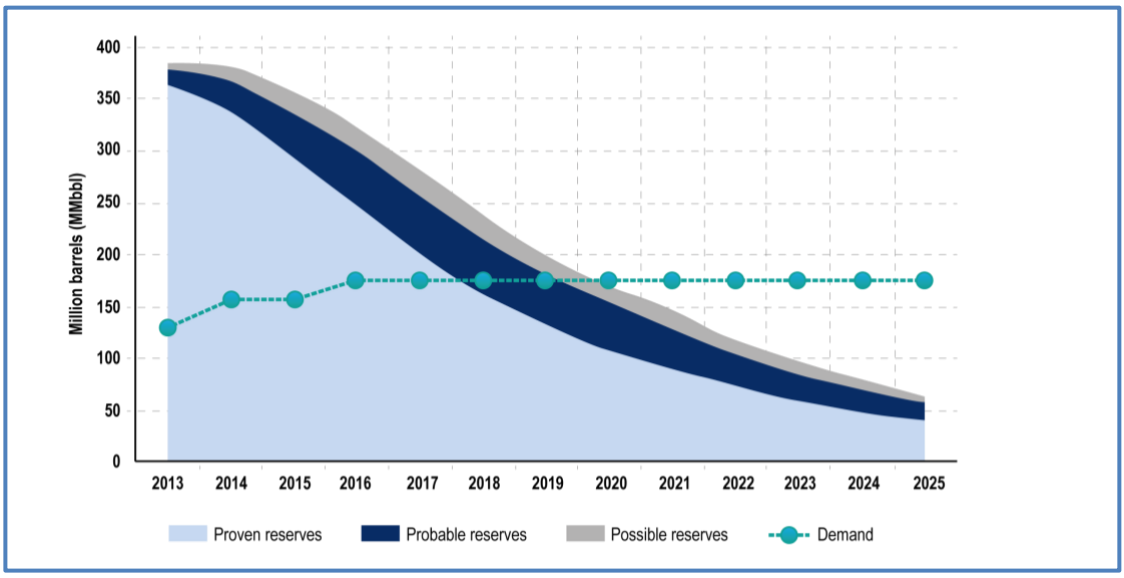
Tools have been put in place to promote the diversification of the energy matrix and UPME **(2015a)** had said that renewable energy is the more feasible option to achieve such diversification. However other studies from the same institution have claimed that Colombia has more opportunities with conventional sources such as coal, because it is an abundant resource in the territory "*which is why it could potentially be an input that guarantees reliability to the system at a low cost*" **(UPME, 2015a, p. 95).** León **(2018),** points out that the actual regulation is complex and is not allowing to innovate and to use new technologies.

7.1.4. New data available

In the energy sector, information plays a major role, and *"to have better policies to generate credibility and trust in the general public, it is essential that the support information is complete, reliable, timely and available using the current technological means*..." **(UMPE, 2015b, p. 148).**

In this sense, the energy sector has been evolving based on the data collected, which shows its value in decision-making. For instance, fossil fuel reserves have been studied to determine the strategy of the country. By 2013, there were 2,444 million barrels of proven reserves, equal to 6.6 years **(UMPE, 2015b, p. 84).** Three years later, the official website of the MinMinas in June 2018, stated that the reserves were for 5.7 years **(MinMinas, n.d.),** which means that the reserves have been decreasing as shown in figure 7.1. This will surely have an impact on the energy matrix.

Figure 7. 1 Projections of oil reserves in millions of barrels (period 2013-2025)

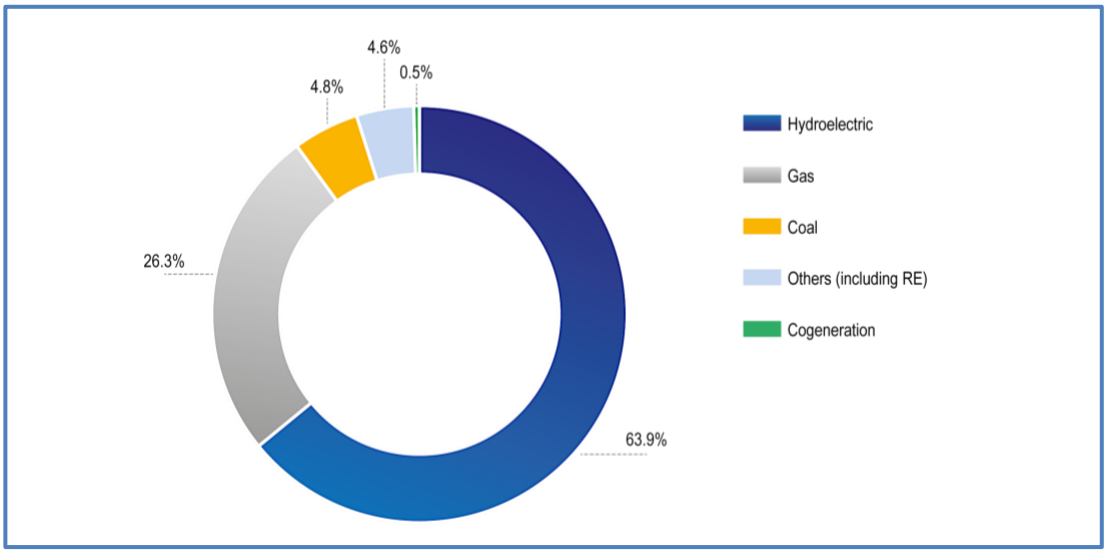


Source: UPME, 2015b: 86

Regarding natural gas, at the end of 2013 Colombia reported total reserves of 6.41 Tera-cubic feet of which 5.51 correspond to proven reserves, estimated for 11.7 years, including newly incorporated reserves **(UPME, 2015b, p. 84).** As the prospective predicted the consumption of gas grew significantly at a time when crude production has started to decline rapidly **(MinMinas, n.d.).** In the case of the gas production, it grew 5.6% in January 2020 compared to the same month of 2019, while the oil production fell 1.68% compared to January the previous year **(El Tiempo, 2020).**

Since 2014, the UPME projected that hydrocarbon self-sufficiency would become unsustainable by 2018, however still fossil fuels play an important part in the total mix of the electricity subsector. In Figure 7.2, and as noted earlier, fossil fuel participation for electricity generation was almost 40% in 2015.

Figure 7. 2 Energy matrix per source

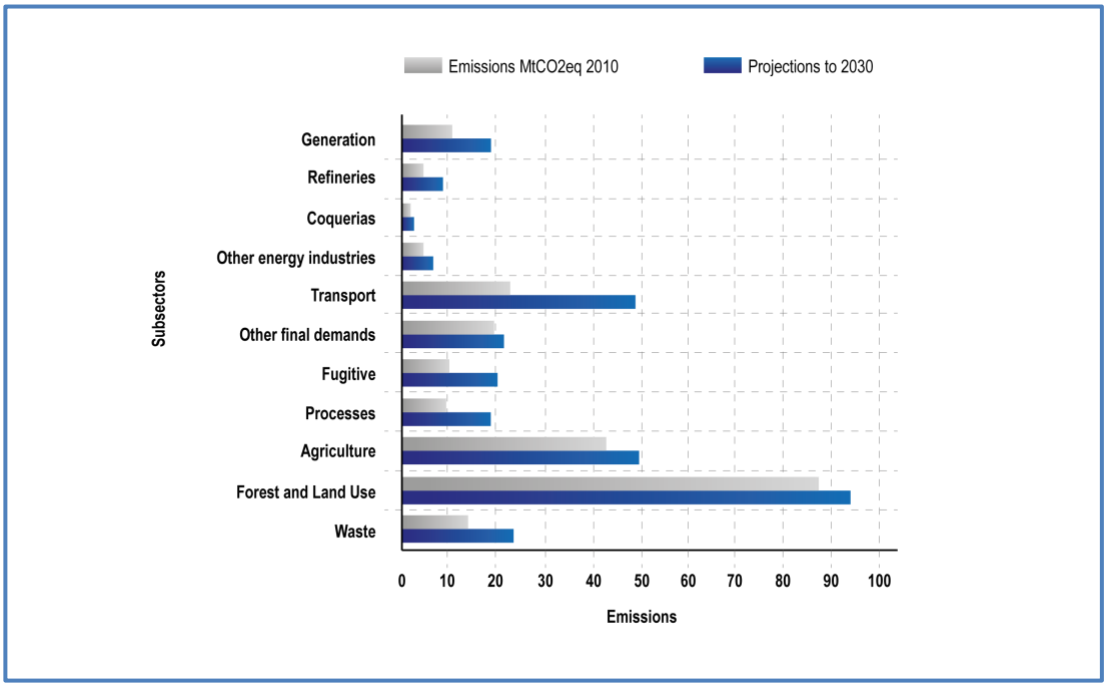


Source: UPME, 2015b: 94.

The emissions from gas production have been increasing rapidly in the last years, contributing to 65% of GHG emissions, particularly from fugitive emissions **(IDEAM, *et al.*, 2017),** due to an increase in the demand. However, in 2020, the Energy Minister stated that Colombia could lose its self-sufficiency in gas by 2024, meaning that production eventually will decline **(Atl Noticias, 2020).**

In Figure 7.3, the projections in terms of emissions are shown, according to the IDEAM *et al*., **(2017).** The emissions will increase towards 2030 in a business as usual scenario if Colombia does not implement emission reduction measures.

Figure 7. 3 Projections of GHG in Colombia in MtCO2eq (period 2010-2030)



Source: IDEAM, *et al.,* 2017

In that context MinMinas **(2012)** has expressed its willingness to mitigate climate change through the ECDBC**,** aiming to access to foreign finance and technology transfer, among other things. The Strategy works in four lines: 1) Generation of energy; 2) Energy efficiency; 3) Fugitive emissions; and 4) Management of the demand, which can reduce 54,112 Gg of CO_2 eq by 2030 **(IDEAM, *et al.,* 2017).**

For electricity, there is data for the generation and transmission expansion plan for 2014-2028, where UPME **(2015a)** is identifying opportunities to use renewable energy. In the most conservative scenario, the incorporation of 474 MW of wind energy into the generation matrix from the Guajira is assumed. With this addition, wind power would have a 2% share in the installed capacity of the national interconnected system**.** In the optimistic scenario, a maximum participation of 15% is estimated in 2028 **(UPME, 2015a, p. 98).**

In addition, the energy sector has been working on studies to determine its vulnerability to the negative impacts of climate change **(IDEAM *et al.*, 2017, p. 330).** A study conducted by UPME point out that there are sources for electricity generation, such as the big dams, that are vulnerable to changes in hydrological cycles and decreased rainfall, as well as producing other types of externalities, and therefore it is not desirable to keep expanding these types of sources to generate electricity **(UPME, 2015a, p. 93).** Besides that, hydropower stations cause other social and environmental externalities **(Interview 8CSC).** According to Payal **(2011),** big hydroelectric projects are also major emitters of methane more powerful than the CO_2 in terms of global warming, 72 times more powerful, according to the IPCC **(2007).**

In this context, a new scenario is under discussion in the government, which is related to the incorporation of reserves from the production of unconventional hydrocarbons, such as shale gas, that could increase the levels of methane. According to UPME, unconventional hydrocarbons are "*the most attractive alternative for the supply of hydrocarbons to develop in the medium and long term*" **(UPME, 2015b, p. 85).**

This analysis shows that data has evolved in order to diversify the energy matrix; however further analysis must take place to use this data to transform a sector that is still highly focused on fossil fuel. Representatives of DNP and the environmental ministry state that further research must be done to better support the energy transition **(Interviews 1FGC, 9FGC, 13FGC, 14FGC).**

7.1.5. Innovation in the way that policy is made

The policies in the energy sector have been facing important challenges to adapt to global dynamics, in particular to internalize environmental and climate factors **(Interview 15FGC).** However, the creation of the ECDBC and the sectorial plan for the mining and energy sector, are important and innovative steps towards the reduction of emissions.

To achieve these goals, some tools have been used to make policies, such as the Law 1715 that promotes renewable energy. Nevertheless, there are policies that have increased their dependency on fossil fuels including non-conventional resources because, while MinMinas explores the potential to extract non-conventional fossil fuel as shale gas, the Ministry of Environment is working on the environmental requirements for its exploration. Governmental efforts to promote unconventional hydrocarbons have been criticized by governmental and

non-governmental representatives as contributing to a carbon lock-in thereby exacerbating the climate change problem **(Interviews 14FGC, 6CSC).**

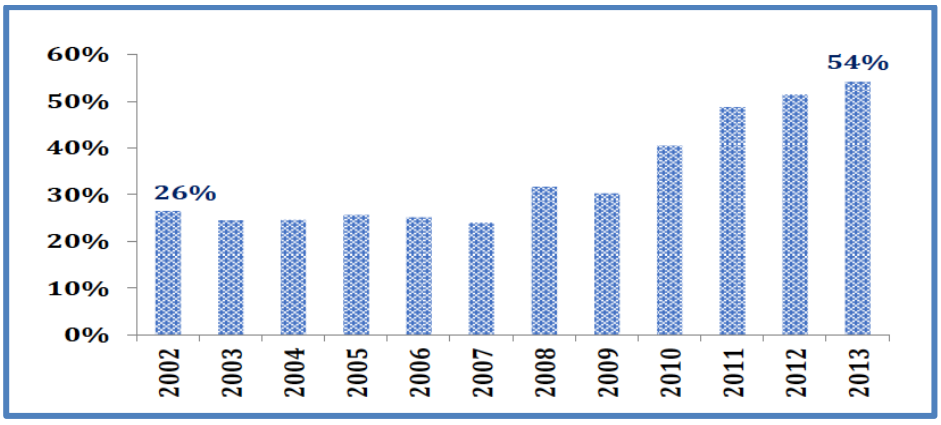
In this sense, the new policies for the extraction of unconventional fossil fuels are hindering Colombia's progress towards climate change mainstreaming in the energy sector. To further analyse the levels of mainstreaming climate change in the sector, the next section assesses the public budget to understand the role public investments have played to guide such processes and under what conditions this has happened.

7.2. Assessing climate change mainstreaming in the public budget and expenditure of the energy sector

As noted in Chapter 6, the energy sector plays an important role in the public finances of Colombia. According to UPME, the hydrocarbons sector has grown considerably in the last 10 years, contributing to the income of the country. The contribution of the sector to the national government includes the utilities of Ecopetrol S.A, which is the national oil company that represents 20% of the current income of the country. If the royalties that come from the sector were counted, would be equivalent to 1% of the GDP **(UPME, 2015b, p. 5).**

Figure 7.4 shows the oil export revenue from 2002 until 2013, where the increase in the dependency on this resource grew rapidly reaching 54% of the income in 2013 **(UPME, 2015b, p. 41).**

Figure 7. 4 Participation of oil export revenue (period 2002-2013)



Source: UPME, 2015b: 44.

In Chapter 6 it was exposed that it was expected a decline in the revenue coming from Ecopetrol after 2016, however in 2019 it was observed an increase in the utilities of the

company in 14.7% (USD3.875 millions), the highest in the last 6 years **(Reuters, 2019).** This can change the tendency in terms of production, because the company announced in 2019 the investment of 500 millions of US dollars during 3 years, for the exploitation of oil in non-conventional deposits with the use of fracking **(Campos, 2019),** that could increase the production and therefore the revenue**.**

Another important factor that has been playing a role in the public finance is the foreign direct investment (FDI) associated with the mining and energy sector, which represented 46% of the total income in 2014 **(UPME, 2015b).**

Although fossil fuels play a major role in the revenues of the country, MinMinas is also aware of possible future changes. For instance, the UPME considers that coal is an alternative that the country can keep producing because it is cheap and abundant. However, the market for this product is changing rapidly at the international level, because many countries are strengthening their environmental standards. For instance, Europe, China and India used to be consumers of Colombian coal, but their demand is declining **(UPME, 2015b),** impacting income. However, the coal was not considered for the carbon tax because of the risk of affecting small producers **(Interview 2FGC).** This is relevant for Colombia because entry to the OECD requires strengthening environmental standards **(Interview 4FGC).**

In terms of public expenditure, the reduction of income creates greater budgetary restrictions in the government. As mentioned in Chapter 6, in the last decade, public spending contributed only 0.9% to the economic growth of Colombia **(UPME, 2015b, p. 55).** In 2015, there was an OECD report related to Colombia that emphasized the need to carry out an integral tax reform that substantially improves the collection in rent and indirect taxes, suggesting in addition, the gradual withdrawal of corporate income tax **(UPME, 2015b, p. 56).** In addition, the International Monetary Fund says that Colombia could reform existing taxes and energy subsidies, eliminating energy subsidies to focus on protecting the population with lower incomes **(UPME, 2015b, p. 58).**

The entrance of Colombia to the OECD may be a key factor that keeps pushing the openness of the economy and also potential support for the energy transition. The PND 2014-2018 states that is necessary, "*to achieve a balanced and reliable composition in the electricity generation matrix, which is in accordance with the recommendations of the OECD to integrate*

solutions of low intensity in carbon, such as non-conventional renewable sources" **(Colombian Government, 2014, p. 189)**

The PND 2018-2022, recognizes that the reserves of oil will last until 2024 and gas reserves will last until 2029; it says that 73% of the energy consumption came from fossil fuels; as well points out that the royalties provide to the country with USD 1.8 millions to invest in social programs. This PND also says that one goal is "*take advantage of other resources in our country to generate energy, reducing the impact of global warming",* increasing the capacity to generate electricity with renewable energy (solar and wind) going from 22,4 MW to 1500MW **(Colombian Government, 2018a).**

Although is early to assess the levels of mainstreaming climate change in the budget of the government of Duque, the next section analyses the extent to which the public budget has mainstreamed climate change in the energy sector until 2018.

7.2.1. Public budget for the energy transition

In order to analyse the extent to which climate change has been mainstreamed in the public budget of the energy sector, I analysed the public budget allocated to key categories: a) general budget to the Energy Ministry, b) public budget to renewable energy, c) public budget to hydrocarbons, d) public budget to natural gas, e) public budget to mining, and f) public budget to other relevant categories. The analysis was conducted considering the investment account for the years 2015-2018, based on public information on the official website of MinMinas.

The analysis shows that the budget of the Ministry has increased, despite a reduction in 2017, as is shown in Table 7.1. In 2018, for instance, the budget allocated to the energy ministry represented 1.54% of the total budget of the country. It is important to note that allocated budget does not always equate to what is spent. For instance, while the budget of the MinMinas was USD 521 million in 2017, the actual expenditure by January 2018 was USD 907 million. However, for the purpose of this analysis, the information included is related to the budget allocation because information about expenditure is not always accessible. The numbers presented aim to show tendencies in the budget allocation, its conversion to USD might change the real number in Colombian Pesos.

Table 7. 1 Budget of the central government and budget of the Mining and Energy Ministry in million of USD (period 2015-2018)

Item	2015	2016	2017	2018
Total national public budget	62,130	65,870	64,065	67,588
Energy Ministry total budget	788	777	521	1,046

Source: Own calculations based on public budget data of MinMinas (2015-2018).

Table 7.1 shows that, in 2016, there were programs created that aimed to consolidate the mining, energy and electric power subsectors. In terms of budget allocation, in 2017 the mining sector received USD 12 million; the hydrocarbons received USD 11 million; and the electric sector received USD 3 million. By 2018, the mining sector had its allocation reduced by USD 10 million, while the hydrocarbon sector almost doubled to USD 22 million and the electric sector also doubled to USD 6 million.

According to a representative of the environmental ministry, this reflects the interest that the energy sector has in fossil fuels as all of these programs aim to increase the use of these sources, including power generation that has been led by gas **(Interview 15FGC).** Although the budget allocation for "*Development of transport infrastructure, distribution and connection of the public natural gas service nationwide"* went from USD 10 million in 2017 to USD 6 million in 2018.

An interesting finding in the analysis of the public budget is related to the mining sector. Besides normal activities related to the sector, a program was created whose budget increased in the last four years. This program is "*Improvement of the image and perception of the mining industry to facilitate the start-up of mining projects in the national territory*". This programme went from USD 610 million, in 2016 to USD 1,830 million and represents 16.77% of the budget for the *"Productive consolidation of the mining sector*". This also included a program called "*Support for the social and environmental management of mining and energy projects in the national territory*".

Table 7. 2 Productive Consolidation Programs of the Mining Sector, budget allocated in million of USD (period 2015-2018)

Item	2015	2016	2017	2018
Productive consolidation of the mining sector		2,017	12,654	10,913
Sub- Improvement of the image and perception of the mining industry to facilitate the start-up of mining projects in the national territory	732	610	1,138	1,830
Sub- Support for the social and environmental management of mining and energy projects in the national territory	1,830	-	-	-

Source: Own elaboration with information of the public budget of MINMINAS for the period 2015-2018.

This is an important finding as, according to three governmental representatives, this highlights an environmental conflict related to the expansion of the mining sector. It can therefore be inferred that the government is protecting the image of the industry to keep expanding it **(Interviews 7FGC, 14FGC, 15FGC).**

On the other hand, in 2016 a programme was created called "*Design and implementation of mitigation and adaptation tools in the energy mining sector in the face of climate change*", which is the only explicit mention to climate change in the public expenditure of the energy sector. Nevertheless, the allocation of resources was reduced, from USD 762 million in 2016, to USD 305 million in 2018. This represents 0.0004% of the total budget of the sector in 2018. In 2017, it also created the "*Sustainable environmental development of the energy mining sector*" classification, whose budget was also slashed in 2018 as shown in Table 7.3.

Table 7. 3 Public budget for climate change and renewable energy in the energy ministry, in millions of USD (period 2015-2018)

Item	2015	2016	2017	2018
Sustainable environmental development of the energy mining sector	-	-	16,988	16,352
Sub- Design and implementation of mitigation and adaptation tools in the energy mining sector in the face of climate change - national	-	762	610	305
Sub- Support and financing of unconventional energy sources and efficient energy	-	4,733	7,626	10,372

management programs nationwide	

Source: Own elaboration with information of the public budget of MinMinas for the period 2015-2018.

Furthermore, budget was identified for the "*Support and financing of unconventional energy sources and efficient energy management programs nationwide"*, created in 2016. This went from USD 4 million in 2016, to USD 10 million in 2018 **(MinMinas, 2016).**

Other categories were identified in the budget that related to *"information management in the mining and energy sector*". As I pointed out in previous sections, this is a valuable aspect for the evolution of the sector. This category went from USD 2 million in 2016 to USD 4 million in 2018. Meanwhile, the budget allocated for the "*Sub- Design and execution of the strategy for national and international management of the environmental agenda of the Colombian national energy mining sector*", was USD 1 million in 2015 and then disappeared. According to a representative of the environmental ministry, this showcases the decrease of interest of the ministry in the environmental agenda **(Interview 9FGC).**

Nevertheless, Colombia has been participating in other initiatives that aim to improve the production of extractive activities in the context of transparency, social and environmental principles, such as the Extractive Industries Transparency Initiative (EITI). EITI is a global initiative that looks for better information in the mining sector to improve the decision-making process **(EITI, n.d.).** There was an allocation of budget in 2018 of USD 453,341 that represented 0.0006% of the total budget of the sector that year. Finally, a program called "*Sub- Design and implementation of tools for citizen participation in the Ministry of Mines and Energy nationwide*" was identified that in 2015 was allocated more than USD 1 million and then disappeared. This can be observed in Table 7.4.

Table 7. 4 Public budget for mining activities, in millions of USD (period 2015-2018)

Sector/Subsector	2015	2016	2017	2018
Information management in the mining and energy sector	-	2,003	4,022	4,815
Sub- Formulation and execution of the environmental management strategy for the promotion of the sector under the principles of national competitiveness	-	610	350	518

Sub- Design and execution of the strategy for national and international management of the environmental agenda of the Colombian national energy mining sector	1,372	-	-	-
Sub- Strengthening Access Information and transparency for the extractive activities at the National level- EITI	-	-	335	453
Sub- Design and implementation of tools for citizen participation in the Ministry of Mines and Energy nationwide	1,324	-	-	-

Source: Own elaboration with information from the public budget of MINMINAS for the period 2015-2018.

There are other public resources that have an important role in the energy transition, such as the national funds in the energy sector, namely: 1) Financial support fund for the energization of non-interconnected areas (*Fondo de apoyo financier para la energización de las zonas no interconectadas*, FAZNI); 2) Social Energy Fund (*Fondo de Energía Social*, FOES); 3) Solidarity Fund for Subsidies and Income Redistribution, (*Fondo de solidaridad para subsidios y redristibución de ingreso*, FSSRI); 4) Financial Support Fund for the Energization of Interconnected Rural Areas (*Fondo de Apoyo Financiero para la Energización de las Zonas Rurales Interconectadas*, FAER); 5) Royalties National Fund (*Fondo Nacional de regalías*, FNR); and 6) Fund for Non-Conventional Energy and Efficient Energy Management (FENOGE, *Fondo de Energías No Convencionales y Gestión Eficiente de la Energía*).

Although all the funds are relevant for the sector, I analysed the case of the FENOGE that was specific created in 2015 to promote the use of renewable energy in the country, based on the aforementioned Law 1715 (Article 10) and is operated by MinMinas**.**

The Fund supports activities related to auto generation at the small scale, and it can finance studies and the substitution of equipment, among other things. Projects financed by the Fund need to comply with a cost-benefit analysis in order to be supported **(Law 1715, Article 10).** The analysis of the public expenditure of the Ministry shows that the allocation of resources to FENOGE has been increasing, as shown in Table 7.5. Since its first allocation the budget went from more of USD 4 million, to almost USD 9 million in 2018.

Table 7. 5 Public budget allocated to the FENOGE in USD (period 2015-2018)

Special funds	2015	2016	2017	2018
FENOGE		4,770,180	6,117,590	8,915,080

Source: Own elaboration with information of Public budget of the MinMinas, 2015-2018.

This trend shows that there is a process to keep financing renewable energy. This is a positive step towards mainstreaming climate change in the energy sector, although the allocation of money for FENOGE represented a mere 0.013% of the total budget of the sector in 2018.

Other funds are highly relevant such as the Royalties National Fund that aims to redistribute income to the country from permits and concessions from extractive activities and has been integrating climate change within their operations, as mentioned in Chapter 6. Although this particular fund is relevant to improve the allocation of funds, it also produces a contra effect, since it intensifies the dependency on oil and extractive activities.

Therefore, there is an attempt to integrate climate change in the public expenditure of the energy sector, but it has not been mainstreamed since the main allocation of sources to the sector are still oriented to fossil fuels and mining.

7.3. Discussion of levels of climate change mainstreaming in the planning and budgeting process of the energy sector

The assessment, based on Daly´s methodology **(2005)**, showed that progress to mainstream climate change in the energy sector is being made but it is still a fragmented endeavour, since areas that promote fossil fuel and extractive activities, which exacerbate the problem, are more powerful.

There is growing inclusion of climate change in the discourse of key entities and stakeholders in the energy sector and in the elaboration of key policies, such as the National Development Plan, which guides the action of the energy sector. This is also related to the fact that, according to UPME, the energy sector is highly vulnerable to the impacts of climate change, particularly hydropower energy.

At an institutional level, it is important to mention the participation of the MinMinas in the creation of the ECDBC, and of the UMPE in the creation of major analyses and projections to examine the needs of the sector in the context of climate change. While these entities are mainstreaming climate change in their projections, there is constant debate regarding the necessity to diversify the energy matrix versus the necessity to take advantage of the country's conventional sources. In that sense, no structural changes were identified in the sector, but a growing debate exists about relevance of considering climate change to project the future of the sector.

The use of innovative tools to make policy was identified. Notably, the Law 1715 that promotes the use of non-conventional energy resources is an important step although regulation is still needed. The existence of new data to improve mainstreaming climate change has shown that the energy sector is one of the most proactive sectors in terms of information generation, allowing for improved projections and, as a result, better decision-making. In recent years, UPME has published several studies about the need to diversify the energy matrix. However, other data, such as the projections of oil and gas, are also influencing the decision-making process.

In terms of innovation in the way that policy is created, there is evidence that Colombia is creating better policies to deal with climate change and that the energy sector has been playing an important role in such policies. However, the perception of representatives from governmental and non-governmental sectors is that Colombia remains highly dependent on fossil fuels and extractive activities. Furthermore, the concern in recent years is related to the role of unconventional resources and techniques, such as shale gas extracted by fracking, which has social and environmental externalities, as will be discussed in Chapter 8.

The allocation of public expenditure indicates that, early on, funds earmarked for climate change-related activities existed in the public budget of the energy sector. As well, a new fund to promote renewable energy was created, the FENOGE. Unfortunately, the budget for these activities is limited, representing only 0.013% of the total of the sector in 2017 and 2018.

Governmental and non-governmental representatives believe that, if Colombia wants to achieve low carbon development, it is necessary to engage more private and international capital but also other social and communitarian stakeholders **(Interviews 8CSC, 9FGC, 10AC).**

For this reason, environmental ministry representatives are not confident that climate change mainstreaming will be achieved until fossil fuels policies are "*changed radically"* **(Interviews 13FGC, 14FGC).**

7.4. Conditions that promote or hinder climate change mainstreaming in the public budget of the energy sector in Colombia

Conditions were identified that promote or hinder mainstreaming climate change in the sector, many of which were the same as those identified in Chapter 6 regarding climate change mainstreaming in the policy and budget of Colombia. However, this section highlights those that are exclusive to the energy sector.

Conditions that promote climate change mainstreaming in the public budget of the energy sector

The energy sector has experienced the impacts of climate change in its daily activities, which has helped to raise attention from the adaptation perspective, although not noticeably from the mitigation side **(Interview 13 FGC).** This growing interest is reflected in **the participation of the MinMinas in the design of instruments**, such as the ECDBC, and particularly the engagement of the Planning Unit in the Ministry, who is in charge of guiding the work of the sector **(Interview 9FGC).**

In the same way, **the creation of a specific legal framework to promote renewable energy** in the energy matrix, such as the Law 1715, is a major step towards the energy transition. However, further regulation is needed to ensure the effectiveness of this Law **(Interview 8CSC)**. **The inclusion of incentives and other public financial mechanisms** have also served as a mechanism to attract the attention of private capital and international cooperation to support the energy transition. Even though Colombia´s public budget does not participate extensively in the production of renewable energy, **there is a perception that improving the political will**, as Santos used to have, President Duque, can still increase the use of renewable energy to keep working in energy transition in the next 10-20 years.

Conditions that hinder climate change mainstreaming in the public budget of the energy sector

The narrative used in the government is that the energy matrix is clean because it is heavily based on hydroelectric power. However, **scholars and non-governmental organizations consider this view of "clean energy" is incorrect because of the externalities that it has**, and that it hinders the progress towards low carbon and climate resilient technologies, such as solar and wind power **(Interviews 8CSC, 10AC).** In addition, there is a growing challenge regarding the use of other sources and methods, such as **the extraction of gas through fracking, which increases the risk of major GHG emissions**, especially methane **(Interview 14FGC).**

The interest of the government in fossil fuel and extractive activities is also based on its **reliance from these activities for revenue generation through concessions**, which has been increasing the number of royalties that represent an important portion of the budget. This hinders the acceleration to include renewable energy and other low technologies in the budget, because it creates a vicious cycle **(Interview 5OIC, 7FGC).**

The last point leads to long-term **dependency on fossil fuel and extractive activities**, directly opposing non fossil fuel sources. In this context, there is another challenge, which is **the engagement of local and regional authorities to be part of the transition**, since they play an important role in the promotion of fossil fuel and extractive activities and in the generation and use of public resources. If these entities are not engaged, it is difficult to achieve an energy transition **(Interview 16LGC).**

7.5. Conclusions

In Colombia, the energy sector plays an important role as a source of income but also as a source of GHG emissions. It is also considered vulnerable to the impacts of climate change, which effects the operation of hydroelectric power stations, a major source of electricity. The analyses of the levels of mainstreaming based on Daly's **(2005)** work have demonstrated that, while the country is including some climate change elements in the energy sector as a way to mainstream the problem, this is still in the early stages and is rather a fragmented endeavour.

It was shown that the discourse and rhetoric related to climate change has been evolving in the energy sector and that institutions, such as the UPME within the Mining and Energy Ministry, have acknowledged the importance of the energy transition, performing studies and

enabling the conditions for the creation of policies, such as the Law 1715, that promotes the use of renewable energy. However, there is no evidence that climate change is mainstreamed in a way that is innovative or that has produced a structural change in the sector.

Instead, the dependence on oil revenue is a major hurdle that explains the extractive pattern that the country has followed and hinders the prioritization of climate change, which is reflected in the limited allocation of public budget to the energy transition.

Based on the approach proposed by Daly **(2005),** it is possible to conclude that Colombia´s energy sector has not been able to mainstream climate change in the planning and budgetary cycle of the energy sector. The challenges ahead fall on the leadership of President Duque who, during his first year of office, showed limited interest in climate change. However, recent entrance into the OECD could play an important role to raise awareness to the problem in the coming years, where international cooperation will also rely on this sector, and whose resources might not be enough to achieve the transformational changes that the country requires if it still remains dependant on fossil fuel and extractive activities.

CHAPTER 8. ANALYSIS OF THE CONDITIONS THAT PROMOTE AND HINDER CLIMATE CHANGE MAINSTREAMING IN THE PUBLIC BUDGET OF LATIN AMERICA AND THE CARIBBEAN COUNTRIES: THE CASES OF MEXICO AND COLOMBIA.

Introduction

Climate change is an evolving problem that can be analysed from different angles because of the multi-sectorial and multi-dimensional nature of it. This thesis asks the question under what conditions are developing countries mainstreaming climate change in their public budgets and what conditions promote and hinder such mainstreaming processes? In this thesis I have analysed the planning and budgetary process to tackle climate change in developing countries based on a mainstreaming approach, a recent concept in climate studies. The empirical research was based on two methods: The Qualitative Comparative Analysis (QCA) in its fuzzy set format and a comparative case study approach.

This Chapter discusses the findings obtained in Chapters 3 to 7, to provide an overall analysis. Different factors conditioned the behaviour of the state and particularly the allocation of the public budget in Mexico and Colombia, as well as other countries studied in the QCA method. However, two conditions appeared most relevant: first, the role of official development aid as an important promoter of climate mainstreaming in planning and budgetary processes; second, the reliance on capital flowing to and from fossil fuel production as a major constraint.

This chapter argues the relevance of mainstreaming climate change in the planning and budgetary process to tackle the problem more comprehensively and the limited effect that this would have if countries remain dependent on fossil fuels to sustain their economies. Regardless if countries receive more international cooperation to tackle climate change, which has its own limitations, transformational change will not occur at the national level if countries are dependent on fossil fuels to generate revenues and if they keep using fossil fuel budget to vein interest in reducing emissions. For this reason, further strengthening of the public finance system is needed. To explain this, the chapter is broken into five sections.

The first section discusses key findings obtained through the fsQCA to set the context for the discussion in the Latin American and the Caribbean regions. The second section discusses general findings regarding the levels of climate mainstreaming found in the case studies, Mexico and Colombia, which are meaningful to understand the conditions that promote and hinder mainstreaming climate change in the public budget. The third section discusses the role of international cooperation as a promoter of mainstreaming climate change in the public budget of developing countries, and the fourth section discusses the role of the dependence on oil and extractive revenues and budgets as the major constraint on such a process. The fifth and final section offers some conclusions and the answer to the research question.

8.1. Mainstreaming climate change in the public budget of Latin American and the Caribbean countries: the big challenge

In this thesis I established that Latin America and the Caribbean region are diverse with significant economic, social and political differences that have created a division among countries, resulting in a "fragmented" region **(Edwards & Roberts, 2016).** Although the region is highly vulnerable to the impacts of climate change, it is also responsible for 8% of the global GHG emissions, with Argentina, Brazil, Mexico and Venezuela responsible for 75% of emissions **(Vergara, *et al.,* 2013).** However, the response to the climate problem varies from country to country.

All the countries studied are part of the UNFCCC and they have developed climate policies. However, it was identified that most of the countries have limitations, particularly in the area of public budget allocation. As stated in Chapter 2, the allocation of public budget in central governments is the reflection of the priorities of a country. This is the reason why this thesis analyses the allocation of public budget labelled as climate change within the environmental ministries' budgets, as well as the allocation of public budget labelled as renewable energy within the energy ministries' budgets, of the 21 major emitters in the region (according to the WRI database CAIT). The aim was to understand to what extent countries have been mainstreaming the climate change problem in their planning and budgetary processes to comply with national and international climate commitments, and under what conditions that happens.

It was identified that out of the 21 countries, in 2010 only 6 countries allocated budget labelled as tackle climate change, while in 2016 the number doubled to 12. The actual amount of budget available is still limited; in most of the countries is less than 1% of the environmental current budget. At the same time, the environmental budget represents in most of the countries less than 2% of the central government budget, which also shows the limited representation of the sector in the allocation of public resources. As I exposed in Chapter 2, there might be other financial resources that are not labelled as climate change that may be used to deal with the problem, but that impact is difficult to identify.

Latin America and the Caribbean is a region that must deal with different challenges, with limited growth **(CEPAL, 2018a)** and increasing levels of poverty **(WB, 2015).** In this context, LAC countries have presented their National Determined Contributions (NDCs), which are the measures that all the members of the UNFCCC submitted as commitments to tackle climate change in the context of the Paris Agreement that "*aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty*" **(UNFCCC, 2015).** However, the fact that in 2016 only 12 of the 21 countries studied have allocated specific national resources to deal with climate change reflects the limited interest or capacity to tackle the problem through national financial means, which remains a major challenge.

8.1.1. Conditions that explain the allocation of climate change budget in the environmental ministry and renewable energy budget in the energy ministry: the influence of international cooperation and fossil fuels.

This research analysed five conditions in the fuzzy set Qualitative Comparative Analysis method (Levels of climate risk; Official Development Aid received; levels of human development; Governance effectiveness and number of climate change policies), which have different effects in each of the countries. Not all of them were necessary and sufficient to explain the outcomes studied, which was the presence of climate change and renewable energy budget in the environmental and energy ministry, respectively. However, are relevant to understand the dynamics in the region.

For instance, *climate risk* represented an important condition in the context of climate change, because the risk is not only a matter of geographic position, but it also relates to the capacity of states to respond to threats **(Miklos, 2018).** It was observed that many countries in the region were less vulnerable in 2015 than in 2009. Perhaps they were better prepared, such as the case of Brazil, but there are countries where the impacts were worst, such as Colombia and Chile, and others where the risk is constant, such as Honduras and Mexico.

Although the levels of risk vary, this condition does not always lead to the allocation of further public budget to deal with climate change. For instance, Honduras, as a vulnerable country, spent 0.9% of its environmental budget on climate change. However, the case of Colombia is

significant because climate risk is leading to an increase of public budget to deal with climate change, increasing from 0.05% in 2010 to 2.58% in 2016.

The analysis of *human development* proved that it is important to measure wellbeing beyond economic indicators such as GDP. It also showed the great disparity that exists among LAC countries. While Chile had the highest levels of human development, Guatemala and Honduras, for example, were comparatively low. Meanwhile, all of them have been improving from 2009 to 2015, according to the UNDP Index.

Regarding the relationship between human development and public budget allocation, Tanzi and Schuknecht **(2000)** suggested that increased public spending is not necessarily correlated to human development in countries, but that if public spending is efficient and well-focused, an even lower spending percentage might be possible to see positive levels of human development. "*Unfortunately, in many countries public spending is neither efficient nor well focused. The conclusion is that more public spending provides no guarantee that social welfare and the well-being of the masses will be improved"* **(2000, p. 12).**

Another condition that was analysed to understand the influence of institutional structures at the national level is the condition of *governance effectiveness*. This measures voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. Generally speaking, all of the studied countries exhibit poor levels of governance. While countries such as Costa Rica, Nicaragua and Uruguay improved their levels of governance, others such as Chile, Argentina, Bolivia, Brazil and Venezuela did not and, in fact, some worsened. Venezuela had the poorest levels of governance in 2009 and 2015, while Chile had the strongest in both years, although in 2015 was worse than 2009. The region has weak institutional structures, a situation that is increasing insecurity and reducing accountability

Recent studies suggest that climate change will put further pressure on these weak institutions in the region, and that this is the reason why countries should start discussing the threats that climate change poses at the national security level affecting the fragile stability that countries currently have **(Erthal, *et al.,* 2019)**.

Another condition analysed, which is directly related to climate action, refers to the number of policies for climate action that exist in these countries. As stated before, all countries studied have developed policies related to climate change. Those with the largest number of policies were Brazil, Chile, Colombia and Mexico, while those with the smallest number were Nicaragua, Panamá and Paraguay. This is relevant because some countries, such as Colombia and Mexico with a high number of policies, spent less than 1% of the public budget for climate change in 2016, while Nicaragua with fewer policies spent 26.4%. This can be interpreted in many ways, but the key observation is that the number of policies may not be relevant if there are no resources to implement those that do exist.

A highly relevant condition in this analysis was the level of Official Development Aid (ODA) received. Countries have received very different levels of support. In 2009 and 2015 the largest recipient of ODA was Colombia while the lowest was Trinidad and Tobago. While there are countries where ODA has been decreasing dramatically, such as Argentina and Nicaragua, others are slowing reducing, such as Brazil and Mexico. The fsQCA identified ODA as an important condition because it appears high in the necessity and sufficiency analysis to explain different outcomes. For instance, *the absence of ODA is necessary and almost sufficient to explain the absence of climate budget in the environmental ministries*, and also appears *highly consistent to explain the absence of renewable energy budget in the energy ministries*; *the absence of ODA is also necessary and sufficient to explain the absence or low levels of environmental budget in relation to central governments budgets*; *and also the absence of ODA is necessary to explain the absence of fossil fuel budget in energy ministries, although in this case it is not sufficient*.

According to Ragin **(2008)**, it is difficult to attribute a single condition to a specific outcome in social science, because events are rarely monocausal. To further explore the fsQCA results, two case studies were analysed in depth: Mexico and Colombia.

8.2. Levels of mainstreaming climate change in Mexico and Colombia: a limited transversality effort.

From the fsQCA, out of the twelve countries that included public budget labelled as climate change in their environmental ministries in 2016, only six of them also had this allocation in 2010: Bolivia, Colombia, Guatemala, Honduras, Nicaragua and Mexico. From these six

countries that showed a trend in tackling climate change, two case studies were selected, looking for similar cases with slightly different outcomes.

The fsQCA analysis showed that ODA was necessary to explain the presence of climate budget in three countries: Colombia, Brazil and Bolivia. Colombia is at the same time the major recipient of ODA, reason why this country was chosen. Then Mexico was selected because of the six countries mentioned above is the one with major similarities than Colombia but slightly different levels of public budget labelled as climate change and received different amounts of ODA. In 2010, Colombia invested 0.05% of the environmental budget to climate change, while Mexico invested 2.14%. In 2016, Colombia increased to 2.58% and Mexico decreased to 0.10%. They have different levels of ODA, although they are both major recipients. Colombia received far more in 2009 and 2015 (1060.2 million and 1347.5 million, respectively) than Mexico (185.5 million and 308.9 million, respectively).

Nevertheless, they perform similarly in other conditions. For instance, Mexico´s scores for climate risk were 56.67 in 2009 and 56.33 in 2015, which means that its vulnerability increased in recent years, while Colombia scored 78.83 in 2009 and 45.67 in 2015, which means that the levels of vulnerability also increased.

Regarding Human Development, Mexico´s scores were 0.745 in 2009 and 0.762 in 2015, while Colombia had 0.685 in 2009 and 0.727 in 2015, which are similar in comparison to other countries; these two are in the mid- to higher end. In terms of governance, Mexico´s scores were 46.2 in 2009 and 41.89 in 2015, while Colombia had 47.1 and 40.78, respectively. Both countries share similar problems, such as insecurity related to drug trafficking. Finally, regarding climate policies, Mexico and Colombia are the highest with 6.3 in 2009 and 3.7 in 2015 in the case of Mexico, and 4.3 and 3.7 in the case of Colombia, which means that both countries are somehow committed to dealing with climate change.

In general, Mexico and Colombia share common national and international issues. At the state level, both face similar challenges such as dependency on oil and extractive activities, insecurity and high levels of unemployment. At the international level, both states have signed on and remain active parties in the context of the UNFCCC. Although they belong to different negotiating groups, Mexico is part of the Environmental Integrity Group while Colombia is part

of the Independent Association of Latin American Countries (AILAC) **(UNFCCC, 2020),** they are both considered active countries under the UNFCCC.

Based on the literature review and elite interviews in both countries, five levels of mainstreaming adapted to climate change were analysed as proposed by Daly **(2005)** (discourse; institutional arrangements and structural change; innovation in tools to make policies; new data; and policy innovation levels), as well as the public budget, proposed in this research as the sixth level of mainstreaming. The analysis concluded that both countries have made significant progress towards climate change mainstreaming in some areas, but mainstreaming of climate change in the environmental sector is a limited transversality effort, while in the case of the energy sector, it is a highly fragmented endeavour, according to Daly´s definition of progress. That is, neither of them has achieved an integrated approach to mainstreaming with regards to the climate change agenda.

For instance, as detailed in Chapters 4-7, Mexico and Colombia have integrated climate change language in the main public policy instrument: the national development plan. This has fluctuated, however, depending on the government in power. Similarly, the discourse of both countries has undergone change. In Mexico, the Calderon government (2006-2012) was considered progressive in relation to the climate agenda, as was the Santos government in Colombia (2014-2018). However, this discourse has not been consistent and varied across successive governments. Colombia changed president in 2018 and Mexico in 2019. The concern with the new leaders is that, although climate change should be a central topic in the political agenda, they haven't treated it as such, since they are both highly interested in the extractive and fossil fuel industries (**De la Fuente & Olivera, 2017; ACLF, n.d.).**

Although it is too early to make any conclusion about the behaviour of the new leaders, research showed that the political changes influenced the climate change discourse in both countries. There is no political trend to explain this behaviour, since Calderon was from a centre right party and Santos was from a centre left party, while Lopez is from a centre left party and Duque is from a centre right party. The political party, therefore, does not have a defined interest, but perhaps the interest of the individual or the main group in the government is significant. Besides that, it is important to highlight that, even though previous governments, such as Calderon in Mexico and Santos in Colombia, had an interest in climate change, they were also interested in strengthening the oil sector, while simultaneously

promoting the renewable energy sector. This means that their progressive vision on climate change was also hindered by interest in fossil fuels.

At the institutional level, both Mexico and Colombia have created inter-ministerial commissions, tasked with discussing their respective national climate agenda as a cross-cutting issue beyond the environmental sector. However, in practice, the environmental ministries are the ones dealing with most of the climate agenda. In this regard, there is a concern related to this environmental-centric approach that limits the participation of other ministries when both global and national commitments on GHGs require the participation of other sectors. Nevertheless, the aim shouldn't be only to mainstream climate change in the rest of the ministries but also to strengthen the role of the environmental sector (where the climate change mainstreaming process has not been accomplished neither) that is budget-limited, to support that process.

In Colombia the engagement of the National Planning Department (DNP in Spanish) is considered the beginning of important changes to come **(Interviews 1FGC, 3AC, 7FGC, 12OIC).** The DNP coordinates the work of other ministers and has created innovative institutional arrangements to tackle climate change, particularly from the climate finance perspective, such as the creation of the Committee of Financial Management. The case of Mexico is less progressive, although in recent years there is a more proactive role of the finance ministry (which, in terms of assignments, could be similar to the DNP). In 2019, the Mexican finance ministry joined the Coalition of Finance Ministers for Climate Action (CAPE) **(WBG, n.d.),** but there is no evidence that this has changed meaningful action at the institutional level, so far. Although there are steps toward greater integration of climate considerations in some policies, this has not led to other, far-reaching structural changes that would challenge business-as-usual.

An example of such a dynamic was found by analysing the tools to make policy and the actual climate policies developed in both countries. While the Colombian Low Carbon Development Strategy was an important attempt to identify the climate related actions of the different productive sectors, which may lead to a reduction in emissions, the analysis shows that this identification does not necessarily lead to substantive change in any of these sectors.

In Mexico, the Special Program of Climate Change (PECC for its name in Spanish) is also an example of the identification of actions in different sectors related to climate change. These actions were integrated in a specific program to set targets to reduce emissions and vulnerability, but this has not led to a mainstreaming process because the actions implemented were planned before in the sectorial programs, in a business-as-usual scenario, and not based on climate change needs.

However, an important tool that has led the climate action in Mexico was the creation of the Climate Change Law, which was approved in 2012; and the Climate Change Law that was approved in Colombia in 2018. These Laws provide a level of certainty about climate action in the short, medium and long term. In both cases, the enforcement through legal systems is still missing.

While in Mexico and Colombia there is an improvement in the generation of information to better understand the changing climate, as well as the mitigation and adaptation opportunities, this has not yet helped to improve the decision-making process beyond the environmental sector. This is particularly needed at the sub-national level, where further capacities are required. Nevertheless, both countries have presented progress reports and national communications to the UNFCCC - six by Mexico and three by Colombia. In general, important progress towards mainstreaming climate change was identified and the expectation is to keep this interest even beyond the political changes that both countries are recently experiencing.

The assessment of public budget, which is the key element of this research, highlights that climate change has been integrated in different ways in the public budget of both countries. In Mexico, based on the progress that followed the approval of the Climate Change Law, a transversal annex in the public expenditure was created to identify the allocation of public financial sources associated with climate change coming from the different ministries that are part of the Inter-Ministerial Commission of Climate Change. Although the tool has been useful to make the allocation of resources transparent, it is not considered a tool that can change the way that the ministries operate with regard to climate change. Besides the fact that the methodology does not have a methodology, the annex is still not clearly connected to the climate policy in place in the country, as was expressed in Chapter 4.

The amount of money reported in the annex has been between USD 1,696,880 (MXP 34,514 million) and USD 1,813,100 (MXP 36,878 million) between 2013-2017 with the lowest amount allocated in 2017. Although, in 2018, this figure increased to USD 3,234,622 million (MXP 61,457,819,955), in 2019 it was significantly reduced to USD 1,847,622 million [29] (MXP 35,104,823,138).

In Colombia, important progress related to climate finance was observed, with the publication of the National Strategy on Climate Finance and the creation of the measuring, reporting and verifying system for climate finance that shows the amount of money allocated to climate change related activities. As part of this process and based on studies such as the CPEIR of UNDP, the country has been investing around USD 430,383 million on average per year in climate related activities **(IDEAM, *et al.,* 2017b).** During 2011-2015, the investments were divided as follows: the federal government provided 54% (USD 763,747 million per year); local governments provided 31% (USD 438,883 million); the Royalties System provided 15% (USD 208,584 million) **(IDEAM, *et al*. 2017b, p. 37).**

In this case, although the amount of budget seems bigger in the case of Mexico, considering the size of the economy, it is quite low. For instance, in 2010, Colombia invested 0.05% of the environmental budget into climate change, while Mexico invested 2.14%. In 2016, however, Colombia increased this amount to 2.58% and Mexico decreased it to 0.10%.

Although these are attempts to include climate change at the budgetary level, it does not prove that a mainstreaming approach exists, but rather an initial integration. This is mainly in the environmental sector. However, the analysis found that this is not significant in relation to the major investments that both governments are making related to fossil fuels and other extractive activities that are intensifying the problem, as was found in the analysis of the energy sector.

8.2.1. Mainstreaming climate change in the energy sector of Mexico and Colombia: a fragmented endeavour

The energy sector is highly relevant for the economy of both Mexico and Colombia, but it is also one of the major emitters of GHGs in the region. As I previously pointed out, there are

[29] Based in the Budget proposal for 2019

state-specific realities that explain the status of the energy policy in both countries, namely their historical dependence on fossil fuel and extractive activities. Although both states have made progress in the use of renewable energy, this is still limited to achieve an actual energy transition towards low carbon development in the energy sector.

In terms of mainstreaming actions, the discourse in the energy sector has progressively emphasized the need for the state to transition towards renewable energy, although this is not always in tandem with the climate change agenda. Instead, this discourse is more likely to be associated with the economic and energy security agenda. Furthermore, the discourse about climate change within the energy sector has summoned a new, problematic narrative, since the term "clean energy" has gained support and includes other sources of energy, such as nuclear, hydropower and recently the use of gas (including shale gas) as clean energy sources. These resources, however, have other environmental and social externalities that can exacerbate the problem **(De la Fuente & Olivera, 2017; Guzman, 2015).**

Regarding institutional arrangements, Mexico and Colombia have both progressed in the consolidation of institutions that promote the energy transition. However, they have simultaneously strengthened the institutions that produce fossil fuels. These simultaneous actions indicate an inconsistency in the energy sector with its climate related goals. Although from the point of view of the climate agenda the strengthening of the fossil fuel sector does not make sense, according to experts, there are factors that can explain that tendency. In particular, the fossil fuel industry lobby is still strong, particularly from the gas industry, and is gaining attention in both countries **(Interviews 7AC, 6CSC, 10AC, 9CSM, 10CSM).**

Regarding the use of tools to make policies, both countries have made significant efforts in the regulation of the energy transition: in Mexico, the Energy Transition Law and in Colombia, the Law 1715. An important element is that both laws include incentives and financial mechanisms to promote the use of renewable energy technologies. Similarly, there is progress for the generation of new data to improve the understanding of the feasibility to generate electricity with renewable energy. The promotion of renewable energy has become an important part of the evolution of the energy sector in both countries. However, my analysis shows that, even though the fossil fuel reserves are declining in Mexico and Colombia, new policies related to extractive activities and fossil fuels continue to emerge.

In the case of the public budget, the dependency that both countries have on fossil fuels to raise revenue puts a lot of pressure on their public finance system. In this sense, both countries have implemented fiscal reforms to generate more income from different sources including through carbon taxes. In Colombia, the carbon tax is more successful because the earned funds are allocated into the Colombia Sustainable Fund, while in Mexico the money generated from the carbon tax is part of the general income and does not necessarily go to sustainable measures. Besides that, the resources coming from both countries are still highly limited in comparison to what is needed.

Nonetheless, the production of renewable energy is slowly gathering momentum and is in the first stages of solid growth. In Mexico, this progress is more evident than in Colombia. Notably, production in Mexico grew at 4.3% per year during the period of 2006-2016 (SENER, 2018), while in Colombia the production of wind power was only 2%, mostly thanks to the project in la Guajira **(UPME, 2015a).** Although in 2019, in the context of the Climate Action Summit President Duque said that the aim is to have 10% by 22 and 20% by the 2030 **(Colombian Government, 2019).** Further progress in renewable energy will be challenging and become more complex because the new governments in both countries wish to continue activities in the fossil fuel and extractive industries. Besides that, research shows that the evolution that has taken place in relation to renewable energy in both countries is not correlated to public finance, but rather to private and multilateral investments, which means that the government was not contributing to the energy transition. Although regulation and policies from the governmental sectors are needed, as well as incentives, the main financial support is not coming from the government.

Regarding the conditions that promote and hinder the mainstreaming process, representatives from both governmental and non-governmental sectors found that there are conditions that hinder progress in general, such as insecurity from drug trade, which affects both countries. Insecurity and drug issues have monopolized the priorities of the government, particularly in Colombia. Even during the government of Calderon in Mexico, there was a frontal fight against the drug trade that created uncertainty in his government, impacting the efforts put into other agendas such as climate change.

Besides these general conditions, there are specific conditions that promote and hinder the climate change mainstreaming process and are common findings in both applied methods. In

the next section I will further analyse the condition that appears to be a major promoter of this process, the role of international cooperation, and the condition is a major hindrance, the public finance dependence on fossil fuels.

8.3. The role of international cooperation as a promoter of climate change mainstreaming in the public budget in developing countries: neo colonization tactics or altruistic low carbon pathway support?

The ODA flows studied in the OECD databases report general aid that has been distributed in different categories, such as environment. When allocation varies among regions, in LAC for instance, the ODA represents 0.2% of the PIB of the region, which is less than the 0.4% that was registered in past decades **(ECLAC, 2018b, p. 5).** According to the Adaptation Watch ODA totalled USD$135 billion in 2013 **(2015, p. 18)**. Michaelowa and Michalowa, point out that between 1998 and 2000, the members of the Development Assistance Committee (DAC) of the OECD, spent USD 2.7 billion or 7.2% of total ODA for climate change related activities; in the case of Finland, Germany and Japan, this share exceeded 10% **(2007, p. 7).** Additionally, around 320 million USD were spent as multilateral ODA for the Global Environmental Facility (GEF), which uses about one third of its funds for climate change related projects.

The Climate Funds Update[30] also presents information about climate change dedicated funds that receive resources from OECD members. This update points out that regions receive different levels of international support. In the case of LAC, the resources are highly concentrated in a few countries: Brazil and Mexico receive the bulk of the financial support, representing a total of 49% of all climate finance approved for the region **(Bird, *et al.*, 2017, p. 3).** Colombia is among the five main recipients of climate funds, while also appearing as the major recipient of general ODA, with Brazil and Mexico, also being major recipients of ODA, although their contributions have been decreasing in recent years.

The fsQCA results suggested that the absence of ODA influences the absence of public budget to deal with climate change, while the case studies confirmed that international cooperation enables countries to implement more climate change actions, because their national budgets are insufficient to do so. This is reflected within the submission of NDCs, where many

[30] This report contains information of: Adaptation Fund, Special Climate Change Fund, and Least Development Countries Fund and the Green Climate Fund. Available from https://climatefundsupdate.org/

countries included conditional and unconditional measures. Conditional measures required international support while unconditional measures could be accomplished with their own resources.

International debate surrounds the historic responsibility of developed countries in causing climate change, and Article 9 of the Paris Agreement also recognizes the leadership that developed countries should provide to mobilize climate finance to support mitigation and adaptation measures in developing countries. Then, what is the role of international cooperation in this transition? There are scholars studying the role of cooperation that claim that cooperation is another way to keep controlling the action of developing states, as a neo-colonization tool **(Easterly, 2009; Wainwright, 2008).** This has been supported by many studies that show that developed countries tend to "invest" where they will have trade benefits **(Klöck, *et al.*, 2018; Younas, 2008).**

What these studies have revealed is that ODA is not a charity box, but rather a box of interest. Coronado **(2008)** considers that it is relevant "*to evoke that the ethical-rhetorical principle of foreign aid is to assist and help those that are in need*" **(p. 197).** However, the main concern is that, so far, ODA has not aligned with its mission, which was *"to promote the economic-development and welfare of developing countries*" with key interest in the reduction of poverty **(OECD, 2019).** ODA evolved and it was associated later with the compliance of the Millennium Development Goals, whose main goal was to reduce poverty, although also included other goals related gender equity, water access, and others. Meanwhile, ODA does not primarily go to those countries with higher levels of poverty **(Michaelowa & Michaelowa, 2007).**

On this point, Alesina and Dollar **(2000)**, ask, *"is the patter of aid flows dictated by political and strategic considerations which have little to do with rewarding good policies and helping the more efficient and less corrupt regimes in developing countries*?" **(p. 3).** To answer that question, analysis conducted by Klöck *et al* **(2018),** show that aid is not always related to willingness to help, but sometimes to greening their actions and to comply with the self-interest of donors, although this varies from donor to donor.

On this, Berthélemy **(2006)** demonstrated that indeed some developed countries use ODA to further "control" the actions of countries where they have an interest. His study shows that

countries that act egoistically are Australia, France and Italy, while Japan and the United States are moderately egoistic; and countries that act in a more altruist way include Switzerland, Austria, Ireland and most Nordic countries.

In this context, it is relevant to analyse the case of climate finance, since according to the UNFCCC "should" be "new and additional" to ODA, although in practice it has been included in the ODA allocation. Indeed, in the Paris Agreement, there is no language about additionality. Besides that, the Sustainable Development Goals signed in 2015, which replaced the Millennium Goals, included climate change as goal number 13. This suggests that ODA also includes climate finance **(Michaelowa & Michaelowa, 2007; Adaptation Watch, 2015)**. Although the provision of climate finance as part of the ODA has been working in practice, with this new international framework, its inclusion now seems to be justified.

The last point is highly criticized by developing countries **(Huq & Reid, 2004).** While climate adaptation is highly related to the development agenda, and in fact mainstreaming adaptation has been promoted in the development agenda **(Gupta, 2009),** the question is to what extent developed countries want to solve all problems with the same bag of money to avoid further investments? Or to what extent they are increasing climate finance but reducing attention in other development issues? Or to what extent they are increasing ODA to tackle both development issues and other additional issues that climate change brings with it?

On this issue, Huq and Reid **(2004)** deliver two arguments. The first is mainstreaming adaptation into development work, with all the institutional arrangements that it requires. The second is to pretend that mainstreaming adaptation funding within development funding will be enough to tackle the problem, because there is no clarity about new or additional resources. Roberts and Weikmans **(2015, p. 14)**, point out that "*new and additional*" funding promised in 2009 in Copenhagen never materialized.

Furthermore, other challenges have been identified related to ODA and climate finance allocation. Betzold and Weiler **(2017)** consider that adaptation support should go to countries that are more exposed to climate change risk, such as extreme weather events or sea level rise; however, most of the money goes to middle-income countries, to democracies and to countries with small populations, which are not always the poorest or most vulnerable.

Within Latin America, Brazil, Mexico and Colombia are the major recipients of climate funds, yet, according to the Paris Agreement, adaptation should be prioritized, which would suggest that countries such as Honduras should be receiving the most aid. So why are Mexico and Colombia major recipients?

I provide some possible explanations. First, Mexico and Colombia are emerging economies that are now part of OECD, which has strengthened ties with developed countries. This relationship could explain why these two countries are major recipients of support. Additionally, Berthélemy **(2006)** points out that developed countries use ODA to intervene when there are security issues, while observes that "*environmental aid does not target the nations that are most in need or abating local pollution, but rather those with whom they have had prior relations (economy and security), nations that are democratic, and nations with unexploited natural resource*" **(p. 144).** Colombia and Mexico both have security issues because of the drug trafficking and are two of the countries with major biodiversity in the world **(LMMC, n.d.).**

For instance, these factors may explain the interest of countries like United States in the provision of support in these countries. Nevertheless, with the arrival of Donald Trump as US president, USAID, the cooperation arm of USA, decided to close their climate change programs in both countries establishing instead smaller green growth programs **(Interview 7FGC).** This is related to what Tingley **(2010)** points out, that when governments become more conservative, their foreign aid efforts are likely to decline. The influence of USA is still there, but just not with the same name and the same resources. The study conducted by Berthélemy **(2006)** concluded "*Given this observation, it is safe to conclude that Japan and United States are more egoistic that the other countries in the "moderately egoistic*" cluster. *Their regional biases, respectively in favour of Asia and Latin America, cannot be considered as undoubtedly independent of commercial objectives*" **(p. 192).**

Other countries such as Germany are supporting Mexico and Colombia in the construction of their carbon markets through their development and cooperation agencies. According to Michaelowa and Michaelowa **(2007),** developed countries also use ODA to offset or to explain to their citizens the failure of their national climate policies. Yet, it is important to analyze why adaptation receives less money than mitigation in Latin America, which contributes "only" 8% of the emissions and has highly vulnerable countries? According to Ayers and Huq **(2009),** the

key answer could be that adaptation measures, which are processes that take too long to show results, are less attractive than specific mitigation actions that might have quicker results and are measurable, even if they are measured ex ante.

There are several measures, such as the CDM, that claimed to reduce emissions when they were first proposed but in practice did not deliver **(Michaelowa & Michaelowa, 2007; Dutschke & Michealowa, 2006).** According to Coronado **(2008)**, in a context where political decisions determine the allocation of aid, "*the success then appears to be irrelevant, as well as its failure*", the author continues, "*what truly matters is the ability to keep the funds flowing, even if that requires made-up projects results, a privilege for action, spending and short-term outcomes instead of focus on learning and long term planning*" **(p. 200).**

It was observed that in the case of Latin America the principle of conditionality appears to be decisive as well, not only to explain the aid allocation schemes that are in place among states and foreign donors, but among non-governmental organizations that rely on international cooperation as well **(Coronado, 2008).** In this point is important to say that while Colombia and Mexico are major recipients of international cooperation, it is important to differentiate the type of cooperation, since the number of grants in the countries has been reduced, and they are rather receptors of other instruments such as loans **(Interview 8FGM, 4R).** As was stated before in this thesis, the reception of loans can also contribute to increasing the public debt that in the end will be paid with public money. Furthermore, access to loans and other financial mechanisms also require a level of governance and institutional work, which is a major condition to receive sources from multilateral banks and other types of international funds, such as the GCF **(Interviews 15OIM, 4R).**

International cooperation then is an important instrument, and it has been helping countries such as Colombia and Mexico to design and implement climate policies. However, it is also observed that environmental priorities differ between the north and the south countries **(Lewis, 2009).** For that reason, my argument is that states shouldn't rely only on international cooperation to address the impacts of climate change. Furthermore, according to Coronado **(2008),** the key aspect of ODA was to support countries in difficult situations to help them to find stabilization until they were ready to keep their own progress, which means that the idea behind ODA is to provide temporary support.

It is true that the situation in the region is complex, which is related to the fact that many countries in Latin America have weak public finance systems, with limited capacity at the governmental level to raise revenues, which in turn reflects their limited capacity to spend **(Giraldo, 2009).** Furthermore, the public budget debate is always contentious and highly politicized, as it is the primary mechanism by which all the ministries and local governments compete for "limited" financial resources **(Interviews 1FGC, 1FGM, 5FGM).** This is especially pertinent in a region that suffers from high poverty, lack of education, insecurity, unemployment, external debt and other social problems that have been treated in isolation without thinking about the relationship that they have with the environmental crisis.

In this context, although international cooperation to deal with environmental problems is even more relevant, developing countries must also seek structural changes at the public finance system level. This is needed to address two challenges: reliance on fossil fuel revenues, which I will discuss in the next section, and, facing the impacts of climate change through climate change adaptation finance.

In this sense, the existence of ODA in countries is positive because it is pushing countries to deal with climate matters, and in a way that creates a mutual conditionality, because developing countries rely on this resources to act while developed countries gain capacity to "participate" in the acceleration of actions. In fact, according to the Adaptation Watch **(2015)** this climate finance exchange is a tool to increase mutual accountability, to be able to sit at the same table to negotiate things that represent completely different priorities in these countries. In this regard, the active participation of Mexico and Colombia in the context of the UNFCCC is a key factor for constructing a national narrative on climate change. Here, negotiators have actively positioned the leadership of both countries to articulate this role, nationally and internationally. However, this articulation hasn't always been successful, because although these countries are very active at the international level, this is not always reflected in better climate policies.

Nevertheless, the efforts of these countries at the international level, and the establishment of key goals to reduce emissions, have raised the attention of developed countries that have the responsibility to transfer financial support. Interviewed governmental representatives consider international support important and necessary, but they agree with the claim that in many cases such support responds to the interests of the developed countries rather than to

the needs at the national level **(Interview 14FGC).** Some authors such as Stewart *et al.,* **(2009)** suggest that recipient countries will demand in exchange stronger commitments from private and public sources as "*the price of their participation in mitigation, and greater voice in the governance of funding mechanism and how the funds are used*" **(p. 7).** This is a debate that has been taking place at the international level and is the reason why the NDCs are called nationally determined contributions, because the definition of sectors and actions should be country driven.

Developing countries claim that the provision of financial resources is an obligation of the developed countries in the context of the UNFCCC, and that it shouldn't be conditional on the actions at the national level **(Huq & Reid, 2004).**

The argument is not to put the responsibility only on developing countries, but rather to encourage developing countries to implement deep changes to leapfrog the development pathways of developed countries **(Perkins, 2003).** This because, according to Bodnar *et al*, **(2018),** to achieve a trajectory to avoid 1.5^{o} warming will require innovative public financial instruments designed to mobilize trillions of dollars of private investments. Limiting warming to 1.5^{o} C will cost roughly "1.5-2.1 times" more than a 2^{o} C scenario between 2010 and 2100 **(Rogelj *et al.*, 2015, p. 525).**

While this discussion will continue in the context of the SDGs and in the context of the implementation of the Paris Agreement and the effectiveness of the support **(Chaum, *et al.,* 2011)** in this research I want to highlight that while developing countries wait their turn to receive funds from the GCF or to catch the attention from bilateral donors, if they do not transform national financial structures, the fight against climate change will be more expensive for them. This increasing cost of climate change will impact their public budget further as countries will have to pay or ask for further money, which is always easy when it comes in a format of loan. Yet, countries in the region have a very high external debt, which in the context of climate change might increase. In general, climate change must be treated as a national security problem that requires serious national transformation **(Barnett, 2007).**

In conclusion, the literature suggests that international cooperation has been used to exert a certain type of control over the actions of recipient countries, which can operate as neo colonialist actions **(Coronado, 2008),** however, studies conducted by Klöck *et al.,* **(2018)** and

Berthélemy **(2008),** suggest that this is not the case of all donors, and that there are countries that have a genuine interest in supporting actions at the national level. The case of Mexico and Colombia showed that the role of international cooperation is highly relevant for climate action. Representatives of government and non-governmental organizations consider that, while cooperation is highly relevant, the donors primarily establish the lines and the topics where they want to support, even if these are not the main lines of interest of the countries **(1FGM, 8FGM, 14 IOM, 15 IOM, 4FGC, 6CSC, 7FGC, 14FGC).**

In terms of the energy transition, this research has shown that international cooperation has also played an important role in the development of renewable energy projects, however it is not as critical as the role of other financial support from multilateral banks and the private sector. The fsQCA also showed that ODA could be used to further fossil fuel investments, which is explained in the next section.

8.4. The role of fossil fuel finance as a hindrance to mainstreaming climate change budgeting: is it possible to break the dependency on fossil fuels?

Scholars have been analysing the influence of fossil fuel and extractive activities in the revenues of Latin American countries **(Campodonico, 2008).** While there is recognition that the fossil fuel reserves are decreasing in the region, which has been analysed since the early years of the 21st century, many Latin American states have maintained a focus on pro-fossil fuel policies. The dependency on these resources became a "Dutch disease", referring to the phenomenon where the rapid development of one sector of the economy (particularly natural resources) precipitates a decline in other sectors. For instance, with the growth of oil and extractive activities, agriculture and other primary sectors suffered in Latin America and Africa, producing a dependency on this sector to "alleviate" the economy, creating a cycle that is very difficult to escape **(Benjamin, *et al.,* 1989).**

For many decades Latin American countries relied on the production of coal, oil and other minerals to increase their revenues to fund social demands. In many countries the revenue from oil, manufacturing and construction, accounted for more than 30% of total government spending in the past **(Fan & Rao, 2003).** Mexico clearly shows this pattern: in 2006 its total revenue was USD$158,940 million, while the revenue from the oil sector was USD$58,127 million, 36% of the total revenue. This tendency has been changing with the reduction of oil

reserves in the region **(EPE, 2013)** - although Venezuela might have reserves for more than 100 years according to Campodonico **(2008),** this is not the case for most countries.

The claim of some governments is that there are important reserves that have been not discovered yet, and that further technologies and investments are needed to keep exploring and extracting fossil fuels. The key concern in Latin America is that most of these reserves are not easy to extract, as articulated by a former representative of the energy sector in Mexico, who stated "*the easy and cheap oil is finished*" **(interview 5FGM).** This means that countries have to use methods, such as fracking, to access unconventional oil and gas, but this has environmental impacts, such as the use of chemicals and the impact on water reserves as a large amount of water is needed in the process **(Guzman, 2015).** In Argentina, for example, fracking the reserves in "*Vaca Muerta*" (Dead Cow) could satisfy energy demand for the next 150 years, with an estimated production of 27 billions of barrels of oil and 802 trillions of cubic feet of shale gas, according to the US Energy Information Administration. However, the question that remains is what are the externalities and what additional costs will it bring to countries in the context of climate change? **(Guzman, 2015).**

Another concern is related to the places where oil reserves are placed. For instance, there are several efforts to keep exploring the resources that are in the Amazon in Colombia, Brazil, and Ecuador **(WWF, n.d.).** The dilemma that these countries have is, to what extent must they protect this ecosystem, or to what extent should they keep extracting resources to raise revenue to pay for their bills, even if this extraction intensifies climate change?

This dilemma has brought proposals such as the Yasuni project in Ecuador. The project aimed to emit bonds and then sell them to developed countries or international organizations that would be willing to invest to ensure that the oil would remain in the ground. In this way the government could commit to avoiding further exploitation of those reserves to protect the National Park Yasuni without "losing" the income that they would receive for such exploitation. The president, Rafael Correa, wanted to raise at least 50% of the resources that they would receive if they would extract oil from that park **(Oilwatch, 2007, p. 4).** The aim was to collect USD$3,600 million in 13 years in compensation to avoid the exploitation of around 846 million barrels of oil **(Mena, 2013).** However, they only collected USD$13.3 million, and the president claimed "the world has defrauded us", and he decided to exploit the park, arguing that the

additional USD$18.292 million that could be raised by doing so could help reduce poverty and misery in the country and the Amazon **(Mena, 2013).**

The dependence on fossil fuels is one of the constant factors in many countries in the region, including Colombia and Mexico. While it was possible to observe that some politicians have shown interest in climate change, this does not change the growing and "stable" interest on fossil fuels **(Interview 18IOC).** This was even more evident when investments in fossil fuels versus investments in renewable energy in the region were analysed.

In Mexico and Colombia, the political, fiscal and regulatory frameworks are still powering fossil fuel development. This dependency on fossil fuel may explain why there is limited progress in the use of renewable energy for the generation of electricity, where public investments are extremely limited. In this regard, the claim of some experts is that "*it is ok if the government does not invest in renewable energy, as long as it does not create barriers*" **(Interview 22JM).** Nevertheless, some consider that public financial support can create a change in the investment trajectory, since "*a signal to the market has to be clear*" **(Interview 24CM).** Many experts agree that a key element to ensure the transition is to reduce investments in fossil fuel and to disconnect the economy from fossil fuel dependency, which at the same time will be helpful for energy security **(Interviews 3R, 9CSM, 10CSM, 11CSM, 1FGM, 4LPM, 1FGC, 3AC, 6CSC; Oilwatch, 2019).**

A major debate in both countries is now in regards to the role of the fracking as a method to continue with the exploitation and production of fossil fuels, while the governments remain interested on this practice to maximize the production, civil society movements have been created to oppose to this expansion, through alliances of organizations and local communities **(AMCF, n.d.).**

According to a recent study by CEPAL **(2019),** the key element that is needed in the region is a comprehensive fiscal reform that can diversify the region's revenue to avoid a path of cyclical dependency that ends up strengthening this carbon lock-in **(Unruh, 2000).** If countries remain dependent on fossil fuel income to pay for their government expenditure programs more generally then it will be very difficult to achieve their climate and sustainable development goals.

The critical factor here, which my research demonstrates, is that there are major trade-offs in the short and medium-term that countries will have to endure as they adapt to a changing climate, mitigate its impact, and transition to a low carbon and resilient development. Indeed, countries are already experiencing budgetary challenges owing to losses resulting from climate impacts. In all scenarios, investing early in actions will always be cheaper than paying the cost of the impacts **(Galindo, 2015; Stern, 2009).**

An important observation highlighted by this study, which requires future research, is the actual role of ODA in the energy sector. One of the results identified in the fsQCA method is that the absence of ODA relates to the absence of a public budget on fossil fuels. While ODA might be a way to help countries to reduce emissions and comply with their climate commitments, this research suggests that ODA might also incentivize the promotion of industries that are important for trade purposes, but that developed countries do not want located in their own territories - what some authors call, "pollution havens" **(Cole, 2004).**

Although it was not possible to know how much, if any, of the ODA provided goes to specific fossil fuel activities, the amount that goes to the energy sector is relevant in many countries. It is possible that ODA itself is not investing in specific technologies related to fossil fuels, but, based on other studies, the countries that belong to the OECD and are also part of the G20, are still major investors in fossil fuels.

In the report "G20 coal subsidies", Oil Watch and other organizations, it is stated that the G20 provided "*at least US$63.9 billions per year in government support to the production and consumption of coal alone*" **(2019, p. 4).** The paradox is that these countries are responsible for 79% of the global emissions. These investments are not only national but also international investments, contributing to the development of this industry overseas, with a sum of USD$27.6 billion. These countries also have USD$15.4 billion in fiscal support and USD$20.9 billion in state-owned enterprise (SOE) investment per year across the G20 countries **(Gencsü, *et al.,* 2019, p. 4).** In this sense there is an increase in the G20 support to produce coal-fired electricity, going from over USD$17.2 billion per year (average 2013-2014) to nearly USD47.3 billion per year (2016-2017) **(Gencsü, *et al.*, 2019, p. 4).**

In the case of Mexico and Colombia, there are also limited efforts to mainstream climate change in the energy sector. These efforts haven't been successful or perhaps they were

implemented to falsely prove that they care about climate change, when in reality the dynamic of the economy is highly driven for the interest and dependency on fossil fuels. Therefore, the energy and climate policies are pulling in opposite directions.

In this sense, the diversification of the energy matrix is desirable in the context of climate change, but to what extent is it desirable in the economic model that exists now, which is based on the unlimited extraction of natural resources to generate capital? Fossil fuels are limited resources. The question is, to what extent should states rely on them to ensure future development **(Sohr, 2011).** Even though in capitalism the market has power, the state plays an important role. In LAC there is constant debate about the role of the state as owner or as a partner of oil companies. This tendency has been divided, between those that aim to control the oil companies, such as Mexico and Venezuela, and those that are rather partners of private companies, such as Colombia, as shown in Chapter 7. On this point, the discussion should also go towards the diversification of the energy sector.

In the case of Mexico and Colombia, the state is not leading the energy transition, but neither is the development assistance which has been investing in renewable energy and energy efficiency projects but is also necessary to adapt to the new context and necessities of the countries **(OECD, 2019b).** In reaction to this, the private sector has gained power in the expansion of renewable energy in the world, but to what extent is it desirable that the state does not play a protagonist role in the energy transition?

While the free market offers opportunities to expand investments where the states cannot, the idea from scholars was not to give the market the right to decide the pathway, but rather for it to follow government rules and support where government is lacking. Issues such as environmental damages, education and others, cannot fall in the free market rules, because free market is "*brutally unsentimental"* **(Sachs, 2011).** Free market will not end poverty, unless the reduction of poverty generates a significant profit. According to Sachs **(2011, pp. 38-39)**, "*free market needs regulation to best serve public interest*".

Therefore, public finance is an important area of the state that requires strengthening to support the actions of the government. I found a gap in the literature regarding the role of public budget in developing countries to tackle climate change. Most climate finance refers to the financial support provided through developed countries; however, this research suggests

that in the context of the climate emergency, both developed and developing countries have to invest in climate change action. My argument is that international cooperation will not be enough if it does not help to leverage public finance at the national level to tackle the problem.

In this thesis, I have explained that the provision of ODA and climate finance is unbalanced. In Latin America, mainly Brazil and Mexico are major recipients of climate finance while, Colombia is the major recipient of ODA. If we extrapolate this to the rest of the world, the country that receives more international support is China. From the 34% of resources going through the GEF to Asian countries, China receives half **(Michaelowa & Michaelowa, 2007, p. 13)**. Meanwhile, Latin America receives 23% and Africa receives 19% of these resources. In this context, should Latin American and Caribbean countries rely only on international resources, or should they also start mainstreaming climate change in their public budgets to directly face the problem, comply with national and international goals and, in particular, to protect their populations from the impacts of climate change?

My answer is that countries should be mainstreaming climate change within their planning and budgetary processes, in order to better allocate the "limited resources" that they have, and to create conditions to leverage potential international support. The state must continue playing an important role. As Eckersley **(2004)** suggests, the state can guide countries towards a "green state" that understands that the protection of the environment is related, and necessary, to ensure the social protection.

This research does not suggest that the developing countries have to pay for the consequences of climate change by themselves, but I suggest that developing countries also have a role to play, in a moment when climate change is progressing rapidly. The states have the responsibility to keep strengthening national structures such as their public finance systems, where the diversification of income sources is a key measure to generate enough budget to invest in adaptation and mitigation actions as well as other social and economic activities. Cutting fossil fuel dependency is key to ensure a transition; otherwise any effort to mainstream climate change will fail.

In this context developed countries also have to take responsibility and should provide support to all countries in the same way, without looking only to their own interests, otherwise the countries that suffer deep levels of poverty will never be able to escape from

it, and the purpose of the ODA and the purpose of the SDGs and the Paris Agreement will not be achieved.

8.5. Conclusions

The allocation of public resources to deal with climate change in Latin American and the Caribbean countries remains as a major challenge because of the limited resources that these countries have and the number of problems they must face. Nevertheless, countries such as Mexico and Colombia have been progressing towards a climate change mainstreaming process in their planning and budgeting processes, although are still limited efforts.

The two methods applied in this research, the fuzzy set Qualitative Comparative Analysis and the case studies method, share some conclusions regarding the conditions that promote and hinder such limited process. They share the conclusion that the reception of international cooperation is a promoter of mainstreaming climate change in the planning and budgeting process of countries, while the dependence on fossil fuels in the public finances is a major hindrance.

This chapter further discussed what is then the role of international cooperation and the fossil fuels in this process. The literature suggests that, while international cooperation is relevant to help comply with international agreements, it is not always a charity box, but rather reflects the actual interests of donor countries. While ODA is supposed to support countries in need, primarily to reduce poverty, it is highly concentrated in middle-income countries. In the case of climate finance, which according to the UNFCCC should support more adaptation actions, it is highly concentrated on major emitters of GHGs and not to the most vulnerable countries.

Some scholars suggest that the main issue with international cooperation in the form of ODA, is that it is allocated where donor countries have interest, such as trade and security interests, although this is not the case with all donors. However, this conditional attitude has been seen in Mexico and Colombia, where donor's countries behave differently. In this sense, the provision of ODA could be a way to create mutual trust as some authors suggest, or to create mutual conditionality, however this can vary significantly between donors and recipients. The take-home message is that priorities between these two sides are not always the same.

Regarding the fossil fuels role, this thesis has shown that there have been limited efforts to mainstream climate change in the energy sector, because countries remain dependent on fossil fuels. So far, little public money is invested in the energy transition, and although international cooperation can play a role in supporting this transition, it is not always clear if this support is “carbon-free” or if it is another means of "greening" to cover up fossil fuel investments from OECD and G20 countries.

The argument presented in this research is that mainstreaming climate change in the planning and budgetary process as a way to comply with national and international commitments, will not be effective if countries do not end their dependency on fossil fuels, even in the presence of international cooperation. While international cooperation is putting pressure on recipient countries to deal with climate change, these resources are not going to be enough to cover all the adaptation and mitigation needs in all developing countries. For this reason, it is essential that developing countries keep strengthening national structures, such as the public finance systems, to be able to raise revenue from alternative sources to fulfil important social and environmental demands. If countries keep investing in fossil fuels to produce revenue, any effort financed by private and international resources will not be successful to achieve mainstreaming as a process or as a goal, to tackle climate change effectively.

CHAPTER 9. CONCLUSIONS

The allocation of public funding to tackling climate change is limited in developing countries. In this thesis I analysed the conditions and combinations of conditions that promote or hinder climate change mainstreaming in planning and budgetary processes in 21 major emitter countries in Latin America and the Caribbean with a more detailed analysis of Mexico and Colombia. The analysis showed that whilst mainstreaming is limited, international cooperation is an important promoter of the climate change mainstreaming process, while dependency on oil revenue to generate budget is a major constraint.

This thesis builds on the idea that, in order to tackle climate change, it is necessary to mainstream the problem to bring it to the heart of policy; a process that has started in some countries. In this context the research question established was, under what conditions are developing countries willing to mainstream climate change in their public budget to comply with national and international commitments, and what factors promote and hinder such a process?

The thesis used two main approaches in order to address the question. The first was a Qualitative Comparative Analysis with its fuzzy set format, where five conditions were

analysed (levels of climate risk, receipt of Overseas Development Aid, levels of human development, governance effectiveness, and number of climate policies); and the second a comparative analysis using two case studies and interviews, Mexico and Colombia. Based on data generated by these methods, several observations were obtained, but there are four findings that are the most relevant to answer the research question.

The first finding is related to the actual existence of a public budget. There is evidence of only a limited allocation of public budget to tackle climate change in in Latin America and the Caribbean countries, even in those contributing the highest GHG emissions in the region and even in those that are highly vulnerable. Although the number of countries allocating public resources in 2016 compared to 2010 doubled, increasing the allocation of public budget from average of 0.89% (including only the countries that allocated resources) to 5.8% of the total of the environmental ministries' budgets. This proportion is minor, when we realize that the budget of the environmental ministries went from average 1.0% of the total of the central government's budget (including only the countries that allocated resources) in 2010, to 0.46% in 2016. Overall, this demonstrates limited effort by countries to mainstream climate change in the planning and budgetary process, which limits the capacity of the state to deal with the problem.

The second finding is that countries such as Mexico and Colombia are nonetheless attempting to mainstream climate change in their planning and budgetary process. They both have created institutional arrangements, policies and even legal frameworks to tackle climate change. However, their efforts to mainstream climate change in the environmental sector and in the energy sector have limited progress so far.

The third finding identified by the two methods is that the international cooperation in form of Overseas Development Aid and climate finance has an influence in the budget behaviour of developing countries. The fsQCA identified that the absence of ODA is necessary to explain the absence of a climate and renewable energy budget. Countries that do not receive ODA tend to invest less in climate change and renewable energy than those that receive ODA. This condition was highly necessary although not sufficient, which means that other conditions have to be in place as well. Nevertheless, this condition was a large determinant for explaining the amount of environmental budget in relation to the central budget of governments, meaning that countries that receive ODA tend to invest more in environmental matters. This

was confirmed by several of the interviews conducted in the case studies, where international cooperation is recognized as a major catalyst to tackle climate change as national resources are rather limited.

The fourth finding is that the role of ODA is relevant to explain the levels of fossil fuel budget in the energy ministry as well. While the fsQCA showed that the absence of ODA also leads to the absence of a fossil fuel budget, the model also showed that the former is also related to the allocation of climate budget. For instance, it was shown that the presence of fossil fuel is necessary to explain the presence of climate budget in certain countries, while the presence of fossil fuels is also necessary to explain the absence of climate budget in others. This could mean that some countries invest in climate matters to compensate their activities in fossil fuels, while others that are highly driven by fossil fuels do not have high interests in climate actions.

The analysis based on the case studies showed that the dependency on fossil fuel in the public finance system, including the collection of revenue and the generation of budget, acts as a constraint on the climate change mainstreaming process. It creates a vicious cycle, where more fossil revenues lead to an increased fossil fuel budget and this leads to opposition against policies that aim to change the behaviour of the energy sector, such as climate policies, since the energy sector is the major emitter of greenhouse gases.

In conclusion, some developing countries such as Mexico and Colombia are mainstreaming climate change in their public budgets as a response, or as part of the dynamics that the reception of international support brings to them; and these developing countries are willing to keep doing so as long as they further received international cooperation, in the form of ODA or climate finance. However, this climate change mainstreaming process will be always limited if the public finance system of these countries remains dependants on fossil fuels, where the energy policies pull in the opposite direction of the climate goals.

While the presence of international cooperation is important, it is not enough to deal with the structural needs that countries have. In addition, international cooperation does not necessarily go where the funding is most needed. This is why it is important to strength the national public finance systems, to better leverage and guide international cooperation. However, if countries keep relying on fossil fuels to generate revenue and budget to cover

their social and economic needs, including dealing with climate change, it will be difficult to achieve an energy transition that will allow countries to build a low carbon and resilient future.

The analyses conducted helped to further understand the conditions that influence developing countries in tackling climate change domestically. From these, I highlight some policy implications of the analysis.

The first is related to the actual political process of mainstreaming climate change, which must take lessons from gender mainstreaming. Subsequently, the role of environmental ministries remains relevant, but to tackle climate change effectively the role of the central government must be reconsidered, bringing on board other ministries, such as energy and agriculture ministries, in a more proactive way, particularly the role of the finance ministries in areas such as revenue and public budget. In general, the role of the finance sectors, public and private, is important, but their work must be connected to the compliance of the goals of countries. Furthermore, the engagement of local governments is still a major requirement in countries like Mexico and Colombia. This process, however, cannot be separated from the main goal to reduce emissions and vulnerability, and further engagement of non-governmental actors is needed to have an effective mainstreaming approach.

Secondly, strengthening the role of the state to focus on climate change also requires making its systems stronger. **The public finance systems in LAC require more balanced attention**, where diversification of revenue is needed to stop relying on fossil fuels due to its contribution to GHG emissions, but also because fossil fuels are becoming scarce. Mexico and Colombia, as well as other countries in LAC, require strong fiscal reforms that can achieve this diversification to transit into low carbon pathways, as well as rethinking the destination of the limited resources available to address social and environmental problems. It is important to work on subsidy policies, including the reduction of fossil fuel subsidies and their potential reallocation to technologies that emit less GHGs and thus have lower environmental impacts.

Thirdly, **a thorough analysis of the implications of relying on fossil fuel must be done** in Mexico and Colombia because the reduction of reserves and the fluctuation of global prices place a lot of pressure on the economy of these countries. Along the same lines, increased transparency regarding revenue, but also the allocation of public resources, is needed, improving the systemization and access to budgetary information to identify gaps and areas

of opportunity to rethink the use of available public resources. This **transparency framework** will become –or already is– an important element to receive international cooperation as a key condition to access finance. The creation of a public budget index in LAC is desirable to track the evolution of flows towards climate change and other activities.

Finally, an agreement regarding the **definition of what constitutes climate finance** in theory and practice is needed. The definition should settle the argument regarding whether or not to include climate finance within the general ODA and, if it is included, whether the few resources supplied by the ODA are enough to combat climate change challenges in all developing countries as well as the rest of the SDGs. Furthermore, it is important that donors and recipients of this international cooperation **improve the analysis of the effectiveness of international support**, to ensure that it goes where it is most needed and that it is having a real impact. Meanwhile, **donors must demonstrate that their resources are being used for reasons beyond their own self-interest**, promoting a more balanced distribution among developing countries.

Mainstreaming climate change in the public expenditure is neccesary, and this research has contributed to our knowledge about the relationship that exists between international cooperation and public budget allocation as mechanisms for delivering climate change policy. The provision of international support was shown to have important impacts, although not always the most desirable for recipient countries, which calls for further analysis regarding the effectiveness of such resources.

In addition, the analysis of the energy transition pathways highlighted the limited role that governments currently have in LAC, but the necessity to ensure their engagement to transit towards a low carbon and resilient pathway to be able to achieve structural changes.

While international cooperation remains key for developing countries, this will not be enough if national resources are continuing to propagate the problem, such as through fossil fuel investments. Furthermore, both national and international resources will be needed for the transformation towards low carbon and resilient pathways or developing and developed countries will end up paying more, in both money and human lives. The investment decisions made today will determine the future that we want for our economies and societies, particularly for future generations. The question is, as Figueres and Rivertt-Carnac **(2020)** propose, what future will we choose?

LIST OF APPENDICES

Appendix 1 Public budget labelled as climate change in environmental ministries (in percentage)

Country	% OF THE PUBLIC EXPENDITURE FOR CC IN RELATION TO THE MINISTRY OF ENVIRONMENT 2010	% OF ENVIRONMENTAL SECTOR OUT OF THE TOTAL OF CENTRAL GOVERNMENT 2010	% OF THE PUBLIC EXPENDITURE FOR CC IN RELATION TO THE MINISTRY OF ENVIRONMENT 2016	% OF ENVIRONMENTAL SECTOR OUT OF THE TOTAL OF CENTRAL GOVERNMENT 2016
Argentina	0	2.02	0	0.25
Bolivia	2.99	0.21	2.60	0.27
Brazil	0	0.13	0.25	0.11
Chile	0	0.03	0	0.12
Colombia	0.05	1.15	2.58	0.03
Costa Rica	0.07	5.7	7.2	0.70
Cuba	NA	NA	NA	NA
Dominican Republic	0	1.4	0	1.02
Ecuador	NA	NA	NA	NA
El Salvador	0	0.51	6.7	0.51
Guatemala	0.0032	0.19	18.70	0.20
Honduras	0.09	0.64	0.9	0.13

Jamaica	0	0	4.45	0.7
México	2.14	0.57	0.10	0.37
Nicaragua	0	0.40	26.4	0.44
Panama	0	0.67	0	0.51
Paraguay	0	0.08	0	0.12
Peru	0	0.10	0.2	0.23
Trinidad y Tobago	0	0	0	0
Uruguay	0	2.3	0.06	1.9
Venezuela	NA	NA	0	0.77
NA: Not available				

Sources: Own elaboration with information of 21 public expenditures.

Appendix 2 Public budget labelled as renewable energy in energy ministries (in percentage)

Country	Existence of public expenditure labeled as renewable energy in energy ministries in 2010	% Of renewable energy expenditure in energy ministries 2010	% Of fossil fuel expenditure in energy ministries 2010	Existence of public expenditure labeled as renewable energy in energy ministries in 2016	% Of renewable energy expenditure in energy ministries 2016	% Of fossil fuel expenditure in energy ministries 2016
Argentina	0	0	0.32	0	0	50.0
Bolivia	1	68.99	1.48	1	0.18	0.087
Brazil	0	0	4.9	0	0	0.58
Chile	1	5.3	19.74	1	4.55	49.03
Colombia	0	0	2.39	1	0.05	6.97
Costa Rica	0	0	1.65	0	0	0.75
Cuba	NA	NA	NA	NA	NA	NA
Dominican Republic	0	0	0	0	0	22.45
Ecuador	NA	NA	NA	NA	NA	NA
El Salvador	1	0.1	0.49	0	0	4.32
Guatemala	1	2.6	12.49	1	4.05	25.8
Honduras	0	0	0	1	0.76	0

Jamaica	0	0	0	1	13.3	0
Mexico	0	0	4.75	1	31.2	13.79
Nicaragua	1	85.6	2.46	1	83.92	1.94
Panamá	0	0	0	0	0	0
Paraguay	0	0	0	0	0	0
Peru	1	1.04	0.36	1	1.03	0.54
Trinidad y Tobago	0	0	0	0	0	0
Uruguay	0	0	0	0	0	0
Venezuela	NA	NA	NA	0	0	25.76

Sources: Own elaboration with information of 21 public expenditures.

Appendix 3 Sources of information for the budgetary analysis per country

Country	Ministry of Finance information (2010)	Ministry of Finance information (2016)
Argentina	http://www.mecon.gov.ar/onp/html/presupresumen/resum10.pdf	http://www.mecon.gov.ar/onp/html/presupresumen/resum15.pdf
Bolivia	http://medios.economiayfinanzas.gob.bo/MH/documentos/PGE2010.htm	Not available for 2016 http://www.economiayfinanzas.gob.bo/index.php?opcion=com_contenido&ver=contenido&id=700&id_item=402#
Brasil	http://www.orcamentofederal.gov.br/clientes/portalsof/portalsof/orcamentos-anuais/orcamento-2010/orcamentos_anuais_view?anoOrc=2010	http://www.orcamentofederal.gov.br/clientes/portalsof/portalsof/orcamentos-anuais/orcamento-2015-2/orcamentos_anuais_view?anoOrc=2015
Chile	http://www.dipres.gob.cl/594/articles-74331_doc_pdf.pdf. Ver más en:http://www.dipres.gob.cl/594/w3-multipropertyvalues-2129-2430.html	http://www.dipres.gob.cl/594/articles-121592_Ley_de_Presupuestos_2015.pdf. Ver más en: http://www.dipres.gob.cl/594/w3-propertyvalue-22368.html
Colombia	http://www.minhacienda.gov.co/HomeMinhacienda/ShowProperty?nodeId=%2FOCS%2FMIG_5817274.PDF%2F%2FidcPrimaryFile&revision=latestreleased. http://www.minhacienda.gov.co/HomeMinhacienda/faces/oracle/webcenter/portalapp/pages/presupuestogeneraldelanacion/LeyPresupuestalPGN.jspx?_afrLoop=616802523861150&_afrWindowMode=0&_afrWindowId=rmvwszn08_10#!%40%40%3F_afrWindowId%3Drmvwszn	http://www.minhacienda.gov.co/HomeMinhacienda/ShowProperty?nodeId=%2FOCS%2FMIG_35006605.PDF%2F%2FidcPrimaryFile&revision=latestreleased

	08_10%26_afrLoop%3D616802523861150%26_afrWindowMode%3D0%26_adf.ctrl-state%3Drmvwszn08_94	
Costa Rica	http://www.hacienda.go.cr/contenido/446-leyes-de-presupuestos-2010	http://www.hacienda.go.cr/contenido/13087-ley-de-presupuesto-de-la-republica-2015
Cuba	Not available the website is on construction http://www.mfp.cu/under/under.php	Not available the website is on construction http://www.mfp.cu/under/under.php
Ecuador	Not available	Not available
El Salvador	Aprobado:http://www.transparenciafiscal.gob.sv/ptf/es/PresupuestosPublicos/Presupuestosvotados/Ao2010.html#_vTab246 Expenditure http://www.transparenciafiscal.gob.sv/ptf/es/PresupuestosPublicos/PresupuestosEjecutados/Ao2010.html	Aprobado:http://www.transparenciafiscal.gob.sv/ptf/es/PresupuestosPublicos/Presupuestosvotados/Ao2015.html#_vTab1056 Expenditure http://www.transparenciafiscal.gob.sv/ptf/es/PresupuestosPublicos/PresupuestosEjecutados/Ao2010.html
Guatemala	No information for 2010 (it was taken 2011) está:http://www.minfin.gob.gt/index.php/presupuestos-aprobados/presupuestos-aprobados	http://www.minfin.gob.gt/images/archivos/presua2015/inicio.htm
Honduras	http://www.sefin.gob.hn/?p=370	http://www.sefin.gob.hn/?p=50800
Mexico	http://www.hacienda.gob.mx/EGRESOS/PEF/pef/pef_2010/index.html	http://www.apartados.hacienda.gob.mx/presupuesto/temas/pef/2015/index.html
Nicaragua	http://www.hacienda.gob.ni/documentos/presupuesto/presupuesto-gral.-de-la-republica/presupuesto-2010	http://www.hacienda.gob.ni/documentos/presupuesto/presupuesto-gral.-de-la-republica/ppresupuesto-2015
Panamá	http://www.mef.gob.pa/es/direcciones/presupuestoNacion/Documents/pre_2010_ley.pdf	http://www.mef.gob.pa/es/direcciones/presupuestoNacion/Documents/pre_2015_ley.pdf
Paraguay	http://www.hacienda.gov.py/web-presupuesto/index.php?c=153	http://www.hacienda.gov.py/web-hacienda/index.php?c=705
Perú	https://www.mef.gob.pe/es/presupuesto-del-sector-publico/aprobacion-presupuestal/nacional-regional-y-local/182-presupuesto-publico/programacion-formulacion-y-aprobacion/872-presupuesto-aprobado-ano-2010	https://www.mef.gob.pe/es/documentacion-sp-3092/leyes-de-presupuesto-del-sector-publico
República dominicana	http://www.digepres.gob.do/wp-content/uploads/2013/07/Presupuesto-Formulado-2010.pdf	http://www.digepres.gob.do/?page_id=2678
Trinidad y Tobago	http://www.finance.gov.tt/wp-content/uploads/2013/11/pub985D6E.pdf	http://finance.gov.tt/wp-content/uploads/2014/09/Budget-Statement-2015.pdf
Uruguay	Not available	https://www.mef.gub.uy/18296/1/mef/presupuesto-nacional-2015---2019.html
Venezuela	Not available	http://www.onapre.gob.ve/index.php/publicaciones/descargas/viewcategory/46-ley-de-presupuesto-ejercicio-fiscal-2015

Argentina	http://www.mecon.gov.ar/onp/html/presupresumen/resum10.pdf	http://www.mecon.gov.ar/onp/html/presupresumen/resum15.pdf

Appendix 4 List of interviews

Interviews in México			
#	Code	Sector	Profile
1	1FGM	Federal Government	Representative of the Environmental Ministry (SEMARNAT)
2	2LPM	Legislative power	Representative of the Climate Change Commission (Deputies Chamber)
3	3LPM	Legislative power	Representative of the Budget Commission (Deputies Chamber)
4	4LPM	Legislative power	Representative of the Climate Change Commission Deputies Chamber)
5	5FGM	Federal Government	Representative of the Ministry of Energy (SENER)
6	6FGM	Federal Government	Representative of the Finance Ministry (SHCP)
7	7FGM	Federal Government	Representative of the Energy Efficiency Commission (CONUEE)
8	8FGM	Federal Government	Representative of the Foreign Affairs Ministry (SRE)
9	9CSM	Civil Society	Representative of the Environmental NGO
10	10CSM	Civil Society	Representative of Research NGO
11	11CSM	Civil Society	Representative of Transparency NGO
12	12FGM	Federal Government	Representative of the Finance Ministry (SHCP)
13	13FGM	Federal Government	Representative of the Finance Ministry, Direction of Revenue Hydrocarbons (SHCP)
14	14IOM	International organization	Representative of International Organization
15	15IOM	International organization	Representative of International Organization,
16	16FGM	Federal Government	Representative of the National Institute of Ecology and Climate Change (INECC)
17	17CSM	Civil Society	Representative of the Environmental NGO
18	18AM	Academia	Representative of the National University of Mexico (UNAM)
19	19LPM	Legislative power	Advisor of the Climate Change Commission (Senates Chamber)
20	20SGM	Sub national government	Advisor Sub national government

21	21FGM	Federal Government	Representative of the Energy Ministry (SENER)
22	22JM	Journalist	Expert journalist on energy
23	23PSM	Private Sector	Advisor of the Private Sector (CEMEX)
24	24CM	Consultant	Expert consultant on climate change
	Interviews in Colombia		
	Code	Sector	
1	1FGC	Federal Government	Representative of the Environmental Ministry (MADS)
2	2FGC	Federal Government	Representative of the Finance Ministry (MinHacienda)
3	3AC	Academia	Representative of the Academia (Universidad del Rosario)
4	4FGC	Federal Government	Representative of the Foreign Affairs Ministry (Cancillería)
5	5OIC	International organization	Representative of the International Organization (UN body)
6	6CSC	Civil Society	Representative of the Environmental NGO
7	7FGC	Federal Government	Representative of the National Planning Department (DNP)
8	8CSC	Civil Society	Representative of the Environmental NGO
9	9FGC	Federal Government	Representative of the Environmental Ministry (MADS)
10	10AC	Academia	Representative of the Academia (Universidad de Antoquia)
11	11CSC	Civil Society	Representative of the Environmental NGO
12	12OIC	International organization	Representative of the International Organization (Multilateral Development Bank)
13	13FGC	Federal Government	Representative of the Environmental Ministry (MADS)
14	14FGC	Federal Government	Representative of the Environmental Ministry (MADS)
15	15FGC	Federal Government	Representative of the National Planning Department (DNP)
16	16LGC	Legislative power	Representative of Sub national government
17	17LPC	Legislative power	Representative of the legislative power
18	18OIC	International Organization	Former governmental representative, now representative of an International Organization
	Regional Interviews		
	Code	Sector	
1	1R	Regional	Expert on climate negotiations
2	2R	Regional	Representative of the regional foundation
3	3R	Regional	Former Representative of the UNFCCC
4	4R	Regional	Representative of a Multilateral Development Bank

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