Coalitions in political process to promote bioenergy: the cases of carbon tax in Sweden and the RenovaBio in Brazil

Coalizões no processo político para promover bioenergia: os casos do imposto de carbono na Suécia e o RenovaBio no Brasil
Coalitions in political process to promote bioenergy: the cases of carbon tax in Sweden and the RenovaBio in Brazil

Coalizões no processo político para promover bioenergia: os casos do imposto de carbono na Suécia e o RenovaBio no Brasil

Thesis presented to the School of Mechanical Engineering of the University of Campinas in partial fulfillment of the requirements for the degree of Doctor in Energy System Planning.

Tese apresentada à Faculdade de Engenharia Mecânica da Universidade Estadual de Campinas como parte dos requisitos exigidos para a obtenção do título de Doutora em Planejamento de Sistemas Energéticos.

Orientador: Prof. Dr. Marcelo Pereira da Cunha
Morilla, Cecília Higa Gonzales, 1986-
M825c Coalitions in political process to promote bioenergy : the cases of carbon tax in Sweden and the RenovaBio in Brazil / Cecília Higa Gonzales Morilla. – Campinas, SP : [s.n.], 2019.

Orientador: Marcelo Pereira da Cunha.
Tese (doutorado) – Universidade Estadual de Campinas, Faculdade de Engenharia Mecânica.


Informações para Biblioteca Digital

**Título em outro idioma:** Coalizões no processo político para promover bioenergia : os casos do imposto de carbono na Suécia e o RenovaBio no Brasil

**Palavras-chave em inglês:**
Coalitions
Public policies
Carbon market
Bioenergy
Biofuels
Biomass

**Área de concentração:** Planejamento de Sistemas Energéticos

**Titulação:** Doutora em Planejamento de Sistemas Energéticos

**Banca examinadora:**
Marcelo Pereira da Cunha
João Paulo Cândia Veiga
Pedro Feliú Ribeiro
Manoel Regis Lima Verde Leal
Arnaldo Cesar da Silva Walter

**Data de defesa:** 20-09-2019

**Programa de Pós-Graduação:** Planejamento de Sistemas Energéticos
Coalitions in political process to promote bioenergy: the cases of carbon tax in Sweden and the RenovaBio in Brazil

Autor: Cecilia Higa Gonzales Morilla
Orientador: Marcelo Pereira da Cunha
A Banca Examinadora composta pelos membros abaixo aprovou esta tese:

Prof. Dr. Marcelo Pereira da Cunha, Presidente
Instituto de Economia/Universidade Estadual de Campinas (UNICAMP)

Prof. Dr. João Paulo Cândia Veiga
Departamento de Ciência Política da Faculdade de Filosofia Letras e Ciências Humanas da Universidade de São Paulo (FFLCH/USP)

Prof. Dr. Arnaldo Cesar da Silva Walter
Departamento de Energia da Faculdade de Engenharia Mecânica da Universidade Estadual de Campinas (FEM/UNICAMP)

Dr. Manoel Regis Lima Verde Leal
Centro Nacional de Pesquisa em Energia e Materiais (CNPEM)

Prof. Dr. Pedro Feliú Ribeiro
Instituto de Relações Internacionais da Universidade de São Paulo (IRI/USP)

A Ata da defesa com as respectivas assinaturas dos membros encontra-se no SIGA/Sistema de Fluxo de Dissertação/Tese e na Secretaria do Programa de Planejamento de Sistemas Energéticos da Faculdade de Engenharia Mecânica.

Campinas, 20 de setembro de 2019
I’m sorry, but I don’t want to be an emperor. That’s not my business. I don’t want to rule or conquer anyone. I should like to help everyone - if possible - Jew, Gentile - black man - white. We all want to help one another. Human beings are like that. We want to live by each other’s happiness - not by each other’s misery. We don’t want to hate and despise one another. In this world there is room for everyone. And the good earth is rich and can provide for everyone. The way of life can be free and beautiful, but we have lost the way.

Greed has poisoned men’s souls, has barricaded the world with hate, has goose-stepped us into misery and bloodshed. We have developed speed, but we have shut ourselves in. Machinery that gives abundance has left us in want. Our knowledge has made us cynical. Our cleverness, hard and unkind. We think too much and feel too little. More than machinery we need humanity. More than cleverness we need kindness and gentleness. Without these qualities, life will be violent and all will be lost....

The aeroplane and the radio have brought us closer together. The very nature of these inventions cries out for the goodness in men - cries out for universal brotherhood - for the unity of us all. Even now my voice is reaching millions throughout the world - millions of despairing men, women, and little children - victims of a system that makes men torture and imprison innocent people.

To those who can hear me, I say - do not despair. The misery that is now upon us is but the passing of greed - the bitterness of men who fear the way of human progress. The hate of men will pass, and dictators die, and the power they took from the people will return to the people. And so long as men die, liberty will never perish. ....

Soldiers! don’t give yourselves to brutes - men who despise you - enslave you - who regiment your lives - tell you what to do - what to think and what to feel! Who drill you - diet you - treat you like cattle, use you as cannon fodder. Don’t give yourselves to these unnatural men - machine men with machine minds and machine hearts! You are not machines! You are not cattle! You are men! You have the love of humanity in your hearts! You don’t hate! Only the unloved hate - the unloved and the unnatural! Soldiers! Don’t fight for slavery! Fight for liberty!

In the 17th Chapter of St Luke it is written: “the Kingdom of God is within man’” - not one man nor a group of men, but in all men! In you! You, the people have the power - the power to create machines. The power to create happiness! You, the people, have the power to make this life free and beautiful, to make this life a wonderful adventure.

Then - in the name of democracy - let us use that power - let us all unite. Let us fight for a new world - a decent world that will give men a chance to work - that will give youth a future and old age a security. By the promise of these things, brutes have risen to power. But they lie! They do not fulfil that promise. They never will!

Dictators free themselves but they enslave the people! Now let us fight to fulfil that promise! Let us fight to free the world - to do away with national barriers - to do away with greed, with hate and intolerance. Let us fight for a world of reason, a world where science and progress will lead to all men’s happiness. Soldiers! in the name of democracy, let us all unite!

(Final speech from The Great Dictator)
Dedicatory

I dedicate this work to the people I helped during my volunteer job at the Red Cross in the slums in the city of São Paulo, although it feels as though they have helped me a great deal more than I have ever done for them.

I dedicate this thesis to them, wishing the world could be a happier, brighter and more decent place to live, mainly in Brazil and in the Latin America.
Acknowledgments

First of all, I wish to express my gratitude to my supervisor Dr. Prof. Marcelo Pereira da Cunha for the excellent guidance and supervision provided at the School of Mechanical Engineering within the University of Campinas (FEM/UNICAMP).

I am also very grateful to Prof. Semida Silveira for giving me the opportunity to join the Energy and Climate Studies Unit at the Royal Institute of Technology (ECS/KTH) in Sweden. Her perspective, contribution, and support were fundamental.

I am very grateful to Prof. Joaquim Seabra and Prof. Arnaldo Walter for helping me achieve my basic knowledge and skills at the energy department, giving me a new perspective in this area at FEM/UNICAMP.

Thanks to Prof. Carla Kazue and especially Prof. Ennio for their support, courtesy and attentiveness at FEM/UNICAMP.

I am also very thankful to Prof. Janina Onuki, Prof. Amâncio, Prof. João Paulo Cândia Veiga and Prof. Pedro Feliú Ribeiro from the International Relations Institute at the University of São Paulo (IRI/USP) for their knowledge, support and solicitude.

Thanks to UNICAMP and KTH staff, especially Rafaela, Bruna and the employees at KTH entré.

I am also grateful to all those who I have met and collaborated throughout my research projects in Brazil and Sweden. I have gained so much experience, held extremely interesting discussions, and benefitted greatly from their input in my research. Thank you for your trust and collaboration. Special thanks go to Svebio and LRF for sharing their space and expertise many times.

I am also very grateful to my nice colleagues at the Energy Department in Brazil and at the ECS in Sweden. I wish to thank Pedro, Rafael, Alisson, Natália and Carol in Brazil, and Dilip, Fumi, Maryna and Effy in Sweden for the hearty atmosphere when sharing the working space. A very special thanks to Izana in Brazil, Carolina and Huiling in Sweden – thanks for your friendship, generosity, sweetness, support and laughs.

I would like to thank my great colleagues at the Department of Energy Technology (EGI/KTH) especially Katarina, Nicklas, Osama, Jose, Vigneshi, Mohammed, Eunice, Saman, Justin and Prof. Mark Howells. My days were nicer and happier even during the Swedish winter because I had the pleasure and honor to share the workspace with you. Thanks for the nice talks and the pleasant company at the fikas.
Thanks to Prof. Claudio Lima, my supervisor on my master’s and bachelor’s at the University of São Paulo (USP). Thanks for always being supportive, for the nice talks during this course, the sound advices and encouragement.

I also would like to thank my family, especially my father for being my encourager and my mother for teaching me to develop a silent resilience. Also thanks to my older sisters for having taught me that sometimes we need to be tough, but not all the time. Thanks to Fernanda and Cristiano for the support and kindness, and to Melissa for the in-depth conversations about everything, especially politics.

A very special thanks to João Arthur Ribeiro - my main krav-magá instructor during the course of this thesis. The teachings from krav-magá are not only about effective self-defense techniques, it is much more about discipline, self-respect, overcoming limits and self-control. Thanks for having showed me that I was more capable than I realized. Thanks to Sidney, Claudio, Victor, Carlos, Roberto, Thiago, Rinaldo, Milton, Valdir and Juliana. It was a pleasure to train and learn with you for so many years. Also a very special thanks to the instructors Vanessa, Bruno and Eduardo - the world needs more people like the three of you.

Warm thanks to some very especial friends I have met during my life: Laura, Marcelo, Melanie, Mauricio and Lucas. Another very special thanks to Sebastian for the support, kindness and everything else. This journey would have been very boring without you, thanks for your friendship and generosity. Special thanks to Angella and Liz for being so kind and supportive.

Special thanks to Prof. Pedro, Dr. Regis, Prof. Amaldo Walter and Prof. João Paulo Cândia for the great input and contribution for the final version of this thesis, besides the support, time and courtesy.

Also thanks to CAPES, because this study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001.
Resumo

O objetivo desse estudo multidisciplinar é a análise da elaboração de políticas públicas na área de bioenergia, considerando um país desenvolvido no qual a agenda ambiental está estabelecida e outro em desenvolvimento, em que a agenda ambiental tem de ser conciliada com o processo de desenvolvimento do próprio país. O foco é a compreensão das forças motivadoras que levaram à adoção do imposto de carbono na Suécia em relação ao setor de aquecimento e ao programa RenovaBio no Brasil. Assim como, o entendimento da dinâmica das interações ocorridas entre os atores políticos que culminaram na adoção dessas políti cas, oferecendo interessantes percepções sobre o processo de formação de coalizões relacionado a esses estudos de caso. Uma breve análise de transparência também constitui objetivo desse estudo. O método utilizado foi a tipologia de atores em negociações bilaterais, explorando o papel dos atores políticos de acordo com uma distribuição funcional numa coalizão. Os resultados mostraram a relevância da variável econômica nas forças motivadoras identificadas para ambos os casos. Além disso, duas coalizões foram identificadas para cada um dos casos – uma coalizão de apoio e outra de oposição. A relevância da opinião pública e a participação da sociedade no processo político foram notáveis no caso sueco. Diferentemente do programa RenovaBio, no qual a opinião pública não foi considerada relevante, sendo caracterizado por um grupo minoritário encarregado de desenvolvê-lo no Brasil. A importância das questões de mercado influenciando os atores políticos a favor (ou não) de uma política e a presença de sólidos lobbies políticos foram evidentes para ambos os casos. Dessa forma, apesar dos fatores divergentes, alguns importantes pontos convergentes foram identificados nessa comparação descritiva entre um país desenvolvido e outro em desenvolvimento, mesmo considerando os diversos contextos, desenhos institucionais e períodos de análise.

Palavras-chave: coalizões, políticas públicas, mercado de carbono, bioenergia, biocombustíveis, biomassa.
Abstract

The aim of this multidisciplinary study is to analyze the policy-making processes regarding public policies inherent to the bioenergy field for both a developed country in which the environmental agenda is already established and a developing nation that is still struggling to balance the environmental agenda with its own development issues. The focus is the comprehension of the driving forces leading to the adoption of the carbon dioxide tax within the heating sector in Sweden and the RenovaBio in Brazil plus the understanding of interaction dynamics among the policy actors that led to the adoption of these policies, offering insights into a coalition formation process. A brief analysis has been also carried out. The framework utilized is the typology of actors in bilateral negotiations exploring the roles of policy actors according to functional distribution within a coalition. The results showed the importance of the economical variable within the driving forces identified for both a developed and a developing country. Two coalitions were identified for each one of the cases – a supporting and an opposing one. The influence of the public opinion and the active participation of society in the policy-making process were noticeable in the Swedish case. The public opinion was not as important for the adoption of RenovaBio which was characterized by a minority group in charge of developing this program in Brazil. The importance of market issues for the policy actors in favor (or not) of a new policy and political lobby activities were evident for both cases. Therefore, despite many factors identified, there were some important convergent points in this descriptive comparison among a developed and a developing country even when considering the different contexts, institutional designs and time of analysis.

Keywords: coalitions, public policies, carbon market, bioenergy, biofuels, biomass.
ABREVIATION LIST

ABBI - Brazilian Association of Industrial Biotechnology (Associação Brasileira de Biotecnologia Industrial)
ABBM - Brazilian Association of Biogas and Methane (Associação Brasileira de Biogás e Metano)
ABIOVE - Brazilian Association of Vegetal Oil Industries (Associação Brasileira da Indústria de Óleo Vegetal)
ANFAVEA - National Association of Automotive Vehicle Manufacturers (Associação Nacional dos Fabricantes de Veículos Automotores)
ANP - National Agency of Petroleum, Natural Gas and Biofuels
APROBIO - Association of Biofuel Producers in Brazil (Associação dos Produtores de Biocombustível no Brasil)
BRASILCOM - Association of Fuel Distributor (Associação das Distribuidoras de Combustíveis)
CBIO - Emissions Reduction Certificates
CHP - Combined Heat and Power Plant
CNPE - National Council for Energy Policy (Conselho Nacional de Política Energética)
COP - Conference of the Parties
COP 3 - Third Session of the Conference of Parties
COP 21 - Twenty-one Session of the Conference of Parties
CSD - Commission on Sustainable Development
CTBE - Bioethanol Science and Technology Center (Laboratório Nacional de Ciência e Tecnologia do Bioetanol)
DH - District Heating
ECC - Environmental Charge Commission
EMBRAPA - Agriculture Researches Brazilian Company (Empresa Brasileira de Pesquisa Agropecuária)
EPA - Swedish Environmental Protection Agency (Naturvårdsverket)
EU - European Union
FEPLANA - Federation of Sugarcane Planters in Brazil (Federação dos Plantadores de Cana-de-Açucar do Brasil)
GDP - Gross Domestic Product
GHG - Greenhouse Gas
ICSU - International Council of Scientific Unions
INDC - Intended Nationally Determined Contributions
IPCC - Intergovernmental Panel on Climate Change
LCA - Life Cycle Assessment
LO - Swedish Trade Union Confederation (Landsorganisationen i Sverige)
LRF - Federation of Swedish Farmers (Lantbrukarnas Riksförbund)
MME - Ministry of Mining and Energy (Ministério de Minas e Energia)
NDCs - Nationally Determined Contributions
NGOs - Non-Governmental Organizations
PSOL - Socialist and Liberty Party *(Partido Socialismo e Liberdade)*
RD&I - Research, Development and Innovation
REDE - Network Sustainability Party *(Partido Rede Sustentabilidade)*
SFS - Swedish Code of Status
SI - Federation of Swedish Industries *(Svenska Industrieeforbundet)*
SKGS - Swedish Energy Intensive Industry *(Skogen, Kemin, Gruvorna och Stålet)*
SNF - Swedish Society for Nature Conservation *(Svenska Naturskyddsföreningen)*
SOU - State Public Reports *(Statens Offentliga Utredningar)*
STORA - Stora Kopparberg Bergslags Aktiebolag
SVEBIO - Swedish Bioenergy Association *(Svenska Bioenergiföreningens)*
TPES - Total Primary Energy Supply
UBRABIO - Brazilian Union of Biodiesel and Biokerosene *(União Brasileira do biodiesel e bioquerosene)*
UDOP - Union of Bioenergy Producers *(União Nacional da Bioenergia)*
UN - United Nations
UNCED - United Nations Conference on Environment and Development
UNCHE - United Nations Conference on the Human Environment
UNEP - United Nations Environment Programme
UNICA - Brazilian Sugarcane Industry Association *(União da Indústria de cana-de-açúcar)*
WCP - World Climate Program
WMO - World Meteorological Organization
# TABLE OF CONTENTS

1 Introduction ........................................................................................................ 16

2 Climate Change background and cases description .............................................. 22
   2.1 Initial Considerations .................................................................................. 22
   2.2 Background of the climate change issues and important conferences .......... 22
   2.3 Cases Description ...................................................................................... 25
      2.3.1 Background of the carbon dioxide tax for the Swedish heating sector ...... 25
      2.3.2 The energy taxation system and the policymaking process referred to the adoption of the carbon dioxide tax in Sweden ............................................. 26
      2.3.3 The forestry sector in Sweden ............................................................... 29
      2.3.4 The institutional design in Sweden ....................................................... 30
      2.3.5 The Swedish law-making process ....................................................... 31
      2.3.6 The influence of institutional culture on the forestry sector in Sweden ....... 33
      2.3.7 Public acceptance of the carbon tax in Sweden ..................................... 35
      2.3.8 Description and effects of the carbon tax for the Swedish heating sector ...... 37
   2.4 Case Description of RenovaBio in Brazil ..................................................... 40
      2.4.1 Background on the RenovaBio ............................................................. 40
      2.4.2 The policymaking process for the adoption of RenovaBio in Brazil .......... 42
      2.4.3 The bioenergy sector in Brazil ............................................................. 43
      2.4.4 The institutional design in Brazil ....................................................... 45
      2.4.5 The Brazilian law-making process ..................................................... 46
      2.4.6 The influence of institutional culture focusing on the bioenergy sector in Brazil ......................................................................................................................... 47
      2.4.7 Description of RenovaBio in Brazil ..................................................... 49

3 Methodology Description ...................................................................................... 52
   3.1 Initial Considerations .................................................................................. 52
   3.2 Description of the typology of actors for bilateral negotiations .................... 52
4.8 Discussion of cases ................................................................. 79
4.8.1 Driving forces identified for the Swedish and the Brazilian cases ............ 79
4.8.2 Analysis of the coalitions identified ............................................. 81
4.8.3 Discussions over transparency .................................................... 83

5 CONCLUSION ................................................................................. 87

5.1 Initial Considerations ................................................................. 87
5.2 Conclusion ................................................................................ 87
5.3 Further Studies .......................................................................... 90

References ..................................................................................... 91

Appendix A: Interview protocol for the case of the carbon dioxide tax for the Swedish heating sector ................................................................. 99
Appendix B: Interviews for the case involving the carbon dioxide tax within the Swedish heating sector ................................................................. 101
Appendix C: Interview protocol for the case of RenovaBio in Brazil ............. 102
Appendix D: Interviews for the case involving the program RenovaBio in Brazil ...... 104
Appendix E: Conferences and workshops ................................................. 105
INTRODUCTION

“I believe that education is the single most important civil rights issue that we face today. Because in the end, if we really want to solve issues like mass incarceration, poverty, racial profiling, voting rights, and the kinds of challenges that shocked so many of us over the past year, then we simply cannot afford to lose out on the potential of even one young person. We cannot allow even one more young person to fall through the cracks.”

(Michele Obama)

The United Nations Conference on the Human Environment (UNCHE) was held in 1972 in Stockholm (Sweden) being the first conference addressing environmental issues (UNFCCC, 2006). Since then, developed nations have not been supporting the creation of a costly organization that would handle such vital issues (CHAMBERS, 2008). Regardless of that, the UNCHE set up the United Nations Environment Programme (UNEP) as an environmental awareness body of the United Nations (UN) (UNEP, 2019).

In 1992, the United Nations Conference on Environment and Development (UNCED) took place in Rio de Janeiro (Brazil) (UNFCC, 2006). However, the UNEP’s political position had been discredited. For the developing countries, UNEP overemphasized the “green northern agenda” in comparison with the “brown-on-the-ground” agenda. Afterwards, the developing countries established new treaties on desertification but not under UNEP’s coordination. At that time, some non-governmental organizations (NGOs) also addressed issues related to environmental safety and economic development balance through global forums (e.g. in the Bretton Woods Institutions). Furthermore, the developing countries started to consider green policies from the North as possible hidden protectionist measures (CHAMBERS, 2008).

In 1997, the adoption of the Kyoto protocol occurred during the third Conference of Parties (COP 3) held in Kyoto (Japan). It was one of the most important international agreements to decrease greenhouse gas (GHG) emissions through which greater responsibility was attributed to developed nations. As a result of more than 150 years of industrial activity these nations were considered the main responsible ones for the higher levels of global GHG

---

1 The “green on the northern agenda” comprised climate change and biodiversity issues and was linked to demands of the developed countries (CHAMBERS, 2008).
2 The “brown on the ground agenda” considered air pollution and clean water issues and was connected to the demands of underdeveloped countries (CHAMBERS, 2008).
emissions. Thus, the principle of common but differentiated responsibilities was adopted and
the developed countries (Annex I) had to reduce five percent of their GHG emissions taking
1990 as the base-year for the first commitment period from 2008 to 2012 (UNFCCC, 1997,

Regarding the outcome of the Kyoto Protocol, Sweden surpassed its national target due
to efficient public policies on transportation, industry and agriculture, among other sectors
(HANSSON, 2015; HAITA, 2012; IEA, 2016; UNFCCC, 1997, 2016). The country is
characterized by a low population, a moderate economic growth and a national agenda that
contemplates environmental issues and sustainable development. In addition to that, the
relevance of environmental issues is also connected to the regional economic and
environmental interdependency (e.g. Nordic cooperation) (IAEA, 2009).

Besides its own environmental awareness, the country has been a member of the
European Union (EU) since 1995. The EU is characterized by having made serious
commitments towards environmental awareness issues (OECD, 2001). As for the Swedish
climate policy, the carbon dioxide tax is a cornerstone on which public dialogue and social
deliberations were fundamental (FUNKE and MATTAUCH, 2018). The tax was created before
the Kyoto Protocol in 1991 and was considered innovative having the support from the public
opinion (JAGERS and HAMMAR 2009). It was levied on fossil fuels for transportation and
heating purposes with the aim of reducing CO₂ emissions (NATURVÅRDSVERKET, 2017;
PMR, 2017). However, the effect of taxation on the heating sector led to a sharp reduction in
heating related fossil fuels whereas a fossil-fuel free transportation system still remains a
challenge to be dealt with (SWEDEN, 2018).

Subsequently, through the twenty-one Conference of Parties (COP 21) the Paris
Agreement was entered into in order to tackle climate change mitigation with a view to limit
warming to no more than 2° C above pre-industrial levels. Each country efforts to reduce
domestic emissions were exposed by Nationally Determined Contributions (NDCs) (UNFCCC,
2015; 2016). According to the Brazilian commitment, the country should reduce its emission
by 37% below 2005 levels, by 2015. Currently, the country is characterised by an economic
growth that led to expansion in agriculture and infrastructure. This expansion led to a higher
energy utilization, increasing the environmental burden. Within this context, a better integrated
environmental target for the economic and policy sectors would contribute to a greener and
more sustainable development approaches in Brazil (OECD, 2015).

Accordingly, the Ministry of Mining and Energy (MME) developed the National
Biofuels Policy (RenovaBio) to encourage the use of bioenergy in Brazil. This program is
important because it follows a perspective through which the climate change and GHG emissions have been taken into account in order to develop an energy policy (BRASIL, 2017). The two above-mentioned policies concerning Swedish carbon dioxide tax and RenovaBio, respectively, are examples of how the environmental agenda set up on the international level can directly and indirectly influence domestic policies at local levels for both developed and developing countries.

In the light of the foregoing and considering environmental and climate issues, this thesis analyses two bioenergy policies, using as reference a developed and a developing country. The first analysis is the Swedish carbon dioxide tax and it focuses on the heating sector. The second analysis refers to RenovaBio in Brazil. Therefore, this multidisciplinary study is a descriptive comparison between a developed country in which the environmental agenda is already regarded as fundamental and a developing nation that is still struggling towards combining development with its environmental agenda and energy policies. It is worth mentioning that this is not an absolutely rigorous comparative analysis since the cases in question are temporarily, institutionally and contextually diverse.

Thus, the question over this study is:

How did the policy-making processes of the Swedish carbon dioxide tax focusing on the heating sector and the RenovaBio in Brazil take place from planning to adoption?

Taking into account the heuristic model for explaining policy-making process, the (i) problem identification\(^3\) and definition is the first stage, followed by (ii) agenda setting\(^4\), (iii) policy formulation\(^5\), (iv) policy legitimation\(^6\), (v) policy implementation\(^7\), and (vi) policy evaluation\(^8\), as shown in Figure 1.1 below.

---

\(^3\) Problem identification and definition is the recognition of an existing problem (RINFRET et al., 2018).

\(^4\) Agenda setting refers to the inclusion of a problem in the policymaker agenda (RINFRET et al., 2018).

\(^5\) Policy formulation is characterized by the design of a policy taking shape (RINFRET et al., 2018).

\(^6\) Policy legitimation is the process in which a bill becomes a law (RINFRET et al., 2018).

\(^7\) Policy implementation is the deployment of the law after its enforcement (RINFRET et al., 2018).

\(^8\) Policy evaluation is the evaluation of policy effectiveness (RINFRET et al., 2018).
In this study the analysis contemplates (i) problem identification and definition, (ii) agenda setting, (iii) policy formulation, and (iv) policy legitimation. To streamline the analysis, these stages are mentioned as planning, formulation, and adoption of public policy referring to (i), (ii), (iii) and (iv), respectively. As for the research design and methodology, the characterization of the policy actors’ profiles that can be performed through some parameters were considered. In particular, the roles connected to the distribution of functions in a coalition have been considered in this thesis. Thus, the framework used is the typology of actors in bilateral negotiations in order to analyse the joint actions of a coalition working in concert to achieve established goals.

Therefore, the objectives of this study are:

- Analyse the policy processes that led to planning, formulation, and adoption of the carbon dioxide tax for the Swedish heating sector;
- Analyse the policy processes that led to planning, formulation, and adoption of RenovaBio in Brazil;
- Brief analysis over the transparency of public policies in a developed as well as in a developing country.

Accordingly, it is worth mentioning the following:

- The understanding of the driving forces that led to the adoption of the carbon dioxide tax for the Swedish heating sector;
• The understanding of the driving forces that led to the adoption of RenovaBio in Brazil;
• The understanding of the dynamics of interactions among the policy actors that encouraged the adoption of the carbon dioxide tax for the Swedish heating sector, offering insights into a coalition formation process;
• The understanding of dynamics of interactions among the policy actors that eventually encouraged the adoption of the RenovaBio in Brazil, offering insights into a coalition formation process.

Taking into account the analysis of the driving forces, the hypothesis for this study is:

H1: The environmental agenda is the main driving force for developed and developing countries when adopting energy policies.

This study is important for policy-makers, decision-makers, and stakeholders willing to decarbonize the energy matrices of their countries through increasing bioenergy use in developed and developing countries. The analysis over the policy-making processes can reveal significant outcomes. Furthermore, the analysis of the driving forces for a developed and a developing country can explore the real importance of the environmental driver for both scenarios. Also, understanding the dynamics of interactions among the policy actors that led to the adoption of these policies is important because such dynamics can be applied to previous or former policies thus allowing them to be considered in other contexts. The same is applicable to the understanding of the roles according to a functional distribution within a coalition. Finally, a transparency analysis is fundamental for both Swedish and Brazilian societies as they are truly impacted by the energy policies analysed and their related outcomes. Nevertheless, the understanding of the whole policy-making process is also vital for these societies for the same reasons.

The thesis follows the structure showed in Figure 1.2
Figure 1.2. Thesis structure (elaborated by the author).
2 CLIMATE CHANGE BACKGROUND AND CASES DESCRIPTION

“Never forget that everything Hitler did in Germany was legal”
(Martin Luther King)

2.1 Initial Considerations

In this descriptive chapter, the background on climate change issues and the important conferences thereof are explored under section 2.2. The first case description is presented in section 2.3. Background information on the carbon dioxide tax for the Swedish heating sector is initially explored under subsection 2.3.1. Subsequently, the energy taxation system and policymaking process regarding the implementation of the carbon dioxide tax in Sweden is presented. Afterwards, the forestry sector is explored followed by the institutional design and the Swedish law-making process. Thereafter, the influence of institutional culture focusing on the forestry sector in Sweden and public approval of the carbon dioxide tax in Sweden are addressed. Finally, the description and effects of the carbon dioxide tax focusing on the heating sector is presented. The second case presented is the RenovaBio in Brazil under the section 2.4. Then, the background on this program is explored. Subsequently the policymaking process for the adoption of RenovaBio in Brazil is presented. After that, the bioenergy sector in Brazil is explored followed by the institutional design in Brazil and the Brazilian law-making process. Thereafter, the influence of institutional culture focusing on the bioenergy sector in Brazil is addressed. Finally, the description of RenovaBio in Brazil closes this Chapter.

2.2 Background of the climate change issues and important conferences

The greenhouse effect is a natural phenomenon responsible for the maintenance of all living beings through a perfect balance between entry and exit of sun energy. The balance from the radiation absorbed for the planet surface and the atmosphere occurs in the troposphere. This is the highest layer of the atmosphere which borders the mesosphere where the infrared
radiation leaves. The trapping of this radiation by natural gases from the atmosphere is responsible for maintaining the proper temperature for supporting life within the terrestrial system (IPCC, 1994).

The unbalance in trace gases concentrations in the atmosphere generates an increase in temperature which is referred to as global warming. Climate changes have been linked to gradual and slow cycles from 50 to 100 years. However, evidences link the accelerated characteristics of the global warming phenomenon to the release of GHG in the atmosphere due to the excess of CO$_2$ released in the atmosphere through fossil fuels burning, destruction of forests and use of fertilizers, among other actions (IPCC, 1994; LEAHY, 2004).

The excessive GHG emissions in the atmosphere promotes a gas layer formation. This layer allows the ultraviolet rays entry but prevents the heat radiation generated by sunlight from entering the atmosphere. This phenomenon is transforming the Earth in a big greenhouse. The main consequence is the global warming which has an influence on the alteration of ecosystems. It also impacts the bio-geochemical cycles, mainly in water and carbon cycles. The most important GHG are: water vapour (H$_2$O), carbon dioxide (CO$_2$), methane (CH$_4$), nitrous oxide (N$_2$O), oxides of nitrogen (NO$_x$), ozone (O$_3$), carbon monoxide (CO) and chlorofluorocarbons (CFC) (IPCC, 1994; LIMA et al., 1999).

In the 1980s, evidences connecting GHG emissions caused by anthropogenic activities and linked to global warming started to be noticed by the population as a whole. Prior to that, in 1972, the UNCHE was the first conference held on international environmental issues and it was very important because such matters reached such dimensions that it started to be discussed on a political level. The conference was organized by the UN and took place in Stockholm (Sweden) (UNFCC, 2006).

However, some issues concerning coordination over the creation of a new agency were discussed at that conference. The existing UN agencies in charge of environmental issues were apprehensive in case they were rendered subservient or even made redundant by the creation of a new agency. And the developed countries presented strong resistance against creating new and costly organizations for handling environmental issues at that time (CHAMBERS, 2008).

Indeed, the climate change and environmental issues were regarded as urgent matters in 1979 at the First World Climate Conference. At that time, there was the establishment of a World Climate Program (WCP) under the World Meteorological Organization (WMO), the UNEP and the International Council of Scientific Unions (ICSU) (UNFCC, 2006). Later on in 1988 the United Nations General Assembly considered climate change as a common concern of humanity at the Toronto Conference on the Changing Atmosphere. Afterwards, the
Intergovernmental Panel on Climate Change (IPCC) was established and the First Assessment Report was disclosed in 1990 (UNFCC, 2006).

This report was the main basis for negotiations at the United Nations General Assembly on a climate change convention held by policymakers, still in 1990 (UNFCC, 2006). In 1992, a general discussion over environmental factors resulted in an important outcome at the UNCED. The principle of common but differentiated responsibilities emerged and the developed countries were held responsible for the substantial rise in levels of GHG emissions. Then, a higher level of emissions was allowed for developing countries in order for them to achieve the conditions of developed countries as mutual cooperation among countries should be on an equal basis (UN, 1992).

Analogously to the UNCHE, the UNCED also presented issues of coordination since the UNEP’s coordinating role on environmental governance was being discredited by other governments. The UNEP was overemphasizing the interests of developed countries in comparison with the concerns of developing countries. The “green northern agenda” represented the interests of developing countries whereas the “brown-on-the-ground” agenda followed the interests of developing nations. The first one addressed climate change issues and biodiversity and the second one matters concerning air pollution and water, among others, as referred to in the introduction (CHAMBERS, 2008).

Therefore, since the UNEP’s political position was declining and the agenda of developing countries was not being considered relevant, these countries followed new paths. They pursued new agreements on desertification and climate change at the UNCED. Besides that, the Commission on Sustainable Development (CSD) was created under the UN Department of Economic and Social Affairs also with the aim of meeting the demands of developing countries at that conference (CHAMBERS, 2008).

In 1995, the first Conference of the Parties (COP) was held in Berlin. In the following year, the human influence on global climate was perceived as evident also presenting risks for human and economic development according to the Second Assessment Report by IPCC. This report influenced the COP 3 that took place in Kyoto (Japan) in 1997 when the Kyoto Protocol was adopted. This Protocol entered into force on February 16, 2005 (UNFCC, 2006).

Since then, several conferences were held and in 2015 the COP 21 occurred in Paris (France), having the drawing of the Paris Agreement as the main outcome. Pursuant to this agreement, the nations were required to intensify their activities and investments towards achieving a more sustainable low carbon future. Therefore, the Intended Nationally Determined Contributions (INDC) represented the efforts that would be put forth for maintaining the global
temperature rise below 2° C above pre-industrial levels. In addition, an appropriate financial flow and an initiative for capacity building would be essential for accomplishing the ambitious targets established by the INDCs. Finally, it is also important that these actions can support developing and vulnerable countries since the Paris Agreement stresses the necessity to deal with the impacts of climate changes (UNFCCC, 2015; 2016).

However, it is worth bearing in mind that the global contexts involving the UNCHE in Stockholm and the UNCED in Rio de Janeiro represented missed opportunities for modifications towards improvements. The international environmental governance could have benefited from a solid reform during these conferences. Furthermore, the coordination issues became more complex over time (CHAMBERS, 2008). Therefore, it is important that the Paris Agreement will not represent just another missed opportunity through which international politicians make empty promises that will never be kept. Indeed, the real meaning of the Paris Agreement will become evident only over the next few years (CLEMENÇON, 2016).

2.3 Case Description of the Swedish carbon dioxide tax

2.3.1 Background of the carbon dioxide tax for the Swedish heating sector

After the Second World War, Sweden was highly dependent on imported oil. In the 1970s, the country imported 70-80% of its overall oil consumption. Despite abundant forests in the countryside, even farmers used heating oil in the boilers instead of firewood due to the offsetting oil price (KJELL, 2015). Nevertheless, in 1973 the oil price increased in the global market due to the oil shock crises. The Swedish Government imposed the rationing of oil products but the consequences of the oil shock crises for the Swedish economy were dramatic (KABERGER, 2007; KJELL, 2015).

Concurrently with the facts mentioned above, an intense debate on nuclear power emerged in the country in the same period. Between the late 1970s and mid 1980s there were nuclear accidents at Three Mile Island in Pennsylvania and Chernobyl leading to further discussions against nuclear power. In the same period, a growing interest in domestic energy sources (e.g. peat, woodchips) was noted. Besides that, research on renewable energy sources started to take place including not only biomass but also wind and solar power energy. Regarding bioenergy, different processes to use biomass in a more efficient way were being
considered (ERICSON and WERNER, 2016). Subsequently, the nuclear debate and the country’s oil dependency triggered a growing trend towards alternative energy sources among Swedish society (KABERGER, 2007; KJELL, 2015).

In the 1980s, a referendum on nuclear power took place in Sweden and the Parliament decided to phase it out by 2010. In addition to that, the discussions on oil replacement became stronger (ERICSON and WERNER, 2016; JOHANSSON, 2000; PMR, 2017). Also investment grants to support bioenergy development were provided by the Swedish Government to convert boilers and heat plants. Initially, it was to replace oil by peat and woodchips, among others. However, this financial support also covered the installation of coal boilers (KJELL, 2015).

At that time, the climate change issue had not been fully considered as an important political factor. Oil prices had decreased and the use of bioenergy grew moderately (KJELL, 2015). However, in the late 1980s a growing public concern on the environment had been given rise in developed countries and Sweden followed that trend (HARRISON, 2005).

In the 1990s, Sweden was one of the first countries to introduce a carbon dioxide tax on fossil fuels and did so as a part of a major tax reform. The tax adoption promoted a dramatic change in the heating sector. Fossil fuels became more expensive for the final user and consequently renewable fuels became more competitive (SCHARIN and WALLSTRÖM, 2018). Since then, a deep transformation in the Swedish district heating (DH) happened, culminating with the phasing out of oil in the heating market for boilers and heat plants. Additionally, investment grants to support new combined heat and power plants (CHPs) using biomass to produce bio-electricity were also provided in the 1990s (KJELL, 2015).

2.3.2 The energy taxation system and the policymaking process referred to the adoption of the carbon dioxide tax in Sweden

“People are suffering. People are dying. Entire ecosystems are collapsing. We are at the beginning of a mass extinction and all you can talk about is money and fairy tales of eternal economic growth. How dare you

(Greta Thunberg)
The energy taxation in Sweden is long-standing – oil has been taxed since 1924 and diesel since 1937 (HAMMAR and ÅKERFELDT, 2011). An energy tax has also been levied on the electricity, oil and coal used for heating purposes since the 1950s. This tax was a financial tool that aimed at increasing public revenues (SCHARIN and WALLSTRÖM, 2018). However, due to the oil shock crises the energy tax was also considered a way to cut down the oil dependence during the 1970s (ENERGIMYNDIGHETEN, 2006). In 1968, Erik Dahmén⁹ wrote a book in which he supported a pricing for environmental damages caused by Swedish society (DAHMÉN, 1968). On one hand, the fact that environmental fees make possible for polluters to buy the right to pollute was a common objection against it. On the other hand, a system without pricing allows the polluters to pollute indiscriminately despite the costs generated by the emissions to society (SCHARIN and WALLSTRÖM, 2018).

In the 1970s, the Social Democrat Party was the dominating political party and expressed scepticism on implementing economic instruments for protecting the environment. This party endorsed administrative instruments (e.g. rules and laws) because the idea of buying off the obligation to reduce environmental damages was not supported by it (SCHARIN and WALLSTRÖM, 2018). Furthermore, when global warming discussions and related issues emerged, the environmental and business groups put forward efforts in terms of trying to lobby the government. The Swedish Parliament (Riksdag) drew attention to these issues in 1988 through a national policy on climate change which sustained two main points: the decreasing of CO₂ and the adoption of a carbon dioxide tax to reduce the demand for fossil fuels (JOHNSON, 1998).

Accordingly, the Environmental Charge Commission (ECC) was created in 1988 to assess possibilities for applying economic instruments on energy and transportation. The proposition of policy instruments (e.g. carbon dioxide tax) was also aimed by the ECC. The first report including fees and taxes was published in 1989 (SCHARIN and WALLSTRÖM, 2018). The ECC was comprised of several interest groups that permeated the Swedish society (e.g. the Federation of Swedish Farmers (Lantbrukarnas Riksförbund - LRF), the Swedish Environmental Protection Agency (Naturvårdsverket - EPA), the Swedish Trade Union Confederation, the Confederation of Swedish Enterprise, the steel industry, the petrochemical industry, experts and political parties) (SCHARIN and WALLSTRÖM, 2018). Furthermore, the major tax reform was also being outlined to reduce the income tax for the general population (SCHARIN and WALLSTRÖM, 2018; NATIONALENCYKLOPEDIN, 2017).

⁹ Erik Dahmén was a professor of Economics in Sweden (SCHARIN and WALLSTRÖM, 2018).
As expected, from one side the environmental groups endorsed the adoption of a carbon
dioxide tax and they were supported by the Centre and Left parties lobbying parliament in favor
of the tax. Indeed, the Liberal Party, the Green Party and the EPA agreed on the replacement
of the energy tax by the carbon dioxide tax because the respective purpose was purely financial
whereas this was in fact connected to climate change issues. The Centre Party and the
Federation of Swedish Farmers endorsed the adoption of the tax claiming benefits over
bioenergy production (SCHARIN and WALLSTRÖM, 2018).

From the other side, the industry sector and the Federation of Swedish Industries
(Svenska Industriefoerbundet)\(^{10}\) lobbied parliament to decline the carbon dioxide tax
(JOHNSON, 1998). They were concerned that a higher tax burden would impact their business.
In addition to that, the industry sector was granted deductions over the energy tax. Driven by
fear of losing these benefits they did not support the adoption of the carbon tax. The Moderate
Party was also against the adoption of the carbon dioxide tax in Sweden (SCHARIN and
WALLSTRÖM, 2018).

However, within parliament the idea of a carbon dioxide tax was not strongly opposed
as society was quite used to high levels of taxation. Plus, the majority of Swedish
parliamentarians had a public sector background (JOHNSON, 1998). The Social Democratic
Party was strongly involved in the discussions surrounding the carbon dioxide tax. The party
needed support in parliament due to the major tax reform that was also being negotiated at the
same time (SOU, 1989; 2007). After a long negotiation process involving the policy actors
mentioned above, a political consensus was reached on the adoption of the carbon tax
(SCHARIN and WALLSTRÖM, 2018).

A broad hearing for the carbon tax adoption took place. Subsequently, the respective
bill proposing it was sent to the parliament (Prop. 1989/90:111). Then, the parliament decided
to implement the carbon tax by law (SFS 1990:582) (SCHARIN and WALLSTRÖM, 2018).
Concomitantly with the adoption of the carbon dioxide tax, the parliament also decreased
income taxes (JOHNSON, 1998). In addition, some substantial concessions were applied to the
industry. Indeed, the carbon tax protected energy-intensive industries (e.g. pulp and paper,
cement, iron and steel, chemicals) from paying higher taxes. Nonetheless, in 1996 a standard
carbon taxation was applied for all branches of the manufacturing sector (SWEDEN, 1994).
Even so, the idea of taxing energy due to CO\(_2\) emissions was relatively acceptable by Swedish

\(^{10}\) The Federation of Swedish Industries (Svenska Industriefoerbundet) was an umbrella company for the
manufacturing group (JOHNSON, 1998).
society (SWEDEN, 1991; SCHARIN and WALLSTRÖM, 2018), as explored in the next sections.

2.3.3 The forestry sector in Sweden

The welfare state built by the Swedes has a connection with the forestry industry sector (e.g. timber and pulp and paper industries). Within this sector, Swedish companies are among the global leaders. As a result, rigid forest laws led to the increase of substantial production levels within the sector, mainly in relation to the pulp and paper sector. However, the increase of the conservation lobby controlled the rise of the referred production levels in the 1990s (HAMILTON, 1997).

Later on, bioenergy production was stimulated and expanded rapidly. From the Kyoto period until 2015, the increasing use of bioenergy was the major element behind the reduction of GHG emissions in Sweden (KJELL, 2015). The largest source of raw material used to generate bioenergy is concentrated in forests. The by-products generated from sawmills (e.g. bark and wood chips), pulp mills (e.g. bark) and forest operations (e.g. branches and tops) can be utilized to produce energy in heat plants and CHP plants (JOELSSON and ATHANASSIADIS, 2015).

The forestry industry sector in Sweden is comprised by the following: the pulp and paper industry, the sawmill industry, the wood board industry, the production of packaging from wood, paper and board, the carpentry industry and the industry for the manufacture of refined wood fuel. Furthermore, the forestry sector includes the producers and suppliers of forest feedstock to the industry (JOELSSON and ATHANASSIADIS, 2015). The pulp and paper industry in Sweden plays an important role in the economy, promoting a substantial contribution to the trade balance. It is an energy intensive and export-oriented industry, having a renowned process optimization to compete in the global market (STENQVIST et al., 2011).

The sawmill industry can be classified in two main categories. The first one is connected to the large forest industry producing saw wood in parallel to the manufacture of pulp and paper, among other forest products. The second one is not linked to other industries. The other companies forming the forestry industry such as the wood board industry and the wood refining companies (e.g. manufacturers of wooden houses and furniture) are smaller and represent a minor economic importance. The forest ownership structure in Sweden encompass a mixture
of family companies and corporate ownership. Furthermore, the state is also an important ownership in Sweden (JOELSSON and ATHANASSIADIS, 2015). Figure 2.1 shows the relevance of the forest sector on a global scale.

![Figure 2.1. Sweden’s share of the world’s (FOREST AND FORESTS IN SWEDEN, 2015)](image)

2.3.4 The institutional design in Sweden

Sweden presents a parliamentary democracy through which people are represented by the Swedish parliament that holds a legislative power. The Swedish Government implements the parliament’s decisions and also develops proposals for the creation of new laws. The general elections take place every four years when the population have the opportunity to influence the parties representing them in the parliament, county and municipal councils. Therefore, the voters elect those who will decide on how Sweden will be administered and governed (SWEDEN, 2014).

In addition to that, the country counts on three levels of government – national, regional and local. Moreover, the European level is also important as Sweden has been an EU member since 1995. Taking into account the national level, the parliament represents the Swedes, counting on legislative power as referred above. Still considering the national level, the Swedish Government presents the proposals for new laws and also implements the resolutions that are handed down by the parliament. Also, the Government Offices have the role to assist the Swedish Government. They hold a substantial number of ministries, and approximately 400 central governmental agencies and public administrations. As for the regional level, the country is divided in 21 counties. The political tasks are duties of the county councils in general
Pursuant to the local level, Sweden comprises 290 municipalities, having a proper municipal council which is an elected assembly and taking decisions over municipality matters. This council is responsible for appointing the municipal executive board as well as to lead and organize the work related to that municipality. Finally, the European level is also important in Sweden. Due to its entry in the EU in 1995, the country acquired the European level of government. Therefore, when new rules are created and approved within EU, Sweden participates in the respective decision-making process. The country is represented by the Government in the European Council of Ministers, that is, the EU’s main decision-making body (SWEDEN, 2015).

2.3.5 The Swedish law-making process

The Government begins the process of submitting legislative proposals to the Swedish Parliament. However, the members of parliament and some committees can also submit new legislative proposals to the Swedish Parliament, characterizing the first phase for legislative change (SWEDEN, 2016). Afterwards, a commission of inquiry will analyse and evaluate the issue discussed thereof before the elaboration of a legislative proposal by the government comprising the inquiry stage. The inquiry bodies work independently from the Government. They are formed by public officials, experts in different fields, and politicians that prepare the inquiry report presenting the respective proposals. These reports are published by the Swedish Government\(^{11}\) (SWEDEN, 2015).

Thus, the consultation process takes place and the inquiry report is circulated among important consultation bodies (e.g. governmental agents, local authorities and interest groups) that will be impacted by the proposal. Whenever the majority of these bodies are opposing a recommendation the government will work towards an alternative solution. This stage is fundamental because it provides useful feedback and also allows the government to measure any given support for a proposal (SWEDEN, 2016).

After the consultant bodies have handed down their comments, the ministry responsible can then draft the bill which will be submitted to the parliament. The inquiry report and the

\(^{11}\) These reports are named Statens Offentliga Utredningar (SOU)
suggestions from the consultation bodies are important because the members of the Government need to achieve consensus before a bill is settled. Then, the consultation of the Council on Legislation is the next step. It is important to assure conformity with the legal system and accordance with a statute with constitutional law. The Council on Legislation is a consultative body, and not a decision-making element (SWEDEN, 2015).

Following the parliamentary process, once the committee has concluded on its deliberations a report is submitted and the respective bill is handed to parliament for approval. Once the bill is approved, it becomes a law. In general, a law is enacted through a single majority choice of the parliament. However, through the standing committees, the members of parliament can settle a counter-proposal or amendment for a new bill. In the cases in which the counter-proposal is adopted by the parliament, the government is compelled to implement the provisions thereof. Finally, after the successful course through parliament is verified, a new law will be promulgated by the Swedish Government. The new laws are issued in compliance with the Swedish Code of Status (SFS) (SWEDEN, 2015). Figure 2.2 sums up this process.

![Figure 2.2. The Swedish law-making process (SWEDEN, 2016).](image-url)
The institutional decision-making cultural feature in Sweden is characterized by egalitarian collectivism that focuses on a broad and strong social welfare. The participation of different policy actors is also a remarkable characteristic thereof (SOU, 1998), being based on the ideals of equality and moderation. Consensus and regard for others is also part of the Swedish values (JOHNSON, 1998). Additionally, the country presents an informal structure and an openness oriented culture in comparison with other European fellow countries (TÖRNKVIST, 2013).

A culture of transparency is also noted for lobbying activities (TÖRNKVIST, 2013). The members of the parliament, industry in general and NGOs frequently know each other because Sweden is such a small country. Within this context, lobbying is informally promoted across personal networks and is referred to as “brotherhood corruption” (JOHNSON, 1998). Indeed, lobbying in Sweden is also considered an instrument of communication and lobbyists are messengers communicating information to decision-makers (SOU, 1998). Furthermore, there are no specific rules about the access to key documents and to the parliament. In other words, Swedish politicians do not regulate lobbying (TÖRNKVIST, 2013).

Furthermore, the participation of several policy actors within the institutional decision-making process turns lobbying into a time-consuming duty (SOU, 1998). Besides that, an isolated politician rarely would act outside its party platform. In general, lobbyists focus their efforts on trying to influence the public opinion and the parties as a whole instead of a politician alone. Therefore, a slow and broader strategy is demanded, for tackling many fronts (TÖRNKVIST, 2013). Moreover, when parliament approves a legislation it means that the matter in question has already been broadly discussed through negotiations between the interested groups12 (e.g. NGOs, companies, municipalities and government organizations) (LOEFSTEDT, 1993).

Regarding the forestry sector in Sweden, the pulp and paper industry has an important economic significance and a consequent political influence (HARRISON, 2005). Taking into account the branch associations within the industry and forestry sectors, the Swedish Trade Union Confederation (Landsorganisationen i Sverige - LO), the LRF and the Confederation of

12 The interest groups can also review and comment over the legislation suggested in the parliament by a procedure called “remiss” (LOEFSTEDT 1993).
Swedish Enterprise (Svenskt näringsliv) have been traditionally adept on exerting political pressure for a long period of time in Sweden (TÖRNKVIST, 2013).

Apart from them, the Swedish Forest Industries Federation (Skogsindustrierna) is also an active organization in this field. This federation represents 50 pulp and paper manufacturers owned by 20 groups of companies, 120 wood mechanical industries owned by 60 companies and 40 companies that have discontinued production relations with the pulp and paper industry and sawn timber manufactures (LOBBYFACTS.EU, 2019). Table 2.1 shows the lobby activity of the Swedish Forest Industries Federation from 2011 to 2018, presenting lobby costs and the lobbyists declared. Figure 2.3 shows the lobbying costs incurred over these years. Before 2001 no data was found, however this information is relevant to contextualize the next chapters.

### Table 2.1. Lobby of the Swedish Forest Industries Federation (Skogsindustrierna)

<table>
<thead>
<tr>
<th>Financial year</th>
<th>Lobbying costs</th>
<th>Lobbyists declared</th>
</tr>
</thead>
<tbody>
<tr>
<td>From October 31, 2011 to September 30, 2012</td>
<td>less than 50,000€</td>
<td>10</td>
</tr>
<tr>
<td>From October 31, 2012 to September 30, 2013</td>
<td>less than 50,000€</td>
<td>10</td>
</tr>
<tr>
<td>From October 31, 2013 to September 30, 2014</td>
<td>less than 50,000€</td>
<td>10</td>
</tr>
<tr>
<td>From October 31, 2014 to September 30, 2015</td>
<td>less than 9,999€</td>
<td>2</td>
</tr>
<tr>
<td>From December 31, 2015 to November 30, 2016</td>
<td>less than 9,999€</td>
<td>2</td>
</tr>
<tr>
<td>From December 31, 2016 to November 30, 2017</td>
<td>10,000€ - 24,999€</td>
<td>3</td>
</tr>
<tr>
<td>From December 31, 2017 to November 30, 2018</td>
<td>25,000€ - 49,999€</td>
<td>4</td>
</tr>
</tbody>
</table>

(Adapted from: LOBBYFACTS.EU, 2019)

Figure 2.3. Lobbying costs of the Swedish Forest Industries Federation (LOBBYFACTS.EU, 2019).
Taking into account the branch associations at the bioenergy sector, Graph 2.4 shows the lobbying costs incurred by the Swedish Bioenergy Association (*Svenska Bioenergiföreningens* - SVEBIO) from 2015 to 2017.

![Lobbying costs of the Swedish Bioenergy Association](LOBBYFACTS.EU, 2018).

### 2.3.7 Public acceptance of the carbon tax in Sweden

The environmental taxes are unpopular among citizens for many reasons. The legitimacy represented by public support is a challenge for the politicians, even when the population is aware of the advantages of these taxes (HAMMAR and JAGERS, 2007; BIEL and LUNDQVIST, 2007). This is mainly because environmental taxes focus on the symptoms and not on deep value transformations within society (DOBSON, 2003). Nevertheless, citizens have a higher tendency to endorse environmental taxes when they rely on their co-citizens (e.g. when they believe that others will pay the related share) and on their politicians (HAMMAR and JAGERS, 2006).

Taking into account the public perception of the carbon pricing schemes (e.g. carbon taxes) the reasons of (un)popularity are also connected to (i) political trust, (ii) low corruption stage and (iii) cultural world perspectives (FUNKE and MATTAUCH, 2018; BARANZINI et al., 2014; RAFATY, 2018). However, these policies tend to promote a scenario characterized by concentrated costs and diffuse benefits whereas a successful policy adoption would have the opposite situation. In this scenario, even the dispersed beneficiaries of a policy in this field have
a low tendency to support it. Indeed, if the benefits of carbon policies are focused on constituencies that will endorse the course and preservation of that policy, the chances of success would be higher. Moreover, due to successive partisan changes it is important to consider a broad political spectrum formed by different constituencies (FUNKE and MATTAUCH, 2018; OLSON, 1965).

In spite of that, Sweden adopted the carbon tax in 1991 obtaining a successful outcome (FUNKE and MATTAUCH, 2018). Furthermore, the carbon tax shows a relatively popularity in Sweden. Taking into account 11 other taxes and climate policy instruments the carbon tax was considered the third least unpopular according to a research (JAGERS and HAMMAR 2009). Also, the adoption of the carbon tax in Sweden was based on public discussions alongside social deliberation throughout the whole process. These elements empowered political reliability and transparency in relation to this tax. (FUNKE and MATTAUCH, 2018) as shown in Figure 2.5. Accordingly, Sweden has the highest carbon price among countries using carbon pricing schemes, as well as the highest public trust in politicians and a low corruption perception.

![Figure 2.5. Carbon prices linked to public trust and perceived corruption (FUNKE and MATTAUCH, 2018).](image)

Besides that, the Swedes are used to high taxation rates (ECKERSLEY 2004). The obvious general standard considers that most of them would prefer to reduce all taxes instead of increasing them. However, the willingness to maintain the welfare state is stronger than the
reluctance against paying taxes (NILSSON, 1995). Finally, the green and ecological awareness is quite significant among Swedes (ECKERSLEY, 2004).

2.3.8 Description and effects of the carbon tax for the Swedish heating sector

As previously referred the discussions over oil replacement intensified in the 1980s. However, the use of alternative fuels such as biomass had not been strongly encouraged until 1991 when the carbon tax was adopted and the energy tax\textsuperscript{13} was reduced by half (ERICSON and WERNER, 2016; JOHANSSON, 2000). Sweden was among the first countries to introduce a carbon tax alongside Norway and Finland (HAMMAR and ÅKERFELDT, 2011). The tax was levied on fossil fuels for transportation and heating purposes (PMR, 2017). The initial amount of the tax was 24 EUR/tonne CO\textsubscript{2}. Afterwards, this amount increased by 114 EUR/tonne CO\textsubscript{2} in 2019 (GOVERNMENT OFFICES OF SWEDEN, 2019). Similarly, the relevance of the carbon tax has increased in the long run (NATURVÅRDSVERKET, 2017).

The targets to be achieved from the adoption of the tax were the following: (i) decrease in fossil fuel consumption, (ii) reduction of CO\textsubscript{2} emissions and (iii) stimulation towards technological innovation (PMR, 2017). Approximately 500 companies are legally required to pay the carbon tax in Sweden. Many of them are large industrial consumers. However, these companies are generally fuel distributors who transfer the tax cost to fossil fuels users – downstream (SUMNER et al., 2009; PMR, 2017). The Swedish Tax Agency administers the carbon dioxide tax, monitoring and reporting GHG emissions (PMR, 2017; WORLD BANK 2014, SUMNER et al., 2009). The revenue commonly goes to the general government fund (SUMNER et al., 2009; PMR, 2017). Furthermore, from 1990 to 2017, the GHG equivalent emissions were decreased by 26% and the GDP increased approximately 78% as shown in Figure 2.6.

\textsuperscript{13} The energy tax was implemented in the 1950s, being levied on energy utilized for heating and engines, with the exception of biofuels (ENERGIDATA GÖTEBORG et al., 1995; JOHANSSON, 2000; PMR, 2017).
Besides the reduction of GHG emissions, the proportion of the energy use from renewables increased substantially (PMR, 2017; SUMNER et al., 2009). The tax pushed changes towards fossil fuels released in the DH systems (ACKVA and HOPE, 2018; JOHANSSON, 2000) since then the cost of coal doubled as opposed to the cost of biomass which became cheaper (ERICSON et al., 2004). Thus, the use of fossil fuels gradually decreased whereas the use of waste and biomass substantially increased in the DH systems as shown in Figure 2.7 (JÖNKÖPING, 2014).

The biomass production was initially introduced in the DH systems in the 1980s and was composed of wood fuels (e.g. wood chips, sawdust) (ERICSON and WERNER, 2016; STATISTICS OF SWEDEN, 2014). Later on in the 1990s an expansion in biomass production
took shape mainly in medium and large-biomass fired plants (STATISTICS OF SWEDEN, 2014). The majority of the biomass in Sweden was produced domestically and supplied by forest industries and subsidiary companies. Furthermore, the country counted on the availability of forest resources and the infrastructure of the forestry industry (ERICSON and WERNER, 2016).

The transition from oil and coal towards biomass occurred gradually in the DH system through a number of technical development steps. Initially, co-firing of biomass with coal and oil and the conversion of existing oil-fired boilers to biomass were utilized. In a second stage, there was the development of combustion technologies (ERICSON and WERNER, 2016). The development of new procedures of biomass extraction and a biomass market were also important consequences of the carbon tax (JOHANSSON, 2000; Ericson and Werner, 2016).

Besides that, due to the increasing demand for bioenergy in the 1990s, numerous mechanical solutions have been developed (e.g. heavy duty chippers, compaction machine for logging residue, multi-tree-handling felling in small wood vegetation) (JOHANSSON, 2000). Several procedures for simultaneous extraction of log and logging residues were also improved. An example of that is a harvester technology which gathers tops and branches in the same manner as the stems are processed; and it then continues compacting the resulting material into composite residue logs. This technology could promote a cost reduction of 20 - 40%, also lessening the demand for machinery (ERICSON and WERNER, 2016; JOHANSSON, 2000). Table 2.1 shows a summary of the mechanical equipment development and biomass plants improvement as a consequence of the growing demand for bioenergy in the 1990s.

Table 2.1. Technology development influenced by the growing demand for biomass

<table>
<thead>
<tr>
<th>Mechanical equipment developed</th>
<th>Mechanical equipment in development (at that time)</th>
<th>Improvements of energy efficiency in the biomass plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Duty Chippers</td>
<td>Procedures for simultaneous extraction of log and logging residues</td>
<td>Utilization of flue gas condensation</td>
</tr>
<tr>
<td>Compaction machine for logging residue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-tree-handling felling in small wood vegetation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(adapted from: JOHANSSON, 2000).

The biomass market was developed as a consequence of the expanding potential of biomass suppliers to the heat plants. Furthermore, the combination of a growing demand for biomass with market pressure was fundamental to combine increased demand with declining
prices (JOHANSSON, 2000). Accordingly, the expansion of biomass production at the DH system influenced the adoption of flue gas condensation, increasing the efficiency of the biomass plant at 10 - 25% (JOHANSSON, 2000; ERICSON and WERNER, 2016).

In this scenario, the carbon dioxide tax should be an important factor towards a transition in the DH system also influencing investment related decisions (BOHLIN, 1998). Some strong regional commitments advocating for local renewable sources utilization also played a fundamental role in the investment decisions taking into account the construction of biomass-fired DH plants (ERICSON and WERNER, 2016). Therefore, as referred to above, the gradual removal of fuel oil is a consequence of the adoption of the carbon dioxide tax in Sweden. Besides that, the expansion of biomass production led to a development in technology for biomass extraction in forestry and in the implementation of more efficient heat plants in the DH system (ACKVA and HOPE, 2018).

2.4 Case Description of RenovaBio in Brazil

“The world is a dangerous place to live; not because of the people who are evil, but because of the people who don't do anything about it”

(Albert Einstein)

2.4.1 Background on the RenovaBio

The use of biofuel in Brazil started in the 1930s through the use of ethanol-gasoline blending (ROTHMAN et al., 1983). Afterwards, 5% of ethanol started to be added to the imported gasoline in 1931. The same percentage was added to the national gasoline in 1939. Between 1946 and 1950, 42% of ethanol was added to gasoline in Brazil. However, there was a reduced interest in ethanol by the Brazilian Government and the business community between the 1950s and 1960s (GIACOMAZZI, 2012).

In the 1970s, the oil shock prices occurred and energy supply was considered a priority (ROSILLO-CALLE and CORTEZ, 1998). Within this context, the National Program of Alcohol (Proalcool) was adopted in 1975 in Brazil. The purpose of this program was the
development of anhydrous ethyl alcohol fuel to be used as added combustible to gasoline. The motivations were related to (i) the need to reduce oil imports, (ii) the oil shock prices and (iii) the idle capacity of the sugarcane sector at that time (RAMOS and BELIK, 1989; OHASHI, 2008).

The third motivation was linked to the expansion of the sugarcane sector. Substantial investments in infrastructure were made and sugar was the main product. However, a reversal of the sugar market expectations occurred and the investments promoted still needed to be amortized. The solution was an increasing alcohol production of anhydrous ethyl alcohol fuel, since the infrastructure for producing alcohol and sugar was quite similar. Therefore, the incentive to enhance alcohol production was considered a strategic movement through the Proalcool (RAMOS and BELIK, 1989; OHASHI, 2008).

This program presented some phases with the first one implemented in the period from 1975 to 1979 and characterized by the respective creation and stability. Subsequently, the consolidation took place between 1979 and 1985. The program faced ongoing development until the low international oil prices started to change this scenario between 1985 and 1989 (ROSILLO-CALLE and CORTEZ, 1998). Then, a stagnation phase occurred until 1997 followed by a redefinition of the program between 1997 and 2000. Afterwards, a deregulation within the ethanol sector was verified in 2000. However, the development of the flex-fuel technology indirectly contributed to support this sector as from 2003 (GIACOMAZZI, 2012). Figure 2.8 shows the evolution of energy and bioenergy consumption in Brazil between 1970 and 2016.

![Figure 2.8. Energy and bioenergy consumption in Brazil (1970-2016) (EPE/MME, 2017).](image-url)
With regard to initiatives considering climate change issues, the Brazilian Government passed a law establishing the National Policy on Climate Change in 2009. The main goals of this policy were the reduction of GHG emissions through the use of clean energy and the economic and social deployment in compliance with the protection of the climate system (BRAZIL, 2010).

Afterwards, considering the Paris Agreement through the NDC, Brazil has made a commitment to reduce its GHG emissions by 37% in 2025 taking 2005 as reference point. It was the only developing country that adopted set forth reduction targets for its entire economy. In addition to that, Brazil ratified the Paris Agreement on September 12, 2016 concentrating efforts on agriculture, energy and deforestation (BRAZIL, 2016). In order to accomplish the reduction of the country’s GHG emissions, the RenovaBio was launched by the MME in December 2016 (BRASIL, 2018d).

2.4.2 The policymaking process for the adoption of RenovaBio in Brazil

As referred previously, the MME launched RenovaBio in December 2016. Subsequently, the Brazilian Government and the productive sector discussed the premises and objectives of the program. This step was fundamental to build the proposal that was to be the base for the program’s public hearing. Subsequently, the period of the public hearing began on February 15, 2017 and ended on March 03, 2017. In the beginning of June 2017 the National Council for Energy Policy (CNPE) approved the strategic guidelines for the program. In addition, the deliberation of the CNPE settled the working group for RenovaBio. This group was in charge of assessing the proposals of revisions to implement the program within the shortest time possible, according to the strategic guidelines thereof (BRASIL, 2018d).

The bill was forwarded to the Civil House in June 2017 by the MME. In November 2017 the bill was submitted at the Chamber of Deputies where it underwent urgent processing due to a request by the deputy from the Green Party that had presented it originally. In November 2017 the bill was approved by a section of the Chamber of Deputies. The voting at the Chamber of Deputies (BRAZIL, 2017b) is shown on Table 2.2.
Table 2.2: Votes at the Chamber of Deputies

<table>
<thead>
<tr>
<th>Party</th>
<th>In favour</th>
<th>Against</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialism and Liberty Party</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Sustainability Network</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Democratic Labour Party</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>Brazilian Labour Party</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Green Party</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Brazilian Socialist Party</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Progressive Party</td>
<td>28</td>
<td>0</td>
</tr>
<tr>
<td>Democrats</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>Brazilian Democratic Movement</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>Social Democratic Party</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Republican Party of the Social Order</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Workers' Party</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>Popular Socialist Party</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Brazilian Social Democracy Party</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Liberal Party</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>Communist Party of Brazil</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Brazilian Republican Party</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Social Liberal Party</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>National Ecologic Party</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Solidarity Party</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Humanist Party of Solidarity</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Podemos</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Social Christian Party</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Without party</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

(elaborated from: NOVACANA, 2017)

In December 2017 the bill was submitted to the Senate for a voting purposes. After the procedures were carried out at the National Congress, the bill was sanctioned by the President of the Republic of Brazil. The decree implementing RenovaBio was signed on March 14, 2018 and published in the Official Journal of the Union on March 15, 2018 (BRASIL, 2018d).

2.4.3 The bioenergy sector in Brazil

Bioenergy is the main source of renewable energy in Brazil (IEA, 2018) as shown in Figure 2.9.
The solid biomass composes the majority of bioenergy in Brazil mainly because of the bagasse generated by the sugar-energy industry. The biofuels are also very important for the generation of bioenergy as shown in Figure 2.10. Also, gasoline in Brazil has anhydrous bioethanol blended in its composition (IEA, 2018).

Thus, the bioenergy share in Brazil ranged from 27% to 30% in the last few years mainly due to the production of solid biomass and liquid biofuels if we consider the total primary energy supply (TPES). The bioenergy consumption presented a constant pattern from 1990 to 2000. However, between 2000 and 2010 bioenergy raised by 75%. Subsequently, from 2005 to 2010 the demand for liquid biofuels increased significantly and after that the rank for liquid biofuels and solid biomass stabilized. In 2012 an increase in liquid biofuels was verified and remained constant until 2016 (IEA, 2018) as shown in Figure 2.11.
The bioenergy sector in Brazil comprises the industrial and agricultural segments apart from the regulatory and distribution segments. The industrial segment is formed by industrial plants (sugar, ethanol, co-products and electric-power) and the industries’ operations relate to production assets and maintenance service providers. The agricultural segment encompasses sugarcane suppliers. The regulatory segment is formed by sectorial organizations (e.g. the Brazilian Sugarcane Industry Association - UNICA) and some governmental bodies working within the sector. Finally, the distribution sector is connected to trading activities (CASTILLO, 2015).

2.4.4 The institutional design in Brazil

Brazil presents a federal presidential system and is formed by 26 states. The Executive, Legislative and Judicial powers are formed by independent branches of government and they in fact represent the federal government. The first one - executive power - is governed by the President who is counselled by the Cabinet. The President is elected by vote and remains in government for a four-year mandate with the possibility of running for a re-election. He or She is the Head of State and the Head of the Government, also legislating through the editing of provisional measures. The president proposes and the legislature can accept (or not) what was previously proposed (FIGUEIREDO and LIMONGI, 2000). The second one - the legislative power is formed by the Chamber of Deputies representing all Brazilian citizens; and the Senate, representing the states (BRAZIL, 2019a). The third one - the judiciary power - has the role to
guarantee individual, collective and social rights and also to solve conflicts involving the state, entities and citizens. Consequently, it has autonomy with regard to finance and administration aspects guaranteed by the constitution (BRAZIL, 2019b).

The Brazilian system is marked by a dominance of the executive branch which has substantial regulatory powers (OLIVEIRA, 2004). This is a consequence of the extension of the legislative branch managed by the president which in turn has an impact on the political system in Brazil and changes the dynamics of the relations among executive and legislative branches (FIGUEIREDO and LIMONGI, 2000). Therefore, the legislative power could be regarded as an executive agent. However, there is a higher openness for dialogue among society as far as the legislative power is concerned. Indeed, the executive power also has the role to represent society as a whole (CESARIO, 2013).

2.4.5 The Brazilian law-making process

In Brazil a new law is made through a deputy or a senator who submits a draft bill for analysis and subsequent approval. Then, the draft bill should be examined by the commissions which are specialized bodies organized by this field, involving a lesser number of parliamentarians. The commission will analyse the draft bill and prepare a position paper communicating if the draft bill should be approved (or not). When the creation of the law is the responsibility of the National Congress, formed by the Chamber of Deputies and Federal Senate, the draft bill will be presented and voted in one of the referred houses. Once the draft bill is approved, it will be forwarded to the other house - the reviewers’ house - for a second voting. At this house the senators will decide whether the draft bill will require changes (BRAZIL, 2019a).

The creation of an ordinary law (a common legislative proposal in Brazil) should be approved through the majority of favourable votes from senators and deputies provided a minimum of half the number of these parliamentarians give their vote. Following the law-making process, the draft bill still must be submitted for purposes of presidential sanction. At this stage, the president can veto the draft bill to some extent or completely if it is considered not to be in accordance with the constitution. However, the president’s veto can be rejected (and invalidated) if the majority of the deputies and senators decide that the draft bill (or part of it) has a degree of validity. After the approval from deputies and senators as well as the
presidential sanction, the draft bill will be promulgated and become law. Finally, the last step is the publication of the law (BRAZIL, 2019a).

2.4.6 The influence of institutional culture focusing on the bioenergy sector in Brazil

In Brazil there is no legislation to regulate the lobbying activity (ARAGÃO, 2012). Nevertheless, some indirect rules are related to this issue (e.g. the constitution settles the freedom of association and also the right of petition instrument). Therefore, the right to possess collective interests presented by associations and to demand provision of information are guaranteed by the constitution. Considering the legislative procedures in Brazil, the constitution assures that committees are supposed to encourage public audiences including important organizations for the civil society. Furthermore, there is an inner code edited by the Chamber of Deputies demanding the registration of representatives within the civil society and Government at the legislative branch (SANTOS and TEIXEIRA DA COSTA, 2012).

The Civil House is also authorized to decide over the submission for general consultation to the public regarding drafts to propose new legislation that has a political or social meaning. This central governmental body can receive suggestions from entities and organizations both from the public and private sectors, as well as people in general (SANTOS and TEIXEIRA DA COSTA, 2012). However, the discussions over lobbying in Brazil is complicated because it is stigmatized by cases of corruption in the country (OLIVEIRA, 2004). Lobbying does not have a positive connotation (SCHNEIDER 1997-1998) being associated with influence peddling, political corruption and pressure in general. There is also a connection with major corporations (having economic power) as main policy actors who conduct lobbying practices in order to achieve determined targets (MANCUSO, 2010; OLIVEIRA, 2004).

Additionally, the lack of regulation referred to above implies in influence peddling and corruption (e.g. some policy actors can provide benefits in general influencing the decision-making process with the aim of a favourable decision). The business sector in Brazil can act in a collective way and is able to identify a substantial bill that will favour the sector, therefore defending its positions and obtaining a positive outcome (MANCUSO, 2010). This sector has a substantial degree of political success primarily because the constitution in Brazil grants legislative powers to the Executive branch within the government (MANCUSO, 2010). Thus, the Executive power develops a fundamental role within the legislative production being the
author of the majority of the propositions that eventually will be turned into laws (FIGUREIDO and LIMONGI, 2000).

In view of the above, the business sector tends to promote political lobbying at the Executive branch during the course of the legislative process, mainly when the author of a proposition is from the executive sector. During the negotiation of bills, the members of the National Congress act as stakeholders or mediators of controversies involving numerous interests. Furthermore, political pressure on the executive branch from organizations (e.g. business sector) in general occurs during this stage (MANCUSO, 2010).

With regard to the bioenergy sector, UNICA was created in the 1990s providing professional lobby to the bioenergy sector. It was formed by producers, researchers and advocates of clean energy that consider bioethanol a potential replacer for oil derivatives. They advocate the increasing bioethanol use as it results in the reduction of GHG emissions (MANDUCA and BERNI, 2018). Also, UNICA is the most important bioenergy organization in Brazil representing more than 50% of all ethanol production and 60% of sugar production in the country (LOBBYFACTS, 2017). Following is Figure 2.12 showing the lobbying costs incurred by this association from 2010 to 2016.

![Figure 2.12. Lobbying costs of the Brazilian Sugarcane Industry Association (UNICA) (LOBBYFACTS, 2017).](image)

Unfortunately, studies over the public acceptance over the adoption of RenovaBio in Brazil were not found in the literature.
2.4.7 Description of *RenovaBio* in Brazil

*RenovaBio* is a state policy developed to recognize a strategic role played by biofuels in the Brazilian energy matrix linked to energy security and mitigation of GHG emissions. However, *RenovaBio* does not require subsidies, carbon dioxide taxes or tax increase on biofuels (BRAZIL, 2018a). The program aims to create a market-based mechanism in order to encourage the promotion of higher energy efficiency along with the decreasing of the carbon footprint (BIOFUTURE PLATFORM, 2018).

The official objectives are: (i) compliance with the commitment established under the Paris Agreement, (ii) promote biofuel expansion at the energy matrix focusing on regularity of fuel supply and (iii) ensure predictability for the fuel market by promoting energy efficiency gains and reduction of GHG emissions, when biofuels are produced, commercialized and utilized (BRAZIL, 2018b). Figure 2.13 shows the current fuel market in Brazil characterized by the spot market. Subsequently, Figure 2.14 presents the innovation *RenovaBio* will introduce through the econometric model that defines the program.

![Diagram](image)

**Figure 2.13.** The current fuel market in Brazil (BRAZIL, 2018d).
RenovaBio is anchored on (i) the annual decarbonization goals established by the Brazilian government considering a minimum 10-year period; (ii) the issuing of GHG emissions reduction certificates - CBIO\textsuperscript{14} and (iii) the use of life cycle assessment (LCA) for the biofuel production certification (BIOFUTURE PLATFORM, 2018). Initially the CNPE is in charge of recommending an annual decarbonization goal that will be established by the executive power of government for a minimum period of 10 years. Subsequently, the National Agency of Petroleum, Natural Gas and Biofuels (ANP) will allocate the national mandatory targets to individual targets. Then, these targets will be applied to fuel distributors in proportion to the respective shares within the fossil fuel market, considering the previous year (BRAZIL, 2018c; BIOFUTURE PLATFORM, 2018).

The fuel distributors will accumulate a determined volume of the CBIO in accordance with their strategy towards achieving the individual target. The fuel distributors can provide evidence of its compliance with the individual goal through purchasing CBIO in the same amount of its obligations. Otherwise, the fuel distributors will suffer penalties. In addition, the ANP can also enforce administrative and monetary sanctions. The CBIO is equivalent to a decreasing of one ton of CO\textsubscript{2}eq. in relation to fossil fuel emissions. RenovaBio contemplates different biofuel sources having many capacities in relation to the contribution of GHG

\textsuperscript{14} CBIO is a decarbonization credit
reduction. Thus, each biofuel will be classified through a determined level of carbon emissions. This classification will be specified based on the LCA of the biofuel (BIOFUTURE PLATFORM, 2018).

The authorized biofuel producers will distribute the CBIO in line with the volume of each bill related to their biofuel sales. The imported biofuel is also considered to be certified. The CBIO generated in this process by biofuel producers will be commercialized in the Brazilian stock exchange market. Then, the fuel distributors should purchase CBIO with the purpose of accomplishing their individual mandates. The medium rate between the amount of CBIO that fuel distributors should buy in order to accomplish their targets and the amounts of certificates available annually will establish the respective price. Therefore, the demand for CBIO will be connected to the national decarbonization goal on an annual basis. Other market factors (e.g. oil prices and biofuel supply) will also influence this demand (BIOFUTURE PLATFORM, 2018).

To sum up, the Brazilian Government aims at increasing the participation of renewable fuels in line with the market growth through RenovaBio. The implementation of a public policy introducing predictability to the biofuel market and favoring a balanced scenario within fossil fuels handling is also important. This scenario will encourage innovation and searching for energy efficiency on an ongoing basis (BRASIL, 2018d). Finally, these aims are underpinned by the Brazilian commitment under the Paris Agreement (BIOFUTURE PLATFORM, 2018).
3 METHODOLOGY DESCRIPTION

“I believe in intuition and inspiration. ... At times I feel certain I am right while not knowing the reason. When the eclipse of 1919 confirmed my intuition, I was not in the least surprised. In fact I would have been astonished had it turned out otherwise. Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution. It is, strictly speaking, a real factor in scientific research.”

(Albert Einstein)

3.1 Initial Considerations

In this chapter the methodology is explored. Section 3.2 presents the typology of actors for bilateral negotiations as the framework, followed by the leadership styles. Subsequently, the research design for the carbon dioxide tax focused on the Swedish heating sector is presented under section 3.4, being comprised by data collection and data analysis. The same structure is fulfilled by the Brazilian analysis in section 3.5. Closing this Chapter, section 3.6 presents a brief analysis of transparency on public policies.

3.2 Description of the typology of actors for bilateral negotiations

The profiles of the policy actors involved in a process are fundamental to find suitable strategies in negotiation cases. In a general way, it is possible to characterize the profiles of the policy actors through some parameters. One of the most important is based on the roles related to the functional distribution within a negotiation coalition (OLIVEIRA and ONUKI, 2015), being named as typology of actors (CAENI, 2018). Taking into account a coalition, a defining characteristic of it is the presence of joint actions, commonly in concert, in order to achieve a determined target (THIBAUT and KELLEY, 1959; EMERSON, 1962).
The power and resource distribution within a coalition were primarily approached by the literature (CAPLOV, 1956; 1968; GAMSON, 1961). However, in this study the coalition formation process was explored using two case studies – the carbon dioxide tax in Sweden focusing on the heating sector and the RenovaBio in Brazil. For that purpose, the typology of actors was utilized as framework, which is schematized in a pyramid blueprint presented in Figure 3.1.

![Pyramid blueprint of typology of actors for bilateral negotiations (elaborated from OLIVEIRA and ONUKI, 2015).](image)

Figure 3.1. Pyramid blueprint of typology of actors for bilateral negotiations (elaborated from OLIVEIRA and ONUKI, 2015).

The negotiating groups composing a coalition have a functional distribution more numerous and complex, although the dimensions and parameters contemplated by the typology of actors can be useful to determine the role of each actor within a coalition. In addition to that, numerous profiles can turn the decision-making process more complex, due to the quantity of variables to be considered (OLIVEIRA and ONUKI, 2015; CAENI, 2018). Furthermore, the bilateral negotiations composing two coalitions were taken in order to delimit this analysis.

Taking into account the pyramid blueprint, the leader actors are placed on the top (leader, co-leader, anti-leader and guardian). In the medium base, the mediators, facilitators and brokers are situated. Finally, in the base of the pyramid, the medium-size and small size organizations comprise the leading actors within a coalition (OLIVEIRA and ONUKI, 2015; CAENI, 2018). Subsequently, these profiles have been accurately explored.
3.2.1 Leader

“Whoever fights monsters should see to it that in the process he does not become a monster. And if you gaze long enough into an abyss, the abyss will gaze back into you.”

(Friedrich Nietzsche)

Within a coalition, the leader plays the most important role. It conducts the coalition towards a specific and determined objective. Accordingly, legitimacy, sense of direction, purpose and strategy are required (OLIVEIRA and ONUKI, 2015).

3.2.2 Co-leader

“Today we must abandon competition and secure cooperation. This must be the central fact in all our considerations of international affairs; otherwise we face certain disaster.”

(Albert Einstein)

Still on the top of the pyramid blueprint, the co-leader helps the leader in the leading process within a coalition. The role of the co-leader is to be a co-manager. In addition to that, the coalition can be divided into smaller groups, and the co-leader will help towards leading these groups (OLIVEIRA and ONUKI, 2015).

3.2.3 Guardian

Analogously to the co-leader, the guardian helps the leader in conducting the coalition. However, the guardian also has a protection role in relation to the leader position, protecting it from over exposure and unnecessary attacks (OLIVEIRA and ONUKI, 2015; CAENI, 2018).
3.2.4 Anti-leader

“Don't be humble. You are not that great”

(Golda Meir)

The last profile in the pyramid blueprint is the anti-leader. This profile of policy actor disguisedly competes with the leader, within a coalition, due to diverse causes and motivations (OLIVEIRA and ONUKI, 2015).

3.2.5 Mediator

“It's not what you give, it's the way you give.”

(Bruce Lee)

Following the base of the pyramid, the mediator has the role to find reasonable positions among the coalitions (CAENI, 2018). The main mechanisms utilized by this intermediary actor are as follows: suggest a balanced proposal, be the communication vector among the parts, suggest solutions for stalemates – building a focal point to the agreement, among others. An important mediator characteristic is neutrality. The defense of their own interests or the biased towards one of the parties should not be considered by this policy actor (OLIVEIRA and ONUKI, 2015).

3.2.6 Facilitator

The facilitators have a role similar to that of the mediators. However, the facilitators have a bureaucratic role whereas the mediators have a technical or political role. If these two actors extrapolate their roles, acting as interesting parties, they will lose their impartiality. Once this situation is noticed it will not be possible for these actors to continue developing their
positions, due to legitimacy issues. In addition to that, for the mediator and the facilitator the protection of their images is crucial (OLIVEIRA and ONUKI, 2015; CAENI, 2018).

3.2.7 Broker

The broker plays the role to lobby the decision-making process, in favor of a specific group of interest or coalition, in accordance with previous and determined interests (OLIVEIRA and ONUKI, 2015).

3.2.8 Medium-size and small organizations

“A hundred times every day I remind myself that my inner and outer life are based on the labors of other men, living and dead, and that I must exert myself in order to give in the same measure as I have received and am still receiving…”

(Albert Einstein)

Finally, in the base of the pyramid, there are the medium-size and small organizations. Their roles are related to supporting the coalition despite being the weaker actors within a coalition (OLIVEIRA and ONUKI, 2015; CAENI, 2018).

3.3 Leadership styles

“If Hitler invaded Hell I should make at least a friendly reference to the Devil in the House of Commons.”

(Winston Churchill)

Three main leadership styles were considered for this analysis – (i) instrumental, (ii) coercive and (iii) unilateral. The first one is based on the power of persuasion of the leader. The
second is underpinning threat scenarios. And the third one is based on the unilaterality of the leader - the decisions are made without using persuasion or threats, and even without interaction among the other parties involved (UNDERDAL, 1994).

These three styles require different skills and capacities on the part of the leader within a coalition. The instrumental style is grounded on the consensus that requires an efficient communication capability on the part of the leader. Additionally, an efficient capability to diagnose situations, proposing efficient ways to tackle problems and elaborating mechanisms for overcoming stalemates, is also demanded (OLIVEIRA and ONUKI, 2015).

Following the second case, a clear imbalance in power among the actors comprising a coalition is necessary for the application of the coercive style. This imbalance is taken from material sources (e.g. financial and military resources) or institutional prerogatives (e.g. relations between managers and staff). The imbalance in power is fundamental for this style because these elements make the inherent threats credible (OLIVEIRA and ONUKI, 2015).

Finally, the unilateral style dismisses the threat by taking prompt actions, changing the course, even without prior notice to the other members of the coalition. When the unilateral leadership is applied it is not possible to consider that a negotiation process has occurred. Decision and the implementation are made unilaterally. Nevertheless, once a decision is made it is possible to open negotiations at another threshold (OLIVEIRA and ONUKI, 2015).

The three styles are important for a leader because he or she should adopt the most appropriate style according to a given situation. Taking into account the instrumental style, it usually takes longer mainly because the use of dialogue and persuasion requires more time than threat and unilateral action. However, once the support is provided through persuasion, there is a tendency for a situation to have more stability. On the other hand, in some cases the leader might need to utilize sources to validate its leadership. Therefore, there is no one leadership style that is more important than another one (OLIVEIRA and ONUKI, 2015).

3.4 Research design for the case of carbon dioxide tax focusing on the Swedish heating sector

The design of this study was a qualitative exploratory case study, which is a useful strategy to assess contemporary phenomena (YIN, 2017). In order to analyse the policy process that led to the planning, formulation and adoption of the carbon dioxide tax focusing on the
Swedish heating sector, the typology of actors in bilateral negotiations was utilised in the form of conceptual lenses applied to a case study. The analysis is based on primary and secondary data sources - the case was analysed through documentary study and a qualitative analysis of full transcripts from interviews. The data supporting the analysis was collected from several sources as described below in depth.

During the first stage, secondary data was utilized. Thus, the material related to the carbon dioxide tax focusing on the Swedish heating sector was collected. Data from secondary sources embodied publicly available official documents related to the planning, formulation and adoption of the carbon dioxide tax focusing on the Swedish heating sector and previous peer-review research related to this process. The identified peer-reviewed papers referred to were collected from DiVA, Scopus and Web of Science as the main databases. The Swedish Government databases contemplating documents and reports related to the planning, formulation and adoption of the carbon dioxide tax focusing on the Swedish heating sector encompassed the period between 1980 and 1991.

In this initial stage, the materials connected to the dynamics of the interactions among the policy actors that eventually led to the planning, formulation and adoption of the carbon dioxide tax focusing on the Swedish heating sector, offering insights into a coalition formation process were collected. In addition to that, material related to the background of the carbon dioxide tax focusing on the Swedish heating sector was also collected in this phase through the data referred to above in order to comprehend the driving forces that promoted the adoption of this energy policy in Sweden. The Swedish Government databases were important to identify the first initial policy actors connected to the analyzed case, especially the reports from the Swedish Parliament, the ECC reports and the official written communication regarding the carbon dioxide tax.

In the second stage, there was the application of semi-structured interviews with open-ended questions following a standard settled protocol (Appendix A). Preliminary names for the initial sample were identified through official documents and reports from the Swedish Parliament and the ECC. They were initially contacted by e-mails, social media vehicles and phone calls. Thus, preliminary interviews were conducted to evaluate the interview protocol and also to identify names of individuals that were not previously determined through secondary sources during the initial stage. Therefore, the snowball sampling was utilized to

---

15 Some policy actors were contacted by the social media vehicles (e.g. linkedin and twitter).
16 During the preliminary interviews, the interviewees were required to suggest other individuals to be included in the sample.
continue composing the sample, targeting those individuals involved in the planning, formulation and adoption of the carbon dioxide tax focusing on the Swedish heating sector.

The great majority of the individuals contacted were willing to participate and contribute. The initial interviews were conducted with experts from the ECC and the Swedish Government in the preliminary stage. Afterwards, interviews with policy actors from the municipalities, DH sector, the forestry sector, NGOs, the industry sector, academia, and political parties were carried out. The total sample was formed by 15 individuals representing the policy actors within the interest groups. They contributed with fundamental information and insights about the policy process for the analyzed case.

Their names were not allowed to be listed but their occupation is presented in Appendix B. Following the last stage, data from primary and secondary sources were triangulated and compared, focusing on the relations of the policy actors comprising the interest groups mentioned above. The outcome of these three phases was the profiles identification for the main policy actors forming the interest groups within the policy process related to the planning, formulation and adoption of the carbon dioxide tax focusing on the Swedish heating and also the driving forces thereof. Figure 3.2 summarizes the methodology process referred above.

![Methodological approach for the Swedish case](image-url)
Regarding the interview protocol applied the semi-structured interview with open-ended questions following a standard established protocol (Appendix A) was composed by three main parties. On the first one, the main driving forces that led to the planning, formulation and adoption of the carbon dioxide tax focusing on the Swedish heating sector were explored. In the second part, the interviewees were inquired about the main actors’ roles having the functional distribution that builds a coalition as reference. They were asked about the leadership position, as well as the anti-leader, the guardian, the mediator, the broker, the medium-size and small organizations supporting the planning, formulation and adoption of the carbon dioxide tax focusing on the Swedish heating sector. Furthermore, the leadership style was also approached in the second part.

In the final part, the opposing movements related to the planning, formulation and adoption of the carbon dioxide tax focusing on the Swedish heating sector were investigated, following a similar structure applied in the second part of the semi-structured interview. The interviewees were inquired about the actors’ roles having the functional distribution of working on opposing movements for the tax adoption within a coalition. These structures provide the ground for reflections and insights on the general context of the policy process of the carbon dioxide tax focusing on the Swedish heating sector, and also on the target of this analysis. The interview structure utilized is provided in Appendix A. The interviews were transcribed and thematically coded using coding protocol\(^{17}\) (Appendix B).

### 3.5 Research design for the case of RenovaBio in Brazil

This study was also a qualitative exploratory case study. For purposes of analysing the policy process that led to the planning, formulation and adoption of RenovaBio in Brazil, the typology of actors in bilateral negotiations was utilized as framework. The analysis of RenovaBio is grounded on primary and secondary data sources. Therefore, the case was investigated through document study and a qualitative analysis of full transcripts from interviews that were conducted.

---

\(^{17}\) Coding is a way utilized to categorize the text setting a structure of thematic ideas about it (GIBBS, 2007).
During the first phase, the material related to the Brazilian analysis was collected. Data from secondary sources included publicly available official documents linked to the policy process analyzed and previous peer-review research approaching this case. The referred identified peer-reviewed papers were collected from Scopus and Web of Science as databases. The Brazilian Government databases containing documents and reports approaching the policy process of RenovaBio cover the period between 2009 and 2017.

Therefore, the materials linked to the dynamics of the interactions involving the actors that eventually guided the planning, formulation and adoption of the RenovaBio in Brazil, offering important insights into a coalition formation process were gathered. Furthermore, material related to the background of the program was also collected at this stage through the data previously referred to with the aim of grasping the driving forces that promoted the adoption of this program in Brazil.

Following the second stage, the application of semi-structured interviews with open-ended questions following a standard settled protocol (Appendix C) was conducted. The first names comprising the initial sample were identified through official documents from the Brazilian Government. They were initially contacted by e-mails and phone calls.

Therefore, preliminary interviews were carried out to assess the interview protocol and to identify other names that were not identified through secondary sources in the initial phase. Afterwards, the snowball sampling was also utilized for the Brazilian analysis. Approximately half of the individuals contacted were willing to participate and contribute. The initial interviews began with academia in the preliminary stage. Subsequently, interviews with policy actors from the Brazilian Government took place. Subsequently, interviews with policy actors from public agencies, political parties, sugarcane industry and branch organizations, private sector and semi-public companies were also conducted.

The total sample was formed by 18 individuals representing the policy actors within the interest groups. They contributed with relevant information and insights towards the policy process involving the Brazilian analysis. Academia and the ministries were the main contributors of this phase. Their occupation is presented in Appendix D, but their names were not allowed to be disclosed. Therefore, after the referred steps were taken, data from primary and secondary sources were triangulated and compared for this case. The results of these stages was the identification of the policy actors comprising the interest groups within the policy process related to the planning, formulation and adoption of the RenovaBio in Brazil, and also the driving forces connected to the process in question. Figure 3.3 sums up the methodology process described above.
Taking into account the interview protocol, the semi-structured interview with open-ended questions following a standard established protocol (Appendix C) was organized in three parts. The first one focused on the driving forces for the Brazilian case. The second one explored the profiles of the policy actors within a coalition. The interviewees were asked about the leadership position, as well as the other ones comprising the typology of actors within a coalition. The leadership style was also explored in this part.

The final part followed a similar structure of the second part. However, the interviewees were questioned about the actors’ roles having the functional distribution working on the opposing movements of the program. This structure provides a base for reflections over the broad context of the RenovaBio’s policy process in Brazil, and also on the objective of this analysis. The interview structure used is provided in Appendix C. Finally, the coding protocol was utilized to transcribe and thematically code the interviews (Appendix D).
3.6 Brief analysis of transparency on public policy

The transparency on public policies should make available the information related to the public policy for the citizens. This is important because they will count with more support when making choices over the outcomes related to these policies. In addition to that, a transparent public policy is considered as effective in cases when the public can act based on the available information provided by that policy. Thus, the transparency of a public policy is related with inputs, outputs and outcomes of the citizen decisions (BALL, 2009).

The accountability is another aspect related to a transparent public policy (BALL, 2009). Therefore, transparency on public policy is perceived as elements that provide information over the policy, a clear accountability, and the citizens in general are aware of their roles in relation to the implementation of the public policy (FINKELSTEIN, 2000). However, the manner in which to design a transparent public policy is not clear. Due to conflicting goals within a policy design, the promotion of transparency is complex. As an outcome, the degree of transparency can differ from one public policy to another, especially in situations involving different countries (BALL, 2009).

The degree of transparency counts on transactional and informational costs, considering the administrative level. Therefore, the public policies that were designed on transparency should provide comprehensible, usable and quality information to the general public. In addition, the inputs, outputs and outcomes should be included in the information provided (BALL, 2009). In this study, these three referred elements have been considered for a brief analysis over transparency on public policy for both cases, having a regulating role on the environmental field in common.
4 RESULTS AND DISCUSSION

“The hardest thing in the world to understand is income taxes.”

(Albert Einstein)

4.1 Initial Considerations

This chapter is divided into two general parts. The first one explores the results of the analysis whereas the second one addresses the discussions over the results. Following the results, the Swedish case is then presented and the first session of this case explores the driving forces converging to promote the carbon dioxide tax in the Swedish heating sector. It is followed by a section presenting the typology of actors in bilateral negotiations applied for the Swedish analysis. This section is divided into three subsections and the first one presents the initial movements towards introducing the carbon dioxide tax in Sweden within the heating sector. The second one explores the steps taken towards the coalition formation process and the final subsection deals with the leadership styles of the coalitions identified for the Swedish analysis. Subsequently, there is a section exploring the transparency analysis of this case. Following the results of the Brazilian analysis, the driving forces converging to promote RenovaBio in Brazil is explored in section 4.5. Then, the typology of actors in bilateral negotiations applied for the RenovaBio in Brazil is addressed under two subsections. The first subsection presents the initial movements towards RenovaBio in Brazil. The second subsection considers the movements towards the coalition formation process for the Brazilian case and the last one comprises the analysis of leadership styles. After that, an analysis of transparency of RenovaBio in Brazil is presented. Then, the second general part is propounded discussing the cases analyzed. This section is divided into three subsections and the first one includes a discussion over the driving forces for both analyzed cases. The second subsection considers an analysis over the coalitions identified also for both cases whereas the third one presents a discussion over transparency.
4.2 Driving forces converging to promote the carbon dioxide tax in the Swedish heating sector

Based on interviews, driving forces on environmental and a political-economical driving levels led to the adoption of the carbon dioxide tax in Sweden. The raising environmental public awareness and the interest of the Swedish Government in supporting bioenergy development were identified as the main driving forces in this process. The rise in environmental public awareness by society promoted a political debate on energy policy in the 1980s. Thus, the Government gradually started to include environmental ideas in new laws and regulations. In the 1990s, the discussion on environmental awareness became stronger pushing the public bodies to develop policies in this field. Therefore, the carbon dioxide tax was one of the initiatives behind this societal demand.

Furthermore, the Swedish Government had been making huge efforts on supporting bioenergy development since the 1980s. The solid fuel regulation and the wood fiber law were developed for such purposes before the adoption of the carbon dioxide tax. Pursuant to the first one, new boilers for heating had to be prepared for cogeneration and solid biofuels. The intention was to increase biomass use, however, a huge amount of coal was introduced in the system instead of that. By the second one, the flow of forest fiber was regulated for the traditional industry but the use for bioenergy was restricted. In view of that, the adoption of the carbon dioxide tax represented a new opportunity to support the use of bioenergy.

4.3 The typology of actors in bilateral negotiations applied for the carbon dioxide tax within the Swedish heating sector

4.3.2 Initial movements towards intruding the carbon dioxide tax in Sweden within the heating sector

The creation of the ECC was identified as a first step towards the adoption of the carbon dioxide tax in Sweden within the heating sector. This Commission was composed of several interest groups including the government, political parties, municipalities and NGOs, among others. Initially, not all members were in favor of the adoption of the carbon dioxide tax even
though the great majority endorsed the tax. In addition to that, for most interviewees the ECC had a leadership position regarding the coalition that supported the adoption of the carbon dioxide tax in Sweden.

The Ministries of Finance, Enterprise and Environment were also supporters of the adoption of the carbon dioxide tax in Sweden. When the initial issues contrary to the introduction of the tax were raised the Ministry of Finance reinforced the need to adopt it by supporting and protecting the ECC. Considering a broader context, the creation of the carbon dioxide tax occurred concurrently with the negotiations of the major tax reform. Moreover, a reduction of income tax was a fundamental societal demand and the Ministry of Finance was searching for ways to promote that as well. Thus, the Ministry supported the adoption of the carbon dioxide tax because it also represented new profits from other sources which would balance the state budget.

Within parliament, according to the majority of interviewees the Swedish parliamentarians also expressed relative support on adopting the tax. Furthermore, the perception of the politicians was changing following new trends by which the environmental driver should be included by their policies. Taking into account the political parties, the Green and Centre contributed towards the planning, formulation and adoption of the tax. The first one expressed its preference for wind and solar energy instead of bioenergy. However, since bioenergy was an alternative for fossil fuels the Greens supported it. In turn, the Centre Party shared values with the farming sector, municipalities and the countryside to a greater extent.

The municipalities and the DH sector endorsed the planning of a carbon dioxide tax, being active at local discussions and committees with the aim of implementing it especially because the biomass market was also interesting for them. Besides that, the energy structure was different after the 1980s. Previously, from 1930 to 1980 there was a central planning composed by the Swedish Government, Vattenfall\(^{18}\) and the General Swedish Electric Company (ASEA)\(^{19}\) at one side and the municipalities at the other. Since the 1930s, these centers had been working independently due to their different views. Taking into account the general context at that time, the main political party considered utilities as part of the basic needs for the population. Following this idea, taxes were decreased in general especially for the industry sector. However, the tariffs on utilities were not substantially decreased for the

---

\(^{18}\) Vattenfall was an important Swedish power company responsible for technology and distributional system in the 1980s (IAEA, 2009).

\(^{19}\) Allmänna Svenska Elektriska Aktiebolaget (ASEA) was an important Swedish company in the energy field in the 1980s (ABB, 2017).
municipalities. Accordingly, the municipalities started to build their own electricity generation structure based on DH on a small scale.

Since the 1960s they supported the expansion and diversification of the DH system even though it started to be developed prior to this decade. Additionally, the municipalities were the owners of heating companies having their own political will to use local fuels in order to boost the local economy. The transition from oil burners towards non-fossil fuels within the DH sector started at the end of the 1970s due to the oil crises. Before the adoption of the carbon dioxide tax, this sector was already aware of the possibility of using solid bioenergy instead of oil. Therefore, the DH sector also endorsed the adoption of the carbon dioxide tax.

After the adoption of it, the technical issues related to biomass use were solved by Research, Development and Innovation (RD&I) programs at the Thermal Engineering Research Association among other centers. Therefore, the carbon dioxide tax did not directly affect the DH development although the implementation of the tax increased the speed for switching the fossil fuel heating system to renewable energy heating. In the 1980s the central planning gradually started to change to a free economy and this tendency followed in Europe. The planning, formulation and adoption of the carbon dioxide tax was also part of this trend. It was also important to reduce the conflicts between municipalities and the central planning in a period during which Sweden and Europe were changing.

One last important aspect is related to the importance of the public opinion for the Swedish case. According to all of interviewees, for the great majority of the Swedish population there was no need to implement new taxes in a country that already had a high tax burden. Furthermore, a newspaper article written by Astrid Lindgren triggered a broad discussion over the existing high levels of income tax. This factor influenced the elections and the Swedish Government started to plan a reform of the century by meeting a new societal demand - decrease the income tax.

However, there was also an urgency to raise environmental awareness among society, at that time. According to the majority of interviewees, the discussions over the formulation and adoption of the carbon dioxide tax were strongly anchored on the environmental support that could be promoted through it. Therefore, the general public opinion supported the adoption of the carbon dioxide tax in Sweden. In spite of strong opposition to a new tax, the respective motivation was highly connected to environmental issues. For a long time, Swedish society had been pushing the government to include the environmental awareness issue in its policies.

---

Astrid Lindgreen was an important Swedish writer (ASTRIDLINDGREN, 2019).
4.3.3 Movements towards the coalition formation process

Within the forestry sector, the forest owners, the sawmill industry, the smaller industries composing the forestry sector and the related branch associations were actively endorsing the adoption of the carbon dioxide tax. The pulp and paper industry was the only policy actor strongly opposing the adoption of the tax within this sector. Regarding the branch associations, SVEBIO held discussions with important policy actors composing the interest groups in order to gain more support. After that, forest equipment manufacturers started to endorse the adoption of the carbon dioxide tax. These policy actors were interested in the creation of a biomass market that would solve the issue of the forestry residues thus generating extra income.

The biomass market was also interesting for the agriculture sector as well as the emerging bioenergy sector and they were also in favor of the adoption of the carbon dioxide tax. Moreover, the Centre Party and the LRF supported the adoption of the carbon dioxide tax and pressed the Swedish Government to grant benefits on bioenergy production. Besides them, academia in general, the Swedish Society for Nature Conservation (Svenska Naturskyddsföreningen - SNF) and EPA also endorsed the implementation of the carbon dioxide tax in Sweden.

On the other hand, the pulp and paper industry was strongly against the adoption of the tax. They expressed concerns over higher costs and competitiveness over forest resources. Furthermore, the pulp and paper industry operated on a similar oligopoly based structure, controlling the market prices of forest resources in Sweden. Apart from that, a free biomass market did not seem an interesting option. Indeed, they were engaged against the adoption of the carbon dioxide tax in different ways, that is, by adopting different strategies and holding a powerful and organized lobby at the parliament. Besides the direct influence over Swedish parliamentarians, the referred industry actors created stalemates in order to delay the negotiation process at both local and national committees. The branch associations also helped them in this process. According to the majority of interviewees, the pulp and paper industry was the leader of the coalition against the adoption of the carbon dioxide tax in Sweden.

Considering the branch associations, the Swedish Forest Industries Federation (Skogsindustrierna) also lobbied the Parliament to refuse the adoption of the tax. The industrial sector and the related branch associations were also against the adoption of the carbon dioxide tax. As far as the branch associations are concerned, the Federation of Swedish Industries (Svenska Industrifoerbundet - SI), the Swedish Trade Union Confederation
(Landsorganisationen i Sverige - LO), the Swedish Energy Intensive Industry (Skogen, Kemin, Gruvorna och Stålet - SKGS) and the Confederation of Swedish Enterprise (Svenskt näringsliv) were very active at exerting political pressure over parliament with the aim of declining the adoption of the carbon dioxide tax.

For these policy actors, the carbon dioxide tax would harm industry competitiveness as a result of higher production costs. Furthermore, the industry sector was engaged in obtaining total exemption of the carbon dioxide tax as the rise in production costs was a major concern. In addition, the initiative to adopt the carbon dioxide tax at an early stage could burden Sweden with an unnecessary responsibility of solving climate issues. For the pulp and paper industry, the adoption of the carbon dioxide tax would generate a competition for forest biomass, especially fiber. Also, the incentive of biomass production for energy purposes through the collection of a new tax was considered unfair by this sector.

The Moderate and Liberal Parties were also against the adoption of the carbon dioxide tax primarily focusing on the industry sector interests, as they usually worked in Sweden. The Moderates worked towards trying to influence further interest groups against the adoption of the carbon dioxide tax. The Liberals protected the pulp and paper industry against unnecessary exposition, mainly at the Parliament. However, it was behind the curtains supporting the continuous opposition from the Liberals. Furthermore, the pulp and paper industry was closer to the industry sector than the other forestry industry sectors (sawmill industry sector, forest owners sector, among others) at that time. Consequently, the branch associations of the pulp and paper industry and the industry sector worked together, expressing a similar position regarding a new tax was considered unfair by this sector.

Therefore, the adoption of the carbon dioxide tax triggered diverging opinions especially within the forestry industry sector. However, the stalemates used by the pulp and paper industry sector for delaying the negotiations thereof slightly strained the other policy actors, not only within the forestry industry sector. Furthermore, the distance within this sector was even higher due to such actions. Afterwards, a traditional Swedish company at the forestry industry sector called Stora Kopparbergs Bergslags Aktiebolag (STORA)21 started a long and complex discussion process with the pulp and paper industry. STORA worked for a reasonable outcome of the discussions over the adoption of the carbon dioxide tax, also promoting a relative unity within the sector. This company was searching for common bases within the forestry industry sector.

21 Stora Kopparbergs Bergslags Aktiebolag (STORA) and the Enso Osj were two companies that merged in 1998 forming Stora Enso (STORAENSO, 2018).
Thus, through a gradual process the direct resistance from the pulp and paper industry ceased. After that, the negotiation process could proceed towards the formulation and adoption of the carbon dioxide tax. Plus, the pulp and paper industry gradually considered that bioenergy would be part of its business. Regarding the divergences within parliament, the Social Democrat Party promoted a dialogue at both local and national levels. The party supported a hesitant balance between industry, economy and environment, comprehending the points involving the adoption of the carbon dioxide tax but still endorsing exemptions for the industry.

The Moderates changed their initial opposing position due to exemptions granted to the industry. The Liberals, alongside the Greens, were in favor of the replacement of the energy tax by the carbon dioxide tax. The Greens did not support the energy tax due to financial reasons (not environmental). The Liberals were also searching for ways to decrease the taxes for the industry. Despite of that, they finally considered the adoption of the carbon dioxide tax as reasonable for the Swedish society. Furthermore, it was important for the adoption of the carbon dioxide tax that the Green, Centre and Social Democrat parties had a higher influence at the parliament during that period. In the light of the foregoing, Figure 4.1 summarizes the outcomes of the identified coalitions.
4.3.4 Leadership styles

According to all interviewees, the leaders used the instrumental style for both coalitions identified. It is also important to punctuate that the coalitions were well defined due to specific and clear interests since the beginning of the process that led to the planning, formulation and adoption of the carbon dioxide tax focusing within the Swedish heating sector.

4.4 Transparency analysis over the Swedish case

With regard to the issue concerning the carbon dioxide tax within the heating sector, the Swedish Government made information available related to the public policy for citizens. On the official webpage of the Swedish Government, the general public can have access to comprehensible, usable and quality information concerning the carbon dioxide tax. The majority of this information is written in Swedish but it is also possible to find useful and comprehensible information written in English.

Articles and reports analyzing the carbon dioxide tax in Sweden, official presentations by the Swedish Ministry of Finance regarding the carbon dioxide tax in Sweden that were utilized at global conferences, events and interviews with employees in charge of the carbon dioxide tax in Sweden are also on this webpage. In addition to that, statistics considering historical tax rates, tax revenues and energy use, among others, are also available on this website. This is important because clear communication is a fundamental aspect that supports a transparent public policy, as referred on Chapter 3.

Furthermore, the legal documents related to the carbon dioxide tax including committee terms of reference, government bill, written communication and the Swedish Government Official Reports (SOU series) are also available on the official webpage of the Swedish Government. The majority of that information is written in Swedish, although it is also possible to find some written communication in English. The reports and written communication from the ECC are written in Swedish. In general, recent public policies have more official information in English. However, because the formulation and adoption of the carbon dioxide tax occurred in the 1990s the majority of the official information is available only in Swedish. Table 4.1 summarizes this analysis.
### Table 4.1. Transparency analysis of the carbon dioxide tax in Sweden

<table>
<thead>
<tr>
<th>Criteria assessed</th>
<th>Comprehensible, usable and quality information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Swedish</td>
</tr>
<tr>
<td>Availability to consult the committee's reports(^{22})</td>
<td>Yes</td>
</tr>
<tr>
<td>Access to public hearing</td>
<td>Yes</td>
</tr>
<tr>
<td>Availability to consult the text of the bill</td>
<td>Yes</td>
</tr>
<tr>
<td>Availability to consult the text of the law</td>
<td>Yes</td>
</tr>
<tr>
<td>Access to the voting of the law</td>
<td>No</td>
</tr>
<tr>
<td>Access to reports exploring the effects of the policy</td>
<td>Yes</td>
</tr>
<tr>
<td>Statistics approaching historical tax rates, tax revenues and energy use</td>
<td>Yes</td>
</tr>
<tr>
<td>General information, including official presentations about the carbon dioxide tax in Sweden</td>
<td>No</td>
</tr>
</tbody>
</table>

(Elaborated by the author)

### 4.5 Driving forces converging to promote RenovaBio in Brazil

“Someday, somewhere - anywhere, unfailingly, you’ll find yourself, and that, and only that, can be the happiest or bitterest hour of your life.”

(Pablo Neruda)

Based on interviews, economic and economic-political driving forces led to the adoption of program RenovaBio in Brazil. A demand from the sugar-energy sector for actions supporting its sector and an interest expressed by part of MME’s employees at the Biofuel Department in actions endorsing the biofuel sector were identified as the main driving forces for the Brazilian analysis. The sugar-energy sector was working on the promotion of actions to support its sector due to a possible scrap of the installed hydrated alcohol structure. This concern was also shared by part of the Brazilian Government which also started to work on actions to endorse this sector. The interest expressed by part of the MME’s employees at the Biofuel Department in actions supporting the biofuel sector was also related to the issue in question.

---

\(^{22}\) The committee’s reports are the State Public Reports in Sweden (Statens Offentliga Utdenningar - SOU).
4.6 The typology of actors in bilateral negotiations applied for the *RenovaBio* in Brazil

4.6.1 Initial movements towards *RenovaBio* in Brazil

In 2016 Brazil ratified the Paris Agreement and the MME introduced changes within the Biofuel Department. The MME minister had changed the biofuel director and required a strategic plan to support the biofuel sector. The new biofuel director formed an initial working group within the Biofuel Department to develop the required program. It also counted on the support from the Bioethanol Science and Technology Center (*Laboratório Nacional de Ciência e Tecnologia do Bioetanol - CTBE*), the Agriculture Researches Brazilian Company (*Empresa Brasileira de Pesquisa Agropecuária - EMBRAPA*) and academia in general to develop the program.

Afterwards, it was submitted to the secretary of Bureau of Oil and Gas who did not approve of the program initially. Over a subsequent meeting, the initial opposition expressed by this secretary changed to resistance because the program would burden the oil sector. After that, the working group in charge to develop the program changed their strategy working on the identification of potential interest groups to support a new program to incentivize the biofuel production called *RenovaBio*. The initial interest groups identified were: (i) ethanol, (ii) biodiesel, (iii) biogas and (iv) bio-methane producers.

Subsequently, the working group that was developing *RenovaBio* discussed the issue again during a third meeting with the Bureau of Oil and Gas, facing continuous opposition. Confronted with this scenario, the group started to build a strategy based on possible situations and simulations before the meetings. Additionally, the political articulation and lobby would be strengthened by the active participation of UNICA and the sugar-energy sector in the Southeast of the country. Some leaders of the sugar-energy sector\(^{23}\) from the Northeast of Brazil also started to support the program.

---

\(^{23}\) The sugar-energy sector produces sugar and ethanol, utilizing the same infrastructure. However, the ethanol producers within the biofuel sector produce only ethanol, and not sugar.
4.6.2 Movements towards the coalition formation process

Subsequently the ethanol sector, UNICA and the sugar-energy sector, set up a mapping of the Congressmen that could support the adoption of the program. Therefore, the coalition towards RenovaBio’s adoption conquered more support within the National Congress, and a provisional measure was considered to speed the process. However, the market-leader of oil production, the oil derivative distribution market and the related branch associations were against the adoption of the program. The first one expressed a discordant position because the program would burden the oil sector, as previously mentioned. The second one preferred a tax differentiation option that would increase the price of the fossil fuels through taxation instead of the adoption of RenovaBio. Furthermore, the distribution market would also be burdened by the program because the increase in the use of ethanol (hydrated alcohol) would promote a lower total fuel cost thus decreasing the marginal gain of the distribution market. Therefore, the interest groups composing the fossil fuel chain in Brazil were not in favor of the transition towards renewables because it would drive profits away from them.

Afterwards, the public hearing over the program occurred between February 15, 2017 and March 03, 2017 (BRAZIL, 2017c). The policy actors who actively participated in this process were: the Brazilian Association of Industrial Biotechnology (Associação Brasileira de Biotecnologia Industrial - ABBI), the Brazilian Association of Biogas and Methane (Associação Brasileira de Biogás e Metano - ABBM), the Brazilian Association of Vegetal Oil Industries (Associação Brasileira da Indústria de Óleo Vegetal - ABIOVE), the Association of Biofuel Producers in Brazil (Associação dos Produtores de Biocombustível no Brasil - APROBIO), the Brazilian Union of Biodiesel and Biokerosene (União Brasileira do biodiesel e bioquerosene - UBRABIO), the Association of Fuel Distributor (Associação das Distribuidoras de Combustíveis - BRASILCOM), the Federation of Sugarcane Planters in Brazil (Federação dos Plantadores de Cana-de-Açucar do Brasil - FEPLANA), the Sugarcane Industry Association ( União da Indústria de Cana-de-Açúcar - UNICA), some members of aeronautics in Brazil, the Platform of biokerosene and renewables from Minas Gerais (Plataforma Mineira de Bioquerosene e Renováveis), the Platform of Biokerosene from Pernambuco (Plataforma Pernambucana de Bioquerosene) and Petrobras (BRAZIL, 2017c). These policy actors were also identified as key small and medium organizations supporting the program through interviews.
The RenovaBio working group continued working to identify supporters to the program. The Union of Bioenergy Producers (União Nacional da Bioenergia - UDOP), an important branch association of the sugar-energy sector and the National Association of Automotive Vehicle Manufacturers (Associação Nacional dos Fabricantes de Veículos Automotores - ANFAVEA) began to approve of the program. Nevertheless, the market-leader of the oil derivative distribution market and the related branch association promoted an efficient movement against the program articulating it within the Civil House, which was also against the program, alongside the Ministry of Planning. Afterwards, between July and August 2017 the RenovaBio working group mobilized efforts on a provisional measure that would speedily block it within the Civil House. This fact represented a favorable outcome deriving from the efficient articulation power of the market-leader of the oil derivative distribution market at the Civil House.

Still with regard to the opposing policy actors forming a coalition against the adoption of the program, the oil market-leader in Brazil presented a report as a contribution to the RenovaBio public hearing. The renewable energy as a national priority in Brazil was questioned through this report. Subsequently, this policy actor strongly tried to publicly change its position. According to some interviewees, this report expressed the position from only a few employees. However, for most interviewees the report represented the actual position of the majority of the employees.

The Ministry of Finance was also strongly against RenovaBio as it was influenced by the oil derivative distribution market and oil market-leader due the effects from the RenovaBio mainly in view of a possible reduction in the tax collection related to higher prices of biofuels. Indeed, this Ministry also protected the oil market-leader against unnecessary exposition. According to half of the interviewees, the Ministry of Finance was empowered with information from representatives of the oil derivative distribution market and oil market-leader against the adoption of the program. It promoted an effective (and clear) opposing movement to RenovaBio at several official meetings.

The channels of mass communication were broadly utilized by both coalitions that were already formed at that time. The supporting coalition used to prepare briefings to be published by a newspaper from the sugar-energy sector called NovaCana. The opposing coalition made attempts to influence the public opinion in Brazil against the program through a large-circulation newspaper called Folha de São Paulo\textsuperscript{24}.

\textsuperscript{24} Folha de São Paulo is one of the major large-circulation newspapers in Brazil, edited in the city of São Paulo (FOLHA, 2017).
Besides the use of mass communication, social media vehicles were also utilized by the pro-RenovaBio coalition. A market intelligence agent joined the working group in charge of developing RenovaBio, and a group in a social media called WhatsApp formed by the majority of the interest groups that would be affected by the program (e.g. employees of the MME, Ministry of Agriculture, Ministry of Environment, the sugar-energy sector, the biofuel sector, academia, the oil market-leader and the oil derivative distribution market among others) was created. This group held strategic information on the program in order to influence its components thereof.

Following bureaucratic procedures and since the provisional measure was blocked, a draft bill would be the next step. Due to the articulation manifested in Congress by the supporting coalition, the period between filing the draft bill at the commission and the respective approval was 23 days. Besides that, the outcome of a dialogue between the Minister of Cities and the President to the Chamber of Deputies addressed the passing of the bill in question as a matter of urgency by the Chamber of Deputies.

Subsequently, these two policy actors also promoted a dialogue with the Ministry of Planning and the Civil House members because they expressed an opposing view on the adoption of the program. Furthermore, the representative of the civil society at the CNPE promoted a dialogue among the interest groups formed by several policy actors that were involved with the formulation and adoption of the program in order to reach a reasonable outcome for them all. Finally, a deputy from the Green Party also worked in terms of promoting a dialogue between the coalitions as well as helping with the bureaucratic process inherent to the program.

What is more, many Congressmen that were biofuel producers helped with the political articulation process as the support to the bioenergy sector was a matter of personal interest to them. At that time, the Ministry of Agriculture also joined the supporting coalition by helping the RenovaBio working groups conduct the process towards the adoption of the program.

As referred to Chapter 2, the outcome of the voting at the Chamber of Deputies was 299 votes in favor and 9 votes against RenovaBio. PSOL and the REDE were against RenovaBio based on the argument that the consequences of the program for the environment were not clear to these parties. As they were not fully aware of the impacts of RenovaBio they refrained from supporting it. According to the majority of interviewees, these two parties worked together within the National Congress in Brazil in an attempt to find opponents that would decline the adoption of the program.
Another interesting fact that occurred between the voting at the Chamber of Deputies and the Federal Senate was a government agency linked to the MME deciding to increase their participation in the program. Afterwards, this agency also decided that the program should be considered its own creation because they were interested in gaining political prestigious. The same trend was considered by a federal government agency linked to the MME for the same reason. Accordingly, RenovaBio working group decided to accept the participation of these two agencies by letting them be in charge of explaining the technical elements of the program during official meetings. After a few meetings these two agencies reassessed their participation in the program.

Following the pro-RenovaBio coalition, the Ministry of Foreign Affairs started to support the program after a meeting held with the RenovaBio working group at which both a national and an international agenda towards renewable biofuels were blended. The RenovaBio comprised the former whereas the Bio-future Platform\textsuperscript{25} represented the latter. Nevertheless, the Bureau of Oil and Gas tried to prevent this meeting from taking place. As for the Ministry of Environment, its position was not clear due to some existing conflicts with the Ministry of Finance. This Ministry had an idea to implement a carbon dioxide tax in order to increase the collection of taxes. As a result, the Ministry of Finance effectively worked towards postponing the vote of the bill at the Federal Senate many times.

Despite the above mentioned, the voting took place at the Federal Senate and the draft bill was approved by the great majority of the Senate. According to the majority of interviewees, the opposing coalition was astonished with the outcome. Therefore, two possible scenarios were considered – the first one has a more dynamic approach in relation to the pro-RenovaBio coalition. The RenovaBio working group formulated and developed an efficient program also focusing on political articulation in order to obtain approval. In this scenario, the opposing coalition was also politically articulated and despite the support from only a few members it was very powerful. However, it was not fast enough to form decision-making chains. The articulation structure and the decision-making process for this coalition were slower in comparison with the pro-RenovaBio coalition.

For the interviewees that supported this first scenario, when the bill was approved at the Federal Senate, the opposing coalition still embraced the movements with the aim of blocking the provisional measure. Also taking into consideration the fact that the opposing coalition

\textsuperscript{25} Following the Paris Agreement, the Biofuture Platform is an initiative representing joint efforts to speed up the development and implementation of advanced biofuels, in diverse sectors, as sustainable alternatives to fossil fuels, involving many countries, such as Brazil, France and Denmark (BIOFUTURE PLATFORM, 2018).
comprised powerful policy actors, they still refused to believe that a draft bill would be approved without their endorsement. Following the other scenario referred to above – a power vacuum was verified and RenovaBio was then approved because Congress was not entirely aware of the program. For a small portion of interviewees, the political situation of the country faced a lack of political leadership at the time. The National Congress was concerned with other types of issues and the deputy who worked on the bureaucratic process related to the program expressed a relatively neutral position. Therefore, these elements contributed to a favorable voting for the program. In the light of the foregoing, Figure 4.2 summarizes the identified coalitions.

Figure 4.2. Coalitions identified for the Brazilian case (elaborated by the author).

4.6.3 Leadership styles

According to the conducted interviews, the leadership position for the pro-RenovaBio coalition adopted the instrumental style. The leadership position for the contra-RenovaBio coalition used a combination of instrumental and unilateral styles. As concerns the unilateral style, the report referred to above was an isolated action taken by the leader without any prior consultation with the other actors forming that coalition.
4.7 Brief analysis over the transparency of RenovaBio in Brazil

Taking into account the case of RenovaBio in Brazil, the Brazilian Government made available the information connected to this public policy for the citizens. On the official webpage of the Brazilian Government linked to the RenovaBio it is possible to find comprehensible, usable and quality information available to the general public. Also, the legal documents related to RenovaBio and public hearing reports, the draft bill and official written communication related to the program are also available on this web page in Portuguese. However, the documents regarding the provisional measure that was declined were not available on this web page. Table 4.2 summarizes this analysis.

Table 4.2. Transparency analysis over the RenovaBio in Brazil

<table>
<thead>
<tr>
<th>Criteria assessed</th>
<th>Comprehensible, usable and quality information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Portuguese</td>
</tr>
<tr>
<td>Availability to consult the committee's reports</td>
<td>Yes</td>
</tr>
<tr>
<td>Access to public hearing</td>
<td>Yes</td>
</tr>
<tr>
<td>Availability to consult the text of bill</td>
<td>Yes</td>
</tr>
<tr>
<td>Availability to find information on the provisional measure</td>
<td>No</td>
</tr>
<tr>
<td>Availability to consult the text of the provisional measure</td>
<td>No</td>
</tr>
<tr>
<td>Availability to consult the text of the law</td>
<td>Yes</td>
</tr>
<tr>
<td>Access to the voting of the law at the Chamber of Deputies</td>
<td>Yes</td>
</tr>
<tr>
<td>Access to the voting of the law at the Federal Senate</td>
<td>No</td>
</tr>
<tr>
<td>Access to reports exploring the potential effects of the policy</td>
<td>Yes</td>
</tr>
<tr>
<td>Statistics approaching historical tax rates, tax revenues and energy use</td>
<td>Yes</td>
</tr>
<tr>
<td>General information, including official presentations about RenovaBio in Brazil</td>
<td>Yes</td>
</tr>
</tbody>
</table>

(elaborated by the author)

4.8 Discussion of cases

4.8.1 Driving forces identified for the Swedish and the Brazilian cases

According to the literature, the targets for creating the carbon dioxide tax were based on the motivation towards technological innovation and the reduction of fuel consumption as
well as CO₂ emissions as explored in Chapter 2. However, the motivation to create the tax were not explored through literature. According to the results, the driving forces leading to the adoption of the tax were the raising of public environmental awareness and the interest of the Swedish Government in supporting bioenergy development. At that time, the atmosphere was driven by a tough resistance against adopting new taxes, a considerable demand to reduce the marginal income tax and an urgency of environmental awareness among society as a whole. Thus, this last element was considered by the Swedish Government for creating a new environmental tax at an appropriate time. Therefore, the adoption of the carbon dioxide tax was a clever way of implementing a new tax and increasing the state budget (reduced by the changes to the marginal income tax) for purposes of environmental awareness.

Following the Brazilian analysis and according to the literature, RenovaBio was created with the aim of identifying the strategic role played by biofuels in Brazil taking into account energy security issues. The mitigation of GHG emissions was also part of the scope of the program since it was born out of the compliance with the targets set forth by the Paris Agreement, as referred to in Chapter 2. However, according to the interviewees demands from the sugar-energy sector for actions supporting its own sector and the interest of part of MME’s Bioenergy Department employees in supporting the biofuel sector were identified as the main driving forces towards the adoption of the program. Therefore, RenovaBio was born through the compliance with the targets of the Paris Agreement although it would nevertheless have been created regardless of anything else due to increasing demands from the sugar-energy sector and part of the MME’s employees.

In the light of the foregoing, as concerns the Swedish case environmental and political-economical driving forces were identified. For the Brazilian case, economic and political-economical driving forces were identified. Reconsidering the hypothesis for this study, the raising public environmental awareness among Swedish society was the only driving force identified that could have been related to the environmental agenda when implementing energy policies. However, this driving force became stronger when joined by the interest of the Swedish Government in supporting bioenergy use. Indeed, the rise in public environmental awareness was already present among Swedish society before the adoption of the carbon dioxide tax. It strengthened the interest of the Swedish Government to support bioenergy use although it was not enough on its own to implement an energy policy.

Regarding the Brazilian analysis, the environmental agenda was not identified as a driving force for the implementation of RenovaBio, according to the great majority of the interviewees. Instead, economic and political-economical driving forces were identified.
Despite the fact that the ratification of the Paris Agreement created a demand for different public policies focusing on the environmental agenda, RenovaBio was the outcome of a demand for sugar-energy sector supported by part of the Brazilian Government. Therefore, the environmental agenda was not considered the main driving force for neither developed nor developing countries when it comes to implementing energy policies. For both analysis, other agendas were considered more important other than environmental agenda.

4.8.2 Analysis of the coalitions identified

According to the literature, the planning of the carbon dioxide tax was a gradual process involving many interest groups within Swedish society. The global warming discussions and related issues emerged in the 1980s and the environmental and business groups pushed the Swedish Government towards taking actions to tackle the problem. The great majority of the interviews showed a similar perspective on this process. In addition to that and according to the literature and the results thereof, the ECC was the first step towards the planning of the carbon dioxide tax in Sweden targeting the heating and transportation sectors as well as involving many interest groups throughout society. Furthermore, these interest groups remained at their initial position along the process of planning, formulation and adoption of the carbon dioxide tax in Sweden, according to the results obtained.

Based on the analysis of RenovaBio in Brazil, it was launched by the MME at the end of 2016 and discussions over the program were held among the productive sector and the Brazilian Government in order to settle the objectives and guidelines thereof. Subsequently, the proposal was drawn up and the period for public hearing began. The CNPE agreed on the strategic guidelines for the program and also deliberated about the RenovaBio working group as referred to in Chapter 2. Following the results, RenovaBio was born out of a demand from the new MME minister for creating a plan to support the biofuel sector. Thus, the MME minister replaced the director of the Biofuel Department and a working group to develop this program was formed by this new director. Therefore, the planning process of this program involved a few interest groups from the Brazilian society.

Reconsidering the Swedish analysis and according to the literature, the environmental groups supported the adoption of a carbon dioxide tax in Sweden alongside the Centre and Left parties. Moreover, the Centre Party and some branch organizations were searching for benefits
from bioenergy production. Besides that and according to the interviewees among the industry sector, the interest groups that supported the planning, formulation and adoption of the carbon dioxide tax within the heating market (e.g. the sawmill industry sector) were interested in the creation of a biomass market. On the other hand, the industrial sector and the branch associations thereof were against the formulation and adoption of the carbon dioxide tax in Sweden within the heating sector due to concerns over higher costs, as per the literature. Accordingly, the pulp and paper industry was identified as the leader of the opposing coalition holding a strong lobby at the Parliament, according to interviewees. This industry was against the carbon dioxide tax because it would trigger the creation of a biomass market. Since it had no involvement with bioenergy producers the biomass market was not an appealing option.

Additionally, the opposing coalition was well organized and structured. The dialogue among its members was effective and all of them had the declared support from the pulp and paper industry, according to the results. The impacts over the production costs for the industry sector resulting from the adoption of the carbon dioxide tax was the main concern for the opposing coalition. At that time, this sector had no concerns over environmental issues that could be associated to its public image. Therefore, within the forestry industry sector, the supporters and opponents of the creation and adoption of the carbon dioxide tax on the heating sector were primarily focused on market issues.

A similar process was considered for the Brazilian analysis. According to the results thereof, the interest groups within the fuel sector that supported the formulation and adoption of RenovaBio were interested in actions that would support the market of biofuel sector. And the interest groups within this sector that did not approve of this process were not interested in actions aimed at backing up the biofuel market. The identified leader of the opposing coalition was the oil market leader in Brazil. Analogously to the Swedish case, this policy actor also held strong lobby at the Brazilian Government according to the majority of interviewees, but not according to the literature.

Nevertheless, the opposing coalition in Brazil was facing some organizational issues. Firstly, the leader was not inclined to take up its position due to concerns over public image. Consequently, the guardian was mistakenly taken as the leader of the opposing movements for many times when protecting the actual leader from exposure. Secondly, the lack of dialogue within this coalition was an evident issue. When the public hearing occurred, the contribution of the leader was a report through which the role of renewable energy in Brazil was being questioned. According to the majority of interviewees, this action was an isolated one without prior consultation among the other members comprising the coalition in question.
However, if a previous dialogue with the other members had taken place this report would probably not have been submitted for public hearing especially because the broker would not allow this action to be taken. Subsequent to the public hearing, the RenovaBio working group worked on the preparation of a provisional measure with the aim of adopting the program. Due to an efficient articulation promoted by the leader of the oil derivative distribution market (broker) within the Civil House, the provisional measure was blocked. The broker worked alongside the guardian – the Minister of Finance who was against the program due to a potential decrease in tax collection that would be impacted as a result of adopting the program. The same argument in an opposite direction was used to influence the Ministry of Finance in Sweden since a growing state budget was a potential effect from the adoption of the carbon dioxide tax within the Swedish heating sector. As a result, the Minister of Finance ended up supporting the formulation and adoption of this policy.

Other important policy actors linked to the Swedish case were the Social Democrat Party and STORA. The mediator and the facilitator have a substantial importance for the Swedish culture because consensus is considered an important value as referred to in Chapter 2. The negotiations over the formulation and adoption of the carbon dioxide tax in Sweden would not have been carried out without at least a partial approval from the interest groups involved. After that, the bill would be sent to the parliament who would then decide to implement the carbon dioxide tax by law.

Reconsidering the Brazilian case, the broker was more important in comparison with the mediator and the facilitator in the Swedish analysis. However, the facilitators were important for speeding up the bureaucratic procedures on the power spheres in Brazil. Following the adoption of RenovaBio, the bill was voted at the Chamber of Deputies and subsequently at the Federal Senate which was approved with a large majority. According to the literature, there is a tendency to promote lobbying at the Executive branch when legislative procedures are taking place in Brazil. However, according to interviewees the political lobbying occurred during the entire process for adopting the program.

Indeed, the planning of RenovaBio was also influenced by the political lobbying within the bioenergy sector having efficient policy actors to promote this activity such as UNICA. On the other hand, the opposing coalition also promoted heavy lobby making the process even more complex. Taking into account half of the interviewees, the oil market leader in Brazil and the oil derivative distributing sector held a more powerful lobby than that of bioenergy although this information was not found in the literature. Furthermore, according to the literature, the
bioenergy sector and the related branch associations count on strong and organized lobbying activities in Brazil.

In Sweden, a relatively similar situation happened - the carbon dioxide tax was adopted despite strong lobby against it by powerful policy actors. According to the literature and the results, the pulp and paper industry and related branch associations held a political influence at that time. Plus, the branch associations within the bioenergy sector were also relatively active as far as lobbying goes, as per the literature. However, prior to the adoption of the carbon dioxide tax in Sweden, these organizations were already conquering their space since the bioenergy sector was an emerging sector at that period. Therefore, for both cases analyzed in Sweden and Brazil, the opposing lobby from important interest groups were against the energy policies implemented, according to the results.

In addition, probably the fact that the Swedish Government and part of the Brazilian Government had a relevant interest in adopting these policies was important for both cases. Following the referred analysis and taking into account the position from the leader of the opposing coalition against RenovaBio in Brazil, perhaps the time at which it took place could be considered. As market issues were primarily the focus instead of environmental issues the scenario thereof was considerably complex even for a developing country at the current time. Due to global efforts towards tackling the consequences of climate change, such position could indeed damage the public image of a policy actor.

As previously mentioned, market issues were strongly influencing elements for both cases. According to the Swedish analysis, not only the forestry industry sector but also the majority of the interest groups composing the coalition that supported the adoption of the carbon dioxide were interested in the creation of a biomass market. The majority of the interest groups forming the opposing coalition was not interested in the creation of a biomass market due to concerns over competitiveness. The other components were concerned about the higher costs impacting their business.

For the Brazilian case, the majority of the interest groups composing the coalition in favor of RenovaBio was interested in the empowering biofuels production. Likewise, the majority of the interest groups forming the opposing coalition had no interest in the instruments for supporting the biofuel sector due to competitive concerns. Therefore, market issues could be regarded as a key element for the endorsement or opposition expressed by the majority of the interest groups forming the coalitions for a developed as well as a developing country.

There were exceptions involving the academia, NGOs and some political parties based on ideological positions and other factors besides market issues. However, these interest groups
had a lesser importance within the coalitions. One final aspect of this analysis in which a substantial difference between Sweden and Brazil is considered relates to the importance of public opinion. According to the literature, the public opinion in Sweden pushed the government to include an environmental agenda in its policies. At that time, the adoption of the carbon dioxide tax was influenced by this trend and the perspective of having a carbon dioxide tax was perceived as acceptable by the majority of the citizenships in Sweden. In addition to that and according to the results thereof, the public opinion support was fundamental for the implementation of the carbon dioxide tax in Sweden. The general context was complicated for the creation of new taxes in Sweden even though the carbon dioxide tax involved an environmental dimension that was supported by society in general.

Following the Brazilian analysis, the literature studies did not identify the importance of the public opinion for the implementation of RenovaBio. Furthermore, according to the results the public opinion was not vital in this process. Therefore, if the importance of market issues was a convergent element to this analysis, the relevance of public opinion would be a divergent element too. Not to mention the broadly participation of society in the decision-making process, as previously referred to.

The policy process of the Swedish analysis involved different policy actors that comprised the interest groups throughout this process on a continuous basis whereas the policy process of the Brazilian analysis was not characterized by several policy actors forming the interest groups throughout a gradual process in which society held a participation. Perhaps the public opinion could have had some impact due to the channels of mass communication that were utilized by both coalitions in order to influence the citizens in Brazil.

4.8.3 Discussions over transparency

The Swedish Government made available a relevant amount of comprehensible, usable and quality information related to the planning, formulation and adoption of the carbon dioxide tax for the Swedish population. The legal documents supporting the process are also available in Swedish. However, it is possible to find a substantial amount of reports and official presentations in English on the official webpage of the Swedish Government.

Taking into account the Brazilian analysis, the Brazilian Government made available a significant amount of comprehensible, usable and quality information related to the planning,
formulation and adoption of *RenovaBio* for the population. The legal documents supporting the process are also available in Portuguese. However, there are no information available in English. Additionally, the official documents linked to the declined provisional measure were also not available.
5 CONCLUSION

“Everyone has inside of him a piece of good news. The good news is that you don’t know how great you can be! How much you can love! What you can accomplish! And what your potential is”!

(Anne Frank)

5.1 Initial Considerations

The conclusion of this thesis is presented herein. From the first steps towards the planning of the carbon dioxide tax, through the formulation process up to the respective adoption, this analysis lasted a rich period of 11 years and approached several interest groups within the Swedish heating sector. Following the Brazilian analysis, a similar process has been considered. From the first steps towards the planning of RenovaBio, right through the formulation process up to the respective adoption, this analysis lasted a complex period and approached several interest groups related to the Brazilian bioenergy sector. The conclusion encompasses the research question and the objectives previously described under the introduction. Thereafter, further studies have been presented.

5.2 Conclusion

The analysis showed the importance of the economical dimension within the driving forces, for both a developed and a developing country. For the earlier case, the environmental as well as the political-economical drivers were fundamental for the adoption of the carbon dioxide tax. For the subsequent case, an economical and a political-economical drivers worked together towards the adoption of a program that would support the bioenergy sector.

Exploring the policy-making process, the reduction of GHG emissions and the need for policies to handle this matter have been under discussions among Swedish society since the 1980s. Nevertheless, this movement became stronger in the 1990s. Then, the establishment of
the ECC was a way of including such issues in the policymaker agenda. A continuous process resulted then involving the active participation of Swedish society.

In Brazil, since 2009 the government has been making attempts to include an environmental agenda in its policies. Probably, the ratification of the Paris Agreement strengthened this process. Subsequently, RenovaBio was created due to a demand from the MME for creating a plan that would support the bioenergy sector based on the context of the Paris Agreement. Afterwards, the design of the program involved a few policy actors within the Brazilian society mainly connected to the sugar-energy sector.

From the design of the carbon dioxide tax in Sweden to the adoption of the respective bill a synergic process was brought about. Through the understanding of the dynamics surrounding the interactions among the policy actors that led to the adoption of the carbon dioxide tax within the Swedish heating sector two coalitions were identified. The majority of the forestry industry sector and branch associations related to this sector, the Centre and Green Parties, the great majority of the government, NGOs, academia, municipalities, the DH sector, the agriculture sector and the emerging bioenergy sector supported the adoption of the carbon dioxide tax in Sweden, focusing on the heating sector.

On the other hand, the pulp and paper industry, the industry sector, the related branch associations of these two sectors and the Moderate and Liberal Parties were against the adoption of the carbon dioxide tax within the heating sector. This coalition was smaller but its leader was the pulp and paper industry which held powerful lobby at the Swedish Parliament. In view of this scenario, the mediator and the facilitator – STORA and the Social Democrat Party were fundamental in the mediation of reasonable discussions among coalitions. The coalitions were well organized and structured and their leadership approach was based on the power of persuasion from both sides. In addition to that, market issues were fundamental for both tax supporters and opponents. The former was interested in the creation of a biomass market in Sweden whereas the latter was against such procedure and this was also due to concerns over costs.

Considering the Brazilian case, two coalitions were also identified. The supporting group mainly comprised the majority of the bioenergy sector (industrial, agricultural and regulatory segments) and the related branch associations, academia, the Ministry of Foreign Affairs and the Ministry of Agriculture. The opposing group was formed by the oil market-leader in Brazil, the distributor segment within the bioenergy sector, the Ministries of Finance and Planning, the Civil House, the Bureau of Oil and Gas at MME, and some political parties - PSOL and REDE. Based on this analysis, the leader of the distributor segment - the broker had
a major importance before government and due to its actions a provisional measure to adopt the program was dropped.

The supporting coalition was well structured whereas the opposing one presented some organization issues. There was a lack of dialogue among the latter and the leader could not assume its position because of concerns over public image. Perhaps that explains the use of an instrumental leadership through which actions are taken on an isolated basis by the leader. Indeed, it was complicated for a policy actor to express opposition to a program that would encourage the use of renewable energy, even if such program would burden its own segment, that is, the oil sector.

However, the majority of the opposing coalition was against the program for the same reason – it would burden the oil sector. The great majority of the endorsing coalition was in favor of the program because giving support to the sugar-energy sector was interesting for them. Therefore, market issues were a key factor for the endorsement or opposition by the majority of the interest groups comprising the coalitions in both a developed and a developing country.

Also for both analysis the opposing coalitions were smaller but comprised of powerful interest groups having economic influence and political lobby. Still, the carbon dioxide tax was adopted in Sweden and the RenovaBio in Brazil. Probably the interest in supporting the emerging bioenergy sector in Sweden by the Swedish Government and the interest in supporting the already established sugar-energy sector in Brazil by the Brazilian Government were key elements in this process.

After exploring the converging elements for both the developed and developing cases analyzed, it worth mentioning that the carbon dioxide tax is a well-consolidated case of the analysis whereas RenovaBio still requires time to have the same status due to some bureaucratic procedures within the power spheres. The Swedish analysis disclosed the importance of public opinion when establishing a public policy in a developed country. It is worth bearing in mind that the public opinion in Sweden had already pushed the government to include an environmental agenda in its policies long before the adoption of the carbon dioxide tax in 1991.

According to the Brazilian case, the public opinion was not considered a key factor for the whole policy-making process. Therefore, by analyzing this process regarding public policies in the energy field in both a developed and a developing country, the main difference lies in the importance attributed to the public opinion. Moreover, the broad participation of society throughout the decision-making process was another divergent factor. The Swedish carbon dioxide tax involved many policy actors composing the interest groups from planning to adoption, whereas RenovaBio in Brazil counted only on a few society members.
On the other hand, considering that this multidisciplinary thesis is a descriptive comparison between a developed country marked by a stable environmental agenda and a developing country in which many efforts still need to be considered in order to combine the environmental agenda with its own development affairs, the importance of market issues for both cases is an interesting aspect. The cases cannot present a rigorous comparative analysis since they are temporally, institutionally and contextually different. However, market issues were taken as the most important factors shared by the coalitions either in favour or against the energy policies analysed. As well as the importance of the economical dimension within the driving forces, other aspects have been discussed in this Chapter.

As for transparency issues both cases counted on this element. However, the documents supporting the Brazilian analysis were available only in Portuguese whereas the documents supporting the Swedish case were available not only in Swedish but also in English. Therefore, the transparency verified was relatively higher for the Swedish case since the language used to write the documents is a critical issue. In addition to that, the documents of the provisional measure for the Brazilian case were not available.

5.3 Further Studies

For further studies the following can be considered:

(i) Analysis of the policy-making process related to the Swedish carbon dioxide tax focusing on transportation using a rationalist method, such as the typology of actors that was used in this thesis;
(ii) Analysis of the policy-making process related to the Swedish carbon dioxide tax focusing on transportation using a cognitive method, e.g. the Advocacy Coalitions Framework (ACF)
(iii) Analysis of the policy-making process of RenovaBio using a cognitive method, e.g. the ACF.
References


JOELSSON, J.M. and ATHANASSIADIS, D., Where is the money? - Value flows in the present Swedish forest-based sector. Report to f3 – the Swedish knowledge centre for renewable transportation fuels.


Appendix A: Interview protocol for the case of the carbon dioxide tax for the Swedish heating sector

Information provided to the interviewee: this research focuses on the understanding of the policy process involving the carbon dioxide tax implementation in Sweden for the heating sector through the period of planning to the actual adoption.

Driving forces converging to introduce the carbon dioxide tax within the Swedish heating sector

1. The carbon dioxide tax was introduced in 1991. Why was it created and adopted?
2. What were the main reasons and motivations thereof?

Actors

1. How was the negotiation process regarding the carbon dioxide tax within the Swedish heating sector held? Who were the most important actors in its planning, formulation and adoption?
2. Did anyone take a leadership role?
3. Who supported this leader by helping in the formulation and adoption of the carbon dioxide tax within the Swedish heating sector?
4. Were there any actors who protected the leader against threats and aggressions?
5. Was there anyone trying to compete with the leader? If so, why?
6. Did anyone mediate negotiations, suggesting solutions for stalemates?
7. Did anyone try to influence the decision-making process aiming at specific interests?
8. Were there any important medium-size organizations involved in this process?
9. Were there any important small-size organizations involved in this process?
10. Regarding the leadership position, was the process based on efficient communication skills, persuasion or use of power, influence and resources? Or was there a combination of all these situations?
Opposing movements

1. Were there any opposing movements in relation to the planning, formulation and adoption of the carbon dioxide tax within the heating sector? If so, why?
2. Is it possible to consider the same structure referred to above? If so, who was the leader, the anti-leader, the guardian, the mediator, the broker, the medium-size organizations and smaller organizations against the formulation and adoption of the carbon dioxide tax focusing within the heating sector?
Appendix B: Interviews for the case involving the carbon dioxide tax within the Swedish heating sector

The table below presents the interviews conducted thereof. In order to preserve confidentiality, companies and the names of interviewees have not been revealed.

Table 1: Organizations and interviews

<table>
<thead>
<tr>
<th>Type of organization</th>
<th>Occupation of informants</th>
<th>Number of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>Government employee</td>
<td>2</td>
</tr>
<tr>
<td>Environmental Charge Commission (ECC)</td>
<td>Expert</td>
<td>2</td>
</tr>
<tr>
<td>Municipalities</td>
<td>Municipality employee</td>
<td>1</td>
</tr>
<tr>
<td>DH sector</td>
<td>DH sector employee</td>
<td>1</td>
</tr>
<tr>
<td>NGOs</td>
<td>NGO employee</td>
<td>1</td>
</tr>
<tr>
<td>Forestry Sector</td>
<td>CEO of forestry industry sector, employee of branch organizations</td>
<td>4</td>
</tr>
<tr>
<td>Energy Intensive Industry</td>
<td>CEO</td>
<td>1</td>
</tr>
<tr>
<td>Academia</td>
<td>Professor</td>
<td>1</td>
</tr>
<tr>
<td>Political Parties</td>
<td>Politician and former minister</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 2: Personal Communication

<table>
<thead>
<tr>
<th>Personal Communication</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government employee</td>
<td>PC1</td>
</tr>
<tr>
<td>Government employee</td>
<td>PC2</td>
</tr>
<tr>
<td>Expert</td>
<td>PC3</td>
</tr>
<tr>
<td>Expert</td>
<td>PC4</td>
</tr>
<tr>
<td>Municipality employee</td>
<td>PC5</td>
</tr>
<tr>
<td>DH sector employee</td>
<td>PC6</td>
</tr>
<tr>
<td>NGO employee</td>
<td>PC7</td>
</tr>
<tr>
<td>CEO of forestry industry sector</td>
<td>PC8</td>
</tr>
<tr>
<td>Branch organization</td>
<td>PC9</td>
</tr>
<tr>
<td>Branch organization</td>
<td>PC10</td>
</tr>
<tr>
<td>Branch organization</td>
<td>PC11</td>
</tr>
<tr>
<td>CEO of energy intensive industry</td>
<td>PC12</td>
</tr>
<tr>
<td>Professor</td>
<td>PC13</td>
</tr>
<tr>
<td>Politician</td>
<td>PC14</td>
</tr>
<tr>
<td>Former minister</td>
<td>PC15</td>
</tr>
</tbody>
</table>
APPENDIX C: Interview protocol for the case of RenovaBio in Brazil

Information provided to the interviewee: focuses on the understanding of the policy process involving the program RenovaBio in Brazil throughout the period from planning to adoption.

Driving forces converging to promote RenovaBio in Brazil

1. Why was RenovaBio formulated and adopted?
2. What were the main reasons and motivations thereof?

Actors

1. How was the negotiation process regarding RenovaBio held? Who were the most important actors in its planning, formulation and adoption?
2. Did anyone take a leadership role?
3. Who supported this leader by helping in the formulation and adoption of the program?
4. Were there any actors who protected the leader against threats and aggressions?
5. Was there anyone trying to compete with the leader? If so, why?
6. Did anyone mediate negotiations, suggesting solutions for stalemates?
7. Did anyone try to influence the decision-making process aiming at specific interests?
8. Were there any important medium-size organizations involved in this process?
9. Were there any important small-size organizations involved in this process?
10. Regarding the leadership position, was the process based on efficient communication skills, persuasion or use of power, influence and resources? Or was there a combination of all these situations?

Opposing movements

1. Were there opposing movements to the planning, formulation and adoption of RenovaBio? If so, why?
2. Is it possible to consider the same structure referred above? If so, who was the leader, the anti-leader, the guardian, the mediator, the broker, the medium-size and the small-size organizations against the formulation and adoption of RenovaBio?
APPENDIX D: Interviews for the case involving the program RenovaBio in Brazil

The table presents the interviews conducted thereof. In order to preserve confidentiality, companies and the names of interviewees have not been revealed.

Table 1: Organizations and interviews

<table>
<thead>
<tr>
<th>Type of organization</th>
<th>Occupation of informants</th>
<th>Number of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>Politician</td>
<td>1</td>
</tr>
<tr>
<td>Ministries</td>
<td>Civil servant</td>
<td>3</td>
</tr>
<tr>
<td>Public agencies</td>
<td>Employee</td>
<td>4</td>
</tr>
<tr>
<td>Academia</td>
<td>Professor, researcher</td>
<td>3</td>
</tr>
<tr>
<td>Branch organization</td>
<td>CEO, President</td>
<td>3</td>
</tr>
<tr>
<td>Sugarcane Industry</td>
<td>CEO</td>
<td>1</td>
</tr>
<tr>
<td>Private sector</td>
<td>CEO, advisor</td>
<td>2</td>
</tr>
<tr>
<td>Semi-public companies</td>
<td>Employee</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2: Personal Communication

<table>
<thead>
<tr>
<th>Personal Communication</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Politician</td>
<td>PC1</td>
</tr>
<tr>
<td>Government employee</td>
<td>PC2</td>
</tr>
<tr>
<td>Government employee</td>
<td>PC3</td>
</tr>
<tr>
<td>Government employee</td>
<td>PC4</td>
</tr>
<tr>
<td>Civil servant</td>
<td>PC5</td>
</tr>
<tr>
<td>Civil servant</td>
<td>PC6</td>
</tr>
<tr>
<td>Civil servant</td>
<td>PC7</td>
</tr>
<tr>
<td>Civil servant</td>
<td>PC8</td>
</tr>
<tr>
<td>Professor</td>
<td>PC9</td>
</tr>
<tr>
<td>Professor</td>
<td>PC10</td>
</tr>
<tr>
<td>Researcher</td>
<td>PC11</td>
</tr>
<tr>
<td>CEO</td>
<td>PC12</td>
</tr>
<tr>
<td>Director</td>
<td>PC13</td>
</tr>
<tr>
<td>President</td>
<td>PC14</td>
</tr>
<tr>
<td>CEO</td>
<td>PC15</td>
</tr>
<tr>
<td>Advisor</td>
<td>PC16</td>
</tr>
<tr>
<td>Employee</td>
<td>PC17</td>
</tr>
<tr>
<td>Employee</td>
<td>PC18</td>
</tr>
</tbody>
</table>
APPENDIX E: Conferences and workshops

The table presents information on conferences and workshops relevant to the thesis.

<table>
<thead>
<tr>
<th>Conference / Workshop</th>
<th>Date</th>
<th>Place</th>
<th>Researcher’s role</th>
</tr>
</thead>
<tbody>
<tr>
<td>X Brazilian Congress of Energy Planning (XCBPE)</td>
<td>26 - 28 Sep. 2016</td>
<td>Gramado, Brazil</td>
<td>Speaker (oral presentation)</td>
</tr>
<tr>
<td>24th Conference of the Parties to the UNFCCC (COP24)</td>
<td>11 - 13 Dec. 2018</td>
<td>Katowice, Poland</td>
<td>Observer</td>
</tr>
<tr>
<td>ITM PhD Student Conference 2019</td>
<td>10 - 11 Apr. 2019</td>
<td>Stockholm, Sweden</td>
<td>Participant</td>
</tr>
<tr>
<td>Trade and environment – the UNCTAD agenda</td>
<td>10 May 2019</td>
<td>Stockholm, Sweden</td>
<td>Participant</td>
</tr>
<tr>
<td>Finance driving sustainability: exploring opportunities and obstacles</td>
<td>14 May 2019</td>
<td>Stockholm, Sweden</td>
<td>Participant</td>
</tr>
<tr>
<td>Sustainability and Circular Economies: Collaborating for a Resilient Future</td>
<td>16 May 2019</td>
<td>Stockholm, Sweden</td>
<td>Participant</td>
</tr>
<tr>
<td>UN talks: Investing in Core Governments Functions – a Road to Peace</td>
<td>4 Jun. 2019</td>
<td>Stockholm, Sweden</td>
<td>Participant</td>
</tr>
<tr>
<td>Climate Culture Conference</td>
<td>12 Jun. 2019</td>
<td>Stockholm, Sweden</td>
<td>Participant</td>
</tr>
</tbody>
</table>