

# **Explaining Divergent Energy Paths: Electricity Policy in Argentina and Uruguay**

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## **Acronyms**

AEEE: Asociación Argentina de Energía Eólica [Argentinean Association of Wind Energy]

ACF: Advocacy Coalition Framework

AGEERA: Asociación de Generadores de Energía Eléctrica de la República Argentina [Association of Energy Electricity Generators in the Argentinean Republic]

AHK Uruguay: Deutsch-Uruguayische Industrie- und Handelskammer

ANCAP: Administración Nacional de Combustibles Alcohol y Portland [National Administration for Fuels, Alcohol, and Portland]

AUDEE: Uruguayan Association of Wind Energy

BAU: Business as Usual

BMU: Bundesministerium für Umwelt,

CACME: Comité Argentino del Consejo Mundial de Energía

CADER: Cámara Argentina de Energías Renovables [Argentinean Chamber of Renewable Energy]

CAMMESA: Compañía Administradora del Mercado Mayorista Eléctrico [Administration Company of the Electricity Gross Market]

CAREM 25: Central Argentina de Elementos Modulares 25 MW

CCGT: Combined Cycle Gas Turbine

CDM: Clean Development Mechanism

CEA: Commissariat à l'Énergie Atomique et aux Énergies Alternatives [Atomic Energy and Alternative Energies Commission]

CFEE: Consejo Federal de la Energía Eléctrica [Federal Council of the Electricity Energy]

CNEA: Comisión Nacional de Energía Atómica [National Commission of Nuclear Energy]

CONICYT: Science and Technology Council

COP15: Copenhagen Climate Change Conference

CREE: Regional Centre of Wind Energy

DGF: Dirección General Forestal del Uruguay [Uruguay's General Directorate of Forestry]

DINAMA: Dirección Nacional de Medio Ambiente de Uruguay [Environmental National Direction of Uruguay]



DINOT: Dirección Nacional de Ordenamiento Territorial [Territorial Planning National Direction]

DNE: Dirección Nacional de Energía [National Direction of Energy]

EDF: Électricité de France [Electricity of France]

EEG: Erneuerbare Energie Gesetz

ENARSA: Energía Argentina S.A. [Argentinean Energy S.A.]

EU: European Union

FA: Frente Amplio [Broad Front]

FARN: Fundación Ambiente y Recursos Naturales [Natural Resources and Environmental Foundation]

FIT: Feed-in Tariff

FEP: Foro de Ecología Política [Political Ecology Forum]

FVS: Fundación Vida Silvestre [Wildlife Foundation]

GEF: Global Environmental Facility

GHG: Greenhouse Gas

GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit

IAE: Instituto Argentino de la Energía General Mosconi [Argentinean Institute of the Energy General Mosconi]

IDB: Inter – American Development Bank

IFIs: International Financial Institutions

IFU: Investment Fund for Developing Countries

IMF: International Monetary Fund

INC: Instituto Nacional de Colonización [Settlement National Institute]

IPCC: Intergovernmental Panel on Climate Change

IRENA: International Renewable Energy Association

MEM: Mercado Eléctrico Mayorista [Wholesale Electricity Market]

MERCOSUR: Mercado Común del Sur [Southern Common Market]

MIEM: Ministerio de Industria, Energía y Minería [Ministry of Industry, Energy, and Mining]

MINPLAN: Ministerio de Planificación Federal, Inversión Pública y Servicios [Ministry of Federal Planning, Public Investment and Services]

MVOTMA: Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente [Ministry of Housing, Territorial Planning, and the Environment]

NGOs: Non-governmental Organizations

PE: Punctuated-equilibrium

PNUD – LAC: Programa de las Naciones Unidas para el Desarrollo – Centro Regional Para América Latina y el Caribe [United Nations Environment Programme – Regional Centre Latin America and the Caribbean]

PROBIO: Proyecto de Producción de Electricidad a partir de Biomasa [Electricity Generation Project from Biomass]

GENREN: Programa de Licitación de Generación Eléctrica a partir de Fuentes Renovables [Electricity Generation Program for Renewable Energy]

PRONUREE: Programa Nacional de Uso Racional y Eficiente de la Energía [National Program for Rational and Efficient Energy]

PURPA: Public Utility Regulatory Policies Act

SEGBA: Servicios Eléctricos del Gran Buenos Aires S.A. [Electrical Services of Greater Buenos Aires SA]

SRU: Sachverständigenrat für Umweltfragen

StrEG: Stromeinspeisungsgesetz

UBA: Universidad de Buenos Aires [University of Buenos Aires]

UDELAR: Universidad de la República [University of the Republic]

UNDP - GEF: United Nations Development Programme – Global Environment Facility

UNDP – LAC: United Nations Development Programme – Latin America and the Caribbean

UNEP: United Nations Environmental Program

UNFCCC: United Nations Framework Convention on Climate Change

UREE: Regulatory unity of the electrical energy

UTE: Administración Nacional de Usinas y Trasmisiones Eléctricas [National Administration of Power Plants and Electricity Transmissions]

UTN: Universidad Tecnológica Nacional [National Technological University]

UWEP: Uruguay Wind Energy Programme

WB: World Bank

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# 1 Introduction

*“Like orientalism, globalism is a creative product of human imagination, disciplined by techniques, skills, tools, schools of thought, institutions, and practices for producing knowledge”.*

Clark A. Miller (2004, p. 82)

## 1.1 Definition of the research topic

South America is a region that has been suffering from tremendous energy demand problems. In response various countries have started to promote sustainable energy policies. Although problems in the region are very similar, energy policies adopted by these countries show different patterns. South American energy policy is a fascinating subject to study but it has received very little attention in the literature to date. In this dissertation, Argentina and Uruguay, two countries that have been experiencing rapid socioeconomic transition, are compared in relation to their energy policies related to electricity supply and the question is why they are pursuing different policies in terms of how to respond to supply shortages.

Both Argentina and Uruguay have faced energy supply shortages since 2004. Yet, while Argentina decided to focus more on increasing nuclear power and start developing unconventional fossil fuels and, to a lesser extent, some renewable energy, Uruguay rejected nuclear power and decided to begin significant development of renewable energy supplemented by liquefied natural gas (LNG) that is processed in one combined cycle gas turbine (CCGT) plant. The paradox is that having one of the most important domestic wind industries of South America, outstanding renewable resources and previous regulation in the sector, Argentina did not consider deploying renewable energy as a significant source to solve their electricity shortage. In contrast, Uruguay, which must import all components for their renewable energy systems and had no previous policies promoting the sector, saw in the development of renewable energy a good alternative to diversify their electricity mix and solve their electricity scarcity problem. This work will answer the following research question: Why Argentina and Uruguay pursued different energy policies in response to the energy

supply challenges they began to face in the mid 2000s?

Understanding the different policy decisions requires an explanation of the institutional and policy framework of both countries. The aim of this study is to compare the similarities and differences between the countries' energy policies, and in particular their support of renewable, especially wind power, and nuclear energy; the research explains the referred *why* question as well as *how* certain policy ideas, understandings or beliefs (but not others) were adopted in their energy policies. This comparative case study of the historical policy process of energy policy, seeks to understand *why* the countries showed different commitments to different forms of energy and *how* the development of renewable and nuclear energy in particular can be explained in each case, trying to identify supportive and hindering factors.<sup>1</sup> A discussion about the possibilities renewable energy might have in Argentina in the next years is considered as well.

As South American post-dictatorships that have been transitioning to liberal democracies, Argentina and Uruguay share several common patterns which strongly condition the way they have been dealing with energy challenges in the last two decades. Since the early 1990s, both countries have been conducting reforms in various sectors, including the electricity sector. Reforms in the electricity sector include transitions from more state-owned to more liberalized electricity systems, greater public participation and the emergence of new actors with new policy beliefs. In addition, their gross domestic products (GDPs) have achieved quite high rates reflecting their great economic growth, especially after the financial crisis of 2001–02. In fact, from 2003 until 2012 Argentina and Uruguay experienced an average GDP growth rate of 8.13% and of 5.21% per year, respectively. Whilst for Argentina the highest GDP growth rate was 9.179% (2005) and the lowest 0.85% (2009), for Uruguay the highest corresponded to 8.895% (2010) and the lowest 2.327% (2003) (IMF 2012).<sup>2</sup> This rapid economic growth has had many implications for both the environment and the energy system.

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<sup>1</sup> The dissertation uses the term renewable energy to refer to renewable energy sources excluding large hydropower.

<sup>2</sup> Source: World Economic Database (April 2012)  
<http://www.imf.org/external/pubs/ft/weo/2012/01/weodata/weorept.aspx?pr.x=50&pr.y=5&sy=1998&e>

Economic growth in Argentina and Uruguay is mainly supported by extractive industries. Economic growth is the priority for both governments and environmental policies are seen as an obstacle for their main objective: the achievement of a great economic developmental transformation based on export diversification. Fernando Mires states in regard to Latin America, “‘Export diversification’ is the new magic yardstick of the ‘growth ideology’. As a result of this dictation, many countries are already turning the most valuable of their soil to a world market that determines not only the prices but also the desired monocultures, the genetic adaptations up to the size of the animal and agricultural products [...] Naturally, there is no place for ecologists in this environment, but rather they are viewed as undesirable factors” (1996, pp. 70–71).<sup>3</sup> This export model is based on exploitation of natural resources, and has thus been called “neo– extractivism” (Gudynas 2009)<sup>4</sup> to differentiate it from the conventional extractivism of the 1980s and especially the 1990s, in which the state played a minimal role, transferring decision powers to the market. Under “neo– extractivism”, however, progressive governments—also called “new lefts” due to their left ideological roots—assign a stronger role to the state. The latter intervenes directly or indirectly in the extractive sector.

Moreover, economic growth has had an enormous impact on energy demand in both countries. During the 1990s Argentina had an overproduction of natural gas and an excess of supply, which it exported to its neighbours, Uruguay and Chile. Energy exports and energy self-sufficiency worked well in the short term, bringing many economic benefits to Argentina. However, energy demand increased and the government failed to provide a favorable climate for investment into the exploration of natural gas, or the development of other sources, such as nuclear, renewable energy or energy efficiency. As a consequence, overall Argentinean energy supply capacity

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y=2013&scsm=1&ssd=1&sort=country&ds=.&br=1&c=213%2C298&s=NGDP\_RPCH&grp=0&a=#c  
s1.

<sup>3</sup>“... ‘Exportdiversifizierung’, die neue magische Meßlatte der ‘Wachstumsideologie’. Infolge dieses Diktats sind viele Länder bereits dabei, das Wertvollste ihrer Böden einem Weltmarkt zuzuwenden, der nicht nur die Preise, sondern auch die gewünschten Monokulturen, die genetischen Anpassungen bis hin zum Format der tierischen und agrarischen Erzeugnisse festlegt [...] Naturgemäß ist in diesem Umfeld für Ökologen kein Platz; vielmehr werden sie als unerwünschte Faktoren angesehen” (Mires 1996, pp. 70-71).

<sup>4</sup> Source: The term ‘neo– extractivism’ appeared for the first time in the publication, ‘*Diez tesis urgentes sobre el nuevo extractivismo. Contextos y demandas bajo el progresismo sudamericano actual*’ of Eduardo Gudynas (2009).



diminished. As Marina Recalde points out “energy policy has not been properly used to contrast the lack of coordination between fossil energy reserves management and electricity demand” (2011, p. 3866). Inadequate investments in the energy sector in conjunction with the growth in energy demand that was caused by strong economic growth provoked an insufficient supply capacity. In 2004 the reserves to production ratio of natural gas were greatly diminished (Recalde 2011). In 2005 the government decided to stop the export of natural gas affecting critically the electricity supply of Uruguay, which had become highly dependent on Argentinean gas imports. Uruguay could not count on Argentinean natural gas anymore. This put serious pressure on the country to look for other alternatives. In the case of Argentina, the energy situation deteriorated even more after 2010. The country began importing fossil fuels to supply its electricity demand and this increased pressure on policymakers to address rapid solutions.

Basically from 2004–05, Argentina and Uruguay started to seek new alternatives to face serious energy challenges. In the case of Argentina these are related to the rapid and unexpected increase in electricity demand, the need for energy access in rural and peri-urban areas without grid connection and, to a less extent, the pressure to reduce greenhouse gas (GHG) emissions. Uruguay has similar problems to Argentina although the need for energy access in rural and peri-urban areas without grid connection is less pressing due to the high degree of electrification of the country. Two very different alternative policy options were discussed and pursued. The Argentinean government rapidly decided to follow a nuclear energy path and introduced goals for wind and other renewable energies; Uruguay, after some years of public debate, decided finally not to develop nuclear energy at least not until 2030 and instead to develop renewable energies, mainly wind and biomass.

In the case of Argentina the Strategic National Plan of the Nuclear Sector was launched in 2006 by the first Kirchner administration. Its goal was to reactivate the construction of Atucha II, a nuclear power plant that started its construction in 1981 but was suspended in 1994 (at the time it was 71.5% completed), and relaunch other objectives of the previous nuclear program that had been sidelined since the mid 1980s due mostly to increasing economic hardship. After the return of democracy the economic situation of the country deteriorated significantly and the economic resources traditionally directed at the nuclear plan seemed unjustifiable. Also in 2006,

the Kirchner government issued the renewable energy Law N° 26190 with the objective that by the year 2016, 8% of the electric power supply must come from renewable energy sources. The Argentinean law establishes a sort of a feed-in-tariff (FIT) that provides a fixed premium tariff on top of the electricity price for 15 years and tax exemptions. Law N° 26190 went into effect in 2009 and at the same time the government launched the program '*Electricity Generation Program for Renewable Energy*'<sup>5</sup> (GENREN) to hold a competitive auction for renewable energy and achieve the 8% of renewable energy electricity by 2016 (about 1000 MW), announcing that 500 MW would come from wind energy production (Secretary of Energy 2010).<sup>6</sup> There were, however, earlier precedents. Argentina issued a wind and solar energy law in 1998, the first national regulation to promote wind and solar power, and a few cooperatives started micro-generation of wind energy in the province of Chubut in 1994.<sup>7</sup>

Uruguay started to promote the development of renewable energy through an auction scheme launched in several decrees (N° 77/2006; N° 403/2009, and N° 41/2010) as well as through the national energy policy, called *Energy Policy 2005-2030*, ratified in 2010. The Decrees of 2009-2010 and the *Energy Policy 2005-2030* established the initial goal of achieving 300 MW (9% in the generation electricity mix) of wind power by 2015 revised to 1200 MW (24% in the generation electricity mix) in 2012; the energy policy assigned a priority to renewable energy as a widespread state policy. The earliest wind energy project in Uruguay was the wind turbine built between 1998 and 2000, a project of the University of the Republic (UDELAR) and the National Administration of Power Plants and Electricity Transmissions (UTE), financed by the Inter-American Development Bank Science

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<sup>5</sup> Note that in order to facilitate the reader's understanding, all the names of national and official programs, institutions, documents, regulations, and citations are translated here from Spanish to English. German names are usually given in both their original language as well as their English translation.

<sup>6</sup> Source: "Resumen GENREN"  
[http://energia3.mecon.gov.ar/contenidos/archivos/Reorganizacion/informacion\\_institucional/discursos/genren/resumen\\_genren.doc](http://energia3.mecon.gov.ar/contenidos/archivos/Reorganizacion/informacion_institucional/discursos/genren/resumen_genren.doc).

<sup>7</sup> In 1994, the first wind park (500 kW) of the country, called Antonio Morán, was installed in the province of Chubut (municipality of Comodoro Rivadavia) by the Limited Popular Cooperative Society (S.C.P.L.). This cooperative together with the Danish wind company Micon and the Danish Investment Fund for Developing Countries (IFU) formed a society named PECORSA, which is responsible for the park. Source: <http://www.scpl.coop/index.php?page=ver&nid=88>; <http://www.ifu.dk/en/Investments>.

and Technology Council (IDB-CONICYT). Also, Uruguay issued a law in 1997 that changed the structure of the monopoly of the public company UTE, enabling private actors to generate electricity and compete with UTE, at the same time that they forbade nuclear power activities. These developments allowed private actors to start investing in renewable energy sources.

The electricity crisis engendered divergent positions and priorities towards nuclear power and renewable energy in Argentina and Uruguay. Similar differences emerged between Germany and France beginning in the mid 1970s making a comparison with the South American situation interesting. The German and French experiences provide good examples about the conflicts between different actors in relation to the choice of whether to develop renewable energy or nuclear power. This dissertation examines what can be learned from these two countries and, which similarities and differences exist between the two European countries and Argentina and Uruguay. The references to Germany and France matter as the position and significance of their nuclear power and renewable energy policies have diverged greatly. While Germany—together with Spain, Denmark, and California—is considered one of the worldwide pioneers in the deployment of wind and renewable energy, France—together with Canada, Japan, Sweden, and US—is deemed to be a reference in nuclear energy. Germany and France are not, however, treated as full-blown case studies here. Rather, attention is given to the differences in the evolution of their nuclear and/or renewable policies to see whether there are elements that might be interesting to apply in Argentina and Uruguay for a better understanding of the policy process in these two countries. The policy process behind the encouragement of renewable energy and nuclear power in Argentina and Uruguay will also be viewed from the perspectives of what happened in Germany and France as countries that were pioneering in these technologies.

The comparison of similarities and differences entails both *how* and *why* questions. The *how* question describes the (policy) process behind the development of renewable and nuclear energy and the way key actors related to these options. This will be examined using the advocacy coalition approach (Sabatier and Jenkins-Smith 1993). The *why* question explains under which factors actors' interactions were constrained, facilitated or conditioned to take certain policy decisions instead of others. To answer the question of *why* the countries are following different energy

paths, the framework of the punctuated equilibrium (Baumgartner and Jones 1993, 2009) with special focus on historical institutionalism (Hall 1992; King 1992; Thelen 1999; Thelen and Steinmo 1992) is used. The study of the development of relevant political institutions will shed light on current (policy) decisions. The examination about whether, and how the two case study countries have observed and been influenced by international practices will be referred to as the international policy learning process.

The study starts with a background introduction to the political history of Argentina and Uruguay since the return of democracy to these countries in 1983 and 1985, respectively. It will then analyze the important events and strategic decisions taken in the electricity sector since the year 1994 for Argentina and 1997 for Uruguay that influenced the subsequent decisions to develop renewable and/or nuclear energy. For the case of Argentina it will be started in 1994 with the first wind energy developments as well as the decision to suspend the nuclear program. For Uruguay the starting point will be the partial loss of the monopoly of UTE as well as the forbidding of nuclear power in 1997 (Law No. 1683) and the installation of the first wind turbine as a pilot project between 1998 and 2000. The main focus, however, will be from 2003-04 until 2014 during which time both countries began to face inadequate domestic electricity supply relative to their growing energy demand.

## **1.2 State of the Art**

### **1.2.1 Empirical Importance and Significance of Electricity Policy in Argentina and Uruguay**

Some political and historical economic researches are related to the electricity and energy sector in Argentina and Uruguay. In Argentina, this literature explains, for example, the electricity reforms during the 1990s (e.g. Nagayama and Kashiwagi 2007; Pollitt 2008) and the electricity 're-reforms' undertaken after the socioeconomic crisis of 2001-02 (Haselip and Potter 2010). Other works focus more on the problems of Argentina's inadequate and inconsistent energy policy development (Montamat 2007; Recalde 2011; Recalde and Guzowski 2012, among others). In the case of Uruguay, it is possible to mention the doctoral research of Reto Bertoni (2010) in the

historical economic field, in an attempt to incorporate the energy restriction in the analysis of the factors that influenced the failed economic development of Uruguay, analyzing the period 1880-2000. The work of Bertoni, Virginia Echinope, Rossana Gaudio, Rafael Laureiro, Mónica Loustaunau, and Javier Taks (2010) focuses more on the specific problems of Uruguay's traditional inadequate energy policy and the current transition, including the deployment of renewable energy, observed in the sector.

There are a few publications about renewable energy policy instruments in Latin American countries (Jacobs et al. 2013; IRENA Report 2013)<sup>8</sup> and some studies focusing on renewable and nuclear energy policies in Argentina and Uruguay. However, there are no comparative case studies and only a handful of single country case studies concerning renewable and/or nuclear energy policy in Argentina and Uruguay. Relevant for nuclear policies is the work of Julio C. Casarales (1999), explaining the historical origins of nuclear policy in Argentina and its political significance for the country. While there has been some attention paid to biofuels and soy-based biodiesel research area in Argentina (Mathews and Goldsztein 2009; Lamers et al. 2008; Timilsina et al. 2013; Tomei and Upham 2009, among others), the only publications on renewable energy policy in the electricity sector of Argentina are the writings of Carina Guzowski and Recalde (2008) and the master thesis of Akiko Urakami (2011). Both refer to the barriers to the deployment of renewable and wind energy in the country. The former explains them briefly and classifies these into four groups: economics (investment and O&M costs), financial, institutional (externalities measurement error) and legal (regulation) factors, assigning the major importance to financial barriers and the lack of national energy policies (Guzowski and Recalde 2008). The latter analyzes more deeply the intrinsic problems of regulations and programs promoting renewable energy development in the country and how they could be improved, assigning a great importance to the lack of investment certainty for renewable energy developers (Urakami 2011).

Except for the work of Bertoni et al. (2010), which refers briefly to the implementation of the early renewable energy policies and the national debate about nuclear power, there is basically no social science research on Uruguay's renewable

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<sup>8</sup> Source:  
[http://www.irena.org/DocumentDownloads/Publications/IRENA\\_Renewable\\_energy\\_auctions\\_in\\_developing\\_countries.pdf](http://www.irena.org/DocumentDownloads/Publications/IRENA_Renewable_energy_auctions_in_developing_countries.pdf).

energy policy even though it is quite active in the field. The Uruguayan case is interesting because it has issued a long-term national energy policy that has given security to foreign renewable companies and, thus, boosted the promotion of international investments into the domestic market. Thus, Uruguay can serve as a good example for Argentina, providing the country with some lessons in the importance of long-term energy policy.

This research project addresses this empirical gap. In particular, it begins with the application of theories and approaches coming from political science in the energy policy related to electricity supply (nuclear, gas) and more specifically to renewable and wind energy sectors, a policy area which remains under-explored in the South American region—except for the isolated case of Brazil—, especially in the two countries analyzed here: Argentina and Uruguay. Also, there are good methodological and empirical reasons for the selection of these two cases.

These two countries belong to two different groups within the “new left”, which currently dominates in the subcontinent (see chapter 4 for more details). Argentina represents the traditional populist, self-oriented, nationalist, and secessionist group while the culturally similar neighbor country Uruguay represents the more open, modern, international, and reformist category (Chapter 4).

Second, since these two South American countries have experienced similar historical trajectories and have a lot of common patterns in their policy-making processes, both cases can be quite well compared. Both have undertaken reforms in the electricity sector during the 1990s. Argentina liberalized its electricity sector and unbundled it into separate industries responsible for generation, transmission, and distribution in 1992. Uruguay opened its market for electricity generation to competition in 1997 but maintained UTE’s monopoly in the transmission and distribution of electricity. Moreover, as was mentioned above, Argentina and Uruguay are facing similar challenges in their electricity sectors: both are greatly dependent on fossil fuels (see below table 1) and suffer from a severe lack of domestic electricity generation capacity. This is a result of a combination of the legacy of bad energy policy choices in the past and a rapid increase in electricity demand due to their rapid GDP growth (see Recalde 2011 for the case of Argentina).

**Table 1.1 National Electricity Mix of Argentina and Uruguay**

Uruguay (2014)	Hydropower 74%	Biomass 13%	Oil and its by- products 7%	Wind 6%	Imported Electricity 0%
Argentina (2014)	Hydropower 31.3%	Nuclear 4.1%	Natural Gas, Oil & Coal 64.1%	Wind & Solar 0.5%	Imported Electricity 1.06%

Source: Author based on data from the *Annual Report 2014* of Administration Company of the Electricity Gross Market (CAMMESA)<sup>9</sup> for Argentina and from the *Preliminary Energy Balance Report 2014* of National Direction of Energy – Ministerio de Industria, Energía y Minería (DNE – MIEM) for Uruguay.<sup>10</sup>

Table 1.1 shows the electricity generation mix in 2014. Argentina has little diversification of the electricity mix, as it has a large dependency on fossil fuels and, to a lesser extent, also on hydropower. Uruguay relies primarily on hydropower, but has increasing participation of renewable energy sources (principally biomass and wind) in the electricity generation mix, showing that is eager to develop renewable energy. For Uruguay the diversification of the electricity mix through the increase of renewable sources is a good alternative that can help in improving energy security and autonomy, minimizing human risks and environmental impacts. Argentina, in contrast, shows relatively less interest in renewable energy; renewables are simply considered a supplementary energy source to traditional sources (i.e. gas, nuclear, and large hydropower). It is important to highlight that since 2011 Argentina began to import gas and oil because their fossil fuel reserves as domestic supplies diminished. This is one of the reasons why Argentina wishes to expand its nuclear energy beyond the 4.1% currently in the electricity mix (table 1.1.). In 2013 Argentina’s leaders also expressed interest in fracking for shale gas and oil. From an energy security

<sup>9</sup> Source: CAMMESA 2014  
[http://www.cammesa.com/archcount.nsf/LinkCounter?OpenAgent&X=InformeAnual\\*2014\\*Vannual14.zip&L=/linfoanu.nsf/WInforme+Anual/5485544A5806855203257E3C0066C1E4/\\$File/Vannual14.zip](http://www.cammesa.com/archcount.nsf/LinkCounter?OpenAgent&X=InformeAnual*2014*Vannual14.zip&L=/linfoanu.nsf/WInforme+Anual/5485544A5806855203257E3C0066C1E4/$File/Vannual14.zip)

<sup>10</sup> Source: DNE - MIEM 2014  
<http://www.dne.gub.uy/documents/15386/6508173/BALANCE%20PRELIMINAR%202014.pdf>

perspective unconventional gas and oil sources will likely improve Argentina's energy security situation. From an environmental perspective, however, there is great concern about the impact hydraulic fracturing could cause in Neuquén, the province where drilling is most likely.

Both countries share similar characteristics concerning their international commitments to climate change and renewable energy agreements and their participation in climate change negotiations. Both Argentina and Uruguay signed the Kyoto Protocol in 1998 and ratified it in 2001.<sup>11</sup> They are both members of the International Renewable Energy Agency (IRENA), having signed the Statute on the 26 January 2009.<sup>12</sup> This is particularly relevant since Argentina, Uruguay, and Ecuador are the only formal South American members of IRENA.

In relation to the program *Climate policy project 2012: Preparing climate strategies*, launched in 2008 by the United Nations Development Program (UNDP) – Regional Centre for Latin America and the Caribbean (LAC), both countries have received support to promote actions in different sectors.<sup>13</sup> Indeed, in Uruguay the project has been supporting national discussions about key issues and strategic actions for climate change mitigation in the energy and electricity sectors. In Argentina, the UNDP – LAC has focused more on supporting sectors like farming, cattle, soybeans, and biofuels production as well as protection of native forests.

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<sup>11</sup> Source: *United Nations Framework Convention on Climate Change* (UNFCCC)  
[http://unfccc.int/kyoto\\_protocol/status\\_of\\_ratification/items/2613.php](http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php).

<sup>12</sup> Source: IRENA Membership  
[http://www.irena.org/DocumentDownloads/Procurement/Annex%20II\\_membership%20list\\_05.07.2013.pdf](http://www.irena.org/DocumentDownloads/Procurement/Annex%20II_membership%20list_05.07.2013.pdf).

<sup>13</sup> The United Nations Development Program (UNDP) launched a large Ibero-American regional project called *Climate Policy 2012* to support Latin American countries facing climate change in September 2008. This project, coordinated by the Regional Centre for Latin America and the Caribbean (LAC) has had two phases. In its first phase, the project *Climate Policy 2012* supported countries in their national and sectoral financial planning. In its second phase, *Climate Strategies 2012*, is providing support for countries to promote actions in different sectors related to climate mitigation and climate adaptation.

See: <http://www.eeg-regionalcentre-lac-undp.org/images/stories/pdf/politicas%20climticas%202012%20preparando%20estrategias%20climticas.pdf>.



### **1.2.2 Theoretical and Practical Interest**

The first theoretical contribution of this study is to explain the analytical compatibility of historical institutionalism and the “advocacy coalition approach” (Sabatier and Jenkins-Smith 1993) and to apply them to the electricity system development paths being taken in Argentina and Uruguay (Chapter 2). This thesis attempts to study how different institutional settings in the electricity sector will either constrain or facilitate the development of different kinds of energy sources, and will either hamper or enable changes in fundamental policy positions, so called “policy core beliefs” (Sabatier and Jenkins-Smith 1993). This theoretical framework will thus try to strengthen the significance of historical institutionalist theory in the study of transition processes in strategic policy sectors, like electricity systems.

Furthermore, the comparative analysis of the two South American case studies along with the better-known German renewable energy case and French nuclear case will produce new theoretical insights. In the cases of Argentina and Uruguay, institutions developed over decades that supported particular policy core beliefs related to conventional energy sources. Only in recent years has there been some policy learning about the potential of renewables, largely due to developments abroad. The development of renewable energy has attracted the attention of national policy makers, private investors and NGOs in Uruguay. In Argentina, renewable energy has attracted less interest. It is mainly supported by international and national environmental NGOs (e.g. Greenpeace, The Greens [“Los Verdes–Foro de Ecología Política”], Natural Resources and Environmental Foundation [FARN]) and actors from the private sector. Nuclear energy has attracted the most attention from national policy makers in Argentina. The analysis of the divergent attitude towards renewable energy and nuclear power in Argentina and Uruguay will be compared to the divergent attitudes found in Germany and France. Through this comparison, the dissertation will show how different policy beliefs and domestic institutional settings became dominant and are shaping energy policies.

Findings about how national policy-making processes relate with international inputs are also examined. The idea that international actors contribute to the introduction and penetration of new ideas in domestic policymaking processes is relevant to the selected case studies. The presence of domestic institutions more open

or closed to international learning is observed with the support of the historical institutionalism.

Regarding practical issues, this research project also intends to contribute to the study of energy policy decision-making processes in South America. Almost all South American countries share a similar type of political system, characterized by young democratic regimes that still have some authoritative elements. Also, they have experienced strong economic growth but still suffer from high poverty and social inequality rates. Uruguay, Brazil, and Chile represent something of an exception to this pattern. They are still young democratic regimes, but the three have succeeded in becoming well-established liberal democracies with relatively low social inequality rates, especially Uruguay.

South American countries tend to share similar energy and socioeconomic challenges. Strong growth of energy demand in the region is due to also great socioeconomic growth. Economic development is based on intensive monoculture and extractive industries. Since “Latin America is the leading emerging market region in terms of agricultural exports, and a key supplier for China” (Da Silva et al. 2009; Rosales and Kuwayama 2012, found in Brenes et al. 2013, p. 1), intensive monoculture is one of the key activities supporting its socioeconomic growth. Extractive industries, including the mining sector (e.g. copper, gas, oil, gold iron, lithium, uranium), are also strategically important for the region. In a context of high economic development, based mainly on agricultural and mineral exports, a larger domestic electricity supply is required. Renewable energy may, therefore, play a greater role in the energy supply of South American countries. As a new energy source, barriers and opportunities are expected to be considered as well. Since the barriers and opportunities of renewable energy are analyzed in two different electricity systems of South America, this work is one of the first attempts to analyze its potential development in-depth within the subcontinent.

### **1.3 Research Questions**

The aim of this study is to compare similarities and differences between the energy policy paths of two South American countries, explaining *why* and *how* certain policy

ideas or beliefs (but not others) were adopted in each electricity policy system. As stated above, this study of the energy policy processes, through a comparative case study analysis, seeks to explain *why* one case (Uruguay) has decided not to develop nuclear and instead to deploy renewable energy, especially wind and biomass, while the other case (Argentina) has decided to increase nuclear capacity and, to a lesser degree, develop renewable energy, above all wind. Research questions can be formulated as follows:

Q1: Why facing a similar electricity supply shortage since the mid 2000s, did Argentina and Uruguay decide to set different renewable energy and nuclear power goals in their public agendas?

Q3: Which exogenous factors have either facilitated or hampered the decision of both countries to develop significantly renewable and nuclear energy?

Q2: What has been the relationship with international actors in the renewable and nuclear energy developments of Argentina and Uruguay? Has there been any international policy learning?

Answering these questions will help identify the factors that have been behind the decisions to develop renewable or nuclear energy as well as the factors that have hindered or favored their development. Special attention will be given to the analysis of international developments on Argentina's and Uruguay's domestic energy developments.

In the next section a brief description of each chapter that will follow the present dissertation is presented.

#### **1.4 Structure of the Work**

Chapter 2 explains the theoretical and analytical framework applied in the present doctoral research. It presents the theoretical approaches, theories, and principal concepts that underpin the empirical analysis of the case studies. First, the “advocacy coalition framework” (Sabatier and Jenkins-Smith 1993, 2007) linked to the

punctuated equilibrium theory (Baumgartner and Jones 1993, 2009), and historical institutionalism (Ebbinghaus 2005; Hall 1992; King 1992; Rothstein and Steinmo 2002; Thelen 1999; Thelen and Steinmo 1992) are described and discussed as the theoretical core of the present dissertation. The concepts of “ownership structures” (Jones Luong and Weinthal 2010) and international policy learning in the context of Latin American countries (Nelson 2004; Weyland 2004) are presented as well. Second, based on the theoretical framework, the analytical framework with the principal variables and hypotheses to be tested throughout the empirical analysis of the two case studies is presented and developed.

Chapter 3 clarifies the methodological approach (i.e. the qualitative research methodology and the case study). This study follows a comparative case study methodology. It investigates Argentina and Uruguay in-depth and also looks at Germany and France. The research was conducted on the basis of original language based materials, semi-structured interviews, and site visits.

Chapter 4 shows the principal (common and different) political and socioeconomic patterns in Argentina and Uruguay. First, it describes the present dominant political context in Argentina and Uruguay. Then it turns to the status of their environmental and energy policies. Finally, the importance for Argentina and Uruguay to observe and learn from international input and practices is presented.

Chapter 5 and Chapter 6 introduce the Argentinean and Uruguayan case studies. Each chapter is divided into two parts. The first part is mostly descriptive, referring specifically to the most relevant historical political events and the principal electricity challenges faced by Argentina and Uruguay during the 1990s as well as the main advocacy coalitions and policy core beliefs in the electricity systems of Argentina and Uruguay. The most important events regarding renewable and nuclear energy are described for the period 1994-2014 in Argentina and 1997-2014 in Uruguay but focusing on 2003-2014 for both countries. Also the renewable, especially wind, and nuclear energy policy framework as well as the energy and the electricity mix are presented in both countries. The second part of the respective chapters analyzes how the dynamic interactions of the contingent conditions explained in the theoretical framework chapter have shaped renewable and nuclear energy developments in Argentina and Uruguay, considering their effects on their

fossil fuel sectors. These chapters follow the leading research questions presented in section 1.3 and test the two hypotheses presented in chapter 2. The purpose is to answer *why* Argentina and Uruguay have followed different energy paths and *how* the development of renewable and nuclear energy can be explained in each case study.

Since this research project analyzes the initial debates and challenges that faced the introduction of renewable energy against other competitive sources like nuclear energy in Argentina and Uruguay, it was decided to present the debates experienced by two more advanced countries—Germany and France—to see what can be learned. Chapter 7 follows this purpose including a brief description of the main factors and events that shaped Germany’s wind and nuclear power development over time. Both France’s nuclear policymaking and its more recent renewable and wind energy developments, under the European Union’s (EU) 20-20-20 strategy for 2020, are included.

Finally, Chapter 8 compares the main findings from the empirical analysis and their implications for Argentina’s and Uruguay’s electricity policy field. The explanations of the main empirical findings will be based upon the theories and approaches discussed in Chapter 2 and the interpretation of the two case studies (Chapters 5 and 6). In particular how favorable and adverse conditioning factors have affected the ability of key actors to set goals, policies, and regulations favorable to the deployment of renewable and nuclear energy over time are explained. Testing and applying the selected theoretical approaches in the two case studies where recent energy policy has not yet been extensively analyzed, will enable us to find new insights that can provide a small contribution to developing theory further. Finally, prospects of the main findings and possible research areas for the near future of the renewable and nuclear energy developments in the two case studies will be discussed.

## **2 Theoretical and Analytical Framework**

This dissertation is about the policy process of the definition and introduction of different technologies like renewable energy and nuclear power, focusing on the different elements that interact to support or inhibit it. The elements identified here are actors, their ideas, fundamental positions, perceptions and interests, their (international) interaction, institutional structures (e.g. legal and policy framework) as well as contingent conditions that are part of, or external to the electricity system. These elements interact in a process over time and they produce different results. First it will be presented the principal actors in the electricity system and it will be explained how they interact. Subsequently it will be defined the importance of their ideas, interests, perceptions, and beliefs. Finally the analytical framework with the hypotheses and variables is developed.

### **2.1 Actors, Advocacy Coalitions, and Policy Subsystems**

Governmental and non-governmental actors at both national and regional levels have sought to shape energy policies in Argentina and Uruguay. Non-governmental actors are defined here as actors from the civil society (NGOs), private sector (companies and investors) as well as scientific research institutions (universities and research institutes). In particular, energy policies were shaped by several actors such as the ministries of energy and national energy agencies; provincial governments; domestic and international interest groups; state-owned, private domestic, and private international energy companies; scientific researchers from the university, and NGOs. These actors did not act alone but rather they have joined different groups with common ideas in order to act and defend their positions.

The different groups where actors tend to aggregate are called “advocacy coalitions” (Sabatier and Jenkins-Smith 1993). According to Sabatier and Jenkins-Smith (1993) “an advocacy coalition consists of actors from a variety of governmental and private organizations at different levels of government who share a set of policy beliefs and seek to realize them by influencing the behavior of multiple governmental institutions over time” (p. 212). The particularity of an advocacy coalition is that it aggregates actors from different types of institutions, while other approaches focus on a single institution or a single level of government (Sabatier and

Jenkins-Smith 1993). Shared policy beliefs connect and group different actors into advocacy coalitions. Important is that common beliefs in “core” elements tend to be relatively stable over long periods of time, being that a coalition’s composition likely to be quite stable (Sabatier and Jenkins-Smith 1993). In fact, “the concept of an advocacy coalition assumes that shared beliefs provide the principal ‘glue’ of politics” (Sabatier 1993, p. 27). Advocacy coalitions are multiple actor-sets in which individual actors are systematically interrelated (Kenis and Schneider 1991, p. 32). Although Sabatier (1993) exposes that advocacy coalition stability is the result of stable common beliefs in core elements, he recognizes that this could be also the result of stable economic and organizational interests. Here it will be assumed that sharing common policy beliefs and collective long-term interests, advocacy coalitions in a given policy system or subsystem compete and seek to achieve their goals in the form of public policies. Multiple actor-sets or advocacy coalitions attempt to shape public policies to achieve their goals. Public policies are the result of a process that is more or less influenced by different competing coalitions.

In the electricity system, there are multiple advocacy coalitions; for example one coalition might be pushing for renewable energy, another coalition for nuclear energy or for fossil fuels or for large hydropower. In Argentina the most favored sectors in the electricity system have traditionally been those runs by large power companies mainly natural gas, large hydropower, and nuclear energy. It is important to consider that since the supply of fossil fuels is insufficient to cover electricity demand, the country began to import gas and oil, and to support renewable energy. In Uruguay, which lacks fossil fuel resources and has no nuclear energy, there has been a reliance on large hydropower and imported natural gas. Recently the country moved in the direction of supporting renewable energy. The advocacy coalition pushing for more renewable and wind energy sources is dubbed the renewable energy coalition. The set of actors pursuing nuclear energy will be called the nuclear energy coalition, and the advocacy coalition pushing for conventional and unconventional fossil fuels will be called the fossil fuel coalition. For the development of renewable and nuclear energy in Argentina, it is necessary to pay more attention to governmental actors at the national level as well as actors from the private sector because these are the main players who shape the energy policies in the country. As a larger and more decentralized country than Uruguay, there are also some governmental actors at the regional level as well as a few researchers, and NGOs involved. In Uruguay,

governmental actors at the national level and the university both play the most significant role in the definition of energy policy, being private actors, and NGOs also involved in the energy policymaking process.

Actors or advocacy coalitions that work to influence governmental decisions result in what Sabatier (1993) calls “policy subsystems”.<sup>14</sup> A policy subsystem is the interaction of “actors from a variety of public and private organizations who are actively concerned with a policy problem or issue such as air pollution control, mental health, or surface transportation” (Sabatier 1993, p. 17). Policy subsystems are a more adequate category to analyze current policy processes instead of “iron triangles” or “sub-governments,” which tend to be limited to administrative agencies, legislative committees, and interest groups at a single level of government and are a rigid category originally observed in areas such as agriculture, transportation and education (Howlett 2002, p. 238; Sabatier 1993, p. 17). Policy subsystems include different levels of government active in policy formulation and implementation as well as journalists, researchers, and policy analysts who regularly interact with each other and with policymakers in order to foster the adoption of their policy goals. A policy subsystem is associated with a different, more open, policy process and a propensity for the adoption of more innovative policies than that found in sectors dominated by iron triangles (Hecl 1978, found in Marin and Mayntz 1991, p. 19; Howlett 2002, p. 238; Sabatier 1993, p. 17). When a group of actors shares common beliefs related to the introduction of a specific new energy source like wind or biomass or nuclear energy or new approaches to energy consumption or energy efficiency a policy subsystem may form. New policy subsystems tend to emerge because a group of actors become quite dissatisfied with the neglect of a particular problem by existing subsystems, deciding to form their own subsystem (Sabatier 1993, p. 24).

## **2.2 Policy Beliefs, Ideas, Perception and Interests**

Actors join different advocacy coalitions according to a set of fundamental positions or policy beliefs such as common ideas, perceptions, interests, and preferences

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<sup>14</sup> The policy subsystem concept was developed in the United States on the basis of the observation that American federal interest groups, congressional committees and government agencies had developed systems of mutual support in the course of constant interaction over legislative and regulatory matters (Howlett 2002, pp. 238).



(Sabatier 1993). Actors are motivated not only by self-interests but also by their collective values, ideals, and world views. The collective values, ideas, interests, and committed fundamental positions are called “belief systems” (Sabatier 1987, 1993). Self-interests as well as organizational (in the sense of collective) interests are both considered under the umbrella of belief system models, allowing actors to form different advocacy coalitions and establish several kinds of goals. To Sabatier (1993) “belief system” is a more appropriate category than “interest” because the first is more inclusive and more verifiable than the latter (p. 28), as it includes collective interests, values, preferences, priorities, causal relationships, and perceptions. Similarly, Robert Putnam (1973) refers to a belief system as a set of empirical beliefs, values or ideals, and habits of thought toward society and politics “that guide and inform a politician’s more ephemeral responses to his environment and that are dependent [...] on his deeper personality structure” (p. 3). The empirical beliefs are dubbed “cognitive predispositions”, the values or ideals “operative ideals”, and the habits of thought “political style” (Putnam 1973); the set of these three broad, interrelated categories composes what Putman (1973) calls a “political culture”.

Sabatier (1993) also highlights that belief systems are broad categories, which include a set of self-interests, organization goals, perceived causal relationships, and general views of the world. He differentiates three structural categories: 1) a deep (normative) core of fundamental normative and ontological axioms that define a person’s underlying philosophy; 2) a near (policy) core of strategies and policy positions for achieving deep core beliefs in a certain subsystem; 3) and a set of secondary aspects comprising a multitude of instrumental decisions and information searches necessary to implement the policy core in the specific subsystem. The three structural categories are arranged in order of decreasing resistance to change, that is, the deep (normative) core is the most resistant and the secondary aspects the least (pp. 30-32). Accordingly, whilst deep and policy core beliefs are unlikely to be changed over time (except if a significant external perturbation to the subsystem occurs), actors are willing to change secondary aspects and even to incorporate some of the opponent’s core beliefs, merely to stay in power or to conceal weaknesses in the policy core (Sabatier 1993, pp. 33-34).<sup>15</sup> Similar to the steady condition of deep and

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<sup>15</sup> Here policy beliefs and policy core beliefs will be used without distinction.

policy core beliefs, Putman (1973) argues that “cognitive predispositions” may be quite stable, even facing contradictory information, but he says that by and large they can change if the environment (or the self) changes. The structure of belief systems of policy elites of the advocacy coalition framework (ACF), explained further below, is shown in the next figure (2.1):

*The Advocacy Coalition Framework*

TABLE 10.1 Revised Structure of Belief Systems of Policy Elites<sup>a</sup>

	Deep Core	Policy Core	Secondary Aspects
Defining characteristics	Fundamental normative and ontological axioms	Fundamental policy positions concerning the basic strategies for achieving core values within the subsystem.	Instrumental decisions and information searches necessary to implement policy core.
Scope	Across all policy subsystems.	Specific to a subsystem.	Specific to a subsystem.
Susceptibility to change	Very difficult; akin to a religious conversion.	Difficult, but can occur if experience reveals serious anomalies.	Moderately easy; this is the topic of most administrative and even legislative policymaking.
Illustrative components	<ol style="list-style-type: none"> <li>1. The nature of man:               <ol style="list-style-type: none"> <li>i. Inherently evil vs. socially redeemable.</li> <li>ii. Part of nature vs. dominion over nature</li> <li>iii. Narrow egoists vs. contractarians.</li> </ol> </li> <li>2. Relative priority of various ultimate values: freedom, security, power, knowledge, health, love, beauty, etc.</li> <li>3. Basic criteria of distributive justice: Whose welfare counts? Relative weights of self, primary groups, all people, future generations, nonhuman beings, etc.</li> </ol>	Fundamental Normative Precepts: <ol style="list-style-type: none"> <li>1. Orientation on basic value priorities;</li> <li>2. Identification of groups or other entities whose welfare is of greatest concern;</li> </ol> Precepts with a Substantial Empirical Component <ol style="list-style-type: none"> <li>3. Overall seriousness of the problem;</li> <li>4. Proper distribution of authority between government and market;</li> <li>5. Proper distribution of authority among levels of government;</li> <li>6. Priority accorded various policy instruments, (e.g., regulation, insurance, education, direct payments, tax credits);</li> <li>7. Ability of society to solve the problem (e.g. zero-sum competition vs. potential for mutual accommodation; technological optimism vs. pessimism).</li> </ol>	<ol style="list-style-type: none"> <li>1. Seriousness of specific aspects of the problem in specific locales.</li> <li>2. Importance of various causal linkages in different locales and over time.</li> <li>3. Most decisions concerning administrative rules; budgetary allocations, disposition of cases, statutory interpretation, and even statutory revision.</li> <li>4. Information regarding performance of specific programs or institutions.</li> </ol>

Figure 2.1. Revised Structure of Belief Systems of Policy Elites

Source: Sabatier and Jenkins-Smiths (1993, p. 221)

The structure of belief systems is the essential core element of the ACF, which was developed by Paul A. Sabatier (1987, 2007) and Sabatier and Hank C. Jenkins-Smith (1993). The ACF has its departure point with its criticism of the stages heuristic

model. To Sabatier and Jenkins-Smith (1993) the stages heuristic model lacks causal mechanisms that allow an identification of the forces driving the policy process from one stage to another. Also, the stages heuristic suffers from descriptive inaccuracy, positing an order sequence of stages (i.e. agenda setting, policy formulation, implementation, and evaluation) and emphasizing the policy cycles as the temporal unit of analysis. However, in reality policy evolution focuses on multiple, interacting cycles and involves multiple levels of government. The stages heuristic suffers from a built-in legalistic and top-down focus, restricting the view of “policy” to a specific piece of legislation. It tends to neglect other important players and overlapping directives. The ACF was introduced as an alternative approach to analyze the policy decision-making process.

The ACF, which was originally conceived as a framework as its name indicates and which was afterwards further developed as a theory, gives a central role to actors and their belief systems.<sup>16</sup> Policy core beliefs provide the basic orientations for actors and are, therefore, translated into public policies that enable advocacy coalitions to meet their goals. Putman (1973) also considers in his study the effects that basic political beliefs have in shaping the political actions taken by politicians. But the ACF focuses more specifically on explaining what public policies refer to: “public policies and programs can be conceptualized in much the same way as beliefs systems. They involve value priorities, perception of important causal relationships, perceptions of world states (including the magnitude of the problem), perceptions of the efficacy of policy instruments, and so on” (Sabatier 1993, p. 17).

For the case studies conducted here the principal policy core beliefs of the main coalitions are examined in relation to their views and perceptions about the roles of different energy sources in the national electricity mix. The meaning of the energy sources for the advocacy coalitions and policymakers is also considered. This analysis

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<sup>16</sup> The distinction between frameworks and theories is that frameworks specify who motivates action or change as well as general classes of variables that structure, constrain, guide, and influence the actions taken by actors. The role of theories (as well as models), which derived from frameworks, is to provide explanations and not only descriptions. They tell why actors act and to what effect, the outcomes that are achieved, and the distribution of the costs and benefits of those outcomes (Schlager 2007). As Edella Schlager (2007) points out, “theories place values on some of the variables identified as important in a framework, posit relationships among the variables, and make predictions about likely outcomes” (p. 296). Theories of policymaking processes must pay attention to the 1) scope of inquiry, 2) the model of the individual, 3) the collective action of actors, 4) the institutions that provide the context for that action, and 5) how policies change over time (Schlager 2007, pp. 296-297).

will facilitate an understanding of who the actors are, what their policy core beliefs are, and how they have been competing in the electricity system to influence policy outcomes.

There are a few case studies which have applied elements of the ACF to the interaction of actors taking into account their policy core beliefs to explain the development of wind energy and renewable energy (see Jankowska 2012 and Ohlhorst 2008). The dissertation of Dörte Ohlhorst (2008) applies a constellation analysis to study the influence of key actors, their policy beliefs, the policy framework as well as technical aspects in the policy process of wind energy in Germany. The doctoral research of Karolina Jankowska (2012) explains policy change related to renewable energy in the electricity sector of Poland, looking at both opportunities and barriers to renewable energy development. The importance of this study resides in that it is the first attempt to employ the advocacy coalition approach linked with the punctuated equilibrium (PE) theory to analyze and explain renewable energy policy change in Poland. As Jankowska explains in relation to the ACF and the PE theory, “they have even never been used for the analysis and explanation of political change in a post-socialist state, or for the analysis of political processes in Central and Eastern European democracies” (2012, pp. 31-32).

The ACF has been principally applied in the United States, where it originated, and to a lesser extent has also been used for western European countries. Its application in relation to developing countries remains limited. One of the reasons could be that this approach is largely a product of the study of American pluralism. In particular, Sabatier and Weible (2007) explained: “One of the most frequent criticisms of the ACF is that it is too much a product of its empirical origins in American pluralism. It makes largely tacit assumptions about well-organized interest groups, mission-oriented agencies, weak political parties, multiple decision-making venues, and the need for supermajorities to enact and implement major policy change. These assumptions fit poorly, however, with European corporatist regimes with their restricted participation patterns, long-lasting decision structures, and consensual decision rules. Questions have been also raised about the applicability of the ACF to the less democratic societies of Eastern Europe and developing countries” (p. 199). Subsequently, they argued that “although the ACF is probably most suited to the complexity of pluralist regimes, it can and has been used to analyze corporatist,

Westminster, and non/quasidemocratic regimes” (Sabatier and Weible 2007, pp. 200-201).

Following a similar objective to Jankowska’s (2012) use of the ACF linked with the PE theory to explain policy change in electricity systems of emerging democracies, the advocacy coalition approach and the punctuated equilibrium will be used here to examine policy change in electricity systems of two socioeconomic transition countries in South America. The attempt is to discover and expand theoretical applications of the referred approach and theory, which is related with the empirical interests explained in chapter 1 (section 1.2.1). To the best of the author’s knowledge, until 2006 the ACF was only applied to South American cases in relation to environmental issues in Brazil (Carvalho 2001) and Chile (Arnold 2003) (for the state of the worldwide ACF application before 2006, see Sabatier and Weible 2007, pp. 217-219). Regarding the PE theory, it has been mostly applied to Latin America in relation to the sectors of public management policy (Barzelay et al. 2003, found in Romero 2009), and civil service policy (Romero 2009).

Finally, it is essential to observe coalitions’ actions and interactions over long periods of time to see how they work to influence political decisions. The idea of long periods of time entails the concept of the “enlightenment function”: “while policy analyses may seldom influence specific governmental decisions, they often serve an enlightenment function by gradually altering the concepts and assumptions of policy makers over time” (Caplan et al., 1975, Weiss 1977, found in Sabatier and Jenkins-Smith 1993, p. 4). Important to Sabatier is the influence that the *cumulative* effects of findings from studies and from ordinary knowledge may have on policy over long periods of time (Lindblom and Cohen 1979, in Sabatier 1993, p. 16), because of the potential for learning. Sabatier and Jenkins-Smith (1993) introduced the “policy oriented-learning” concept, which focuses on the better understanding of a coalition’s belief system and the identification of internal challenges in a policy subsystem, in order to improve the achievement of a coalition’s goals (Sabatier and Jenkins-Smith 1993, pp. 42-44).

Here I will also study the influence of new information or ideas in policy change over time (Hall 1993) but I will focus more on the interaction between domestic and international actors and how domestic actors may observe, learn, imitate from, or be inspired by international actors. Richard Rose for example studies the role

of members of “transnational epistemic communities” where learning can take place in the form of a transfer of a given policy instrument (Rose 1991, found in Benett and Howlett 1992, pp. 281-282). Related to this, Howlett and Ramesh (1993) suggest that the selection of a policy instrument from a variety of possible options is due, to a great extent, to the role of policy learning at the transnational and international levels. But international policy learning plays a crucial role not only in the choice of a particular policy instrument but also in the influence it may have on the decision of domestic policymakers to boost the development of a new sub-sector.

National policymakers, domestic private companies and investors, environmental NGOs, and researchers can learn, emulate or look for inspiration from international examples and practices. International policy learning—or lack thereof—will influence the policy process in the direction of institutional change or institutional stabilization. Kurt Weyland (2004) points out that international policy learning can result from autonomous learning by recipient countries or from the inducements or pressure exerted by foreign actors (pp. 2-3).

Based on this remark of Weyland (2004), I have defined international policy learning as a process resulting from autonomous learning from a foreign idea and experience that interacts with, but does not replace, domestic practice and national objectives. Similar to the autonomous character of international learning is the notion of unilateral and voluntary adoption of international policies through a process of diffusion, elaborated by Per-Olof Busch and Helge Jörgens (2012, p. 70). Diffusion has been defined “as a process by which information on policy innovations is communicated in the international system and these policies are then adopted voluntarily and unilaterally by an increasing number of countries over time” (Busch and Jörgens 2012, p. 70). Busch and Jörgens highlight the unilateral and voluntary characteristics of diffusion in contrast to the notions of external imposition or collective decision-making contained in the concepts of coercion and cooperation respectively (2010, 2012).

Diffusion is a very useful concept to explain international adoption of renewable energy and environmental policies in the context of global governance and Europeanization studies (Busch and Jörgens 2010, 2012; Jacobs 2012; Jacobsson and Johnson 2000; Weidner and Jänicke 2002). Analyzing the diffusion of renewable energy policies in Europe has shed light on how coordination has occurred, even

though supranational attempts at legal harmonization of domestic policies have failed (Busch and Jörgens 2012; Jacobs 2012). In Europe, convergence can be explained by the horizontal approach of diffusion whereby interdependent states in the international system observe, imitate, and learn from each other in an horizontal relationship (Busch and Jörgens 2010, pp. 25-26). Diffusion is, therefore, especially relevant for studies that compare similar national policies among different countries in a supranational institutional context like the EU as well as on the international level in parallel temporal frameworks. It might also be very useful to compare similarities in domestic renewable energy policies among Latin American countries, a subject that has been understudied. The unique example we found was the work of Inna Platanova (2013) that investigates the role of international development NGOs in the diffusion of rural renewable energy in two areas, Talamanca in Costa Rica and Cajamarca in Peru.

This dissertation discusses how two nations independently looked at different foreign experiences and initiated relationships with different international actors. To explain this autonomous observation from foreign ideas and how these ideas are interpreted and implemented by domestic actors, the concept of international policy learning as a form of policy diffusion is focused upon. To answer the questions what motivates actors to learn from external experiences as well as how the international learning process is produced, Weyland (2004, pp. 2-3) and Joan Nelson (2004, p. 44) introduce the following four aspects: (1) decision makers can be motivated by either cost-benefit assessments for the country or symbolic concerns for legitimacy and the desire to appear modern; (2) actors can follow different international examples, according to the prestige of the innovators; (3) actors can act seeking to anticipate concrete effects of an innovation, or they can imitate a foreign model before a substantial performance is available; (4) actors can comprehensively assess the advantages and disadvantages of adopting a foreign model as well as fully adapt it to specific national needs and requirements, or they can rely on cognitive shortcuts in order to facilitate the process, at the same time that they might fail to adapt it sufficiently to their own needs. From these categories, I will focus more on the first and second aspects. The first considers what (cost-benefit or legitimacy concerns) has motivated domestic advocacy coalitions (policymakers, scientific experts, and private

investors) to learn from the contribution of other countries, while the second refers to why they look at some particular international examples.

### **2.3 Advocacy Coalitions and Punctuated Equilibrium**

In order to have a clear understanding of when is an advocacy coalition strong enough to exercise a powerful control over the other weaker competing coalitions it will be referred to the PE theory. The PE framework developed by Frank Baumgartner and Bryan Jones (1993, 2009) attempts to explain policy change and policy stability “based on the emergence and recession of policy issues from the public agenda” (p. 1). They state that when new issues emerge, short periods of intense change are produced entailing new structural arrangements that are supported by ideas and institutions—policy monopolies. Periods of rapid change are followed by long periods of policy stability in which the structural arrangements remain in place until new issues emerge in the agenda and a new period of intense change is produced. Stability and change result from the interaction of powerful ideas, called “policy images”, and institutional structures and both processes can be understood within the agenda-setting model. As Baumgartner and Jones (1993, 2009) point out “... agenda-setting process implies that no single equilibrium could be possible in politics, and how the generation of new ideas makes many policy monopolies unstable in the long run” (p. 4).

Powerful ideas or understandings and institutional structures are taken here as key elements to define more precisely the ACF in relation to the process of competing advocacy coalitions in a policy system. When new advocacy coalitions sideline other new competing coalitions, they will try to establish a policy monopoly, which will entail two elements “political understandings concerning the policy of interest, and an institutional arrangement that reinforces that understanding” (Baumgartner and Jones 1993, 2009, p. 6). For example, in Uruguay the emergent renewable energy advocacy coalition attempted to sideline the also emergent nuclear competing coalition organizing public energy debates and committees; obtaining national and international funds to conduct technical research, diagnosis, and projects in the renewable field; and developing public wind energy and biomass programs. These “venues” were important to create a positive understanding of renewable energy, which was crystallized when Director of Energy launched the national energy policy, a public



document agreed by all the political parties, with clear renewable and wind energy goals and confirming that discussion about nuclear power was over until 2030. Since then a regulatory framework was introduced to favor renewable energy.

It is important to highlight what the relationship between the two characteristics of policy monopolies is. “First, a definable institutional structure is responsible for policymaking, and that structure limits access to the policy process. Second, a powerful supporting idea is associated with the institution. These buttressing policy ideas are generally connected to core political values which can be communicated directly and simply through image and rhetoric [...] If a group can convince others that their activities serve such lofty goals, then it may be able to create a policy monopoly” (Baumgartner and Jones 1993, 2009, p. 7). Baumgartner and Jones explain that decision-makers are interested in fostering policies aimed at improving the socioeconomic and political conditions of the country they represent, but “the trick for policymakers is to convince the others that their policy and program represents the solution to the long-standing policy problems” (Kingdom 1984, in Baumgartner and Jones 1993, 2009, p. 7). To convince different groups of actors the competing advocacy coalitions may increase their ability and skills to persuade other groups.

When a policy monopoly succeeds, it limits the access in the policy process because it establishes formal and informal rules of access that discourage the participation of the so-called “outsiders” (Ibid. p. 7). Also, the prevalent understandings of a policy are so positive that they tend to evoke either support or indifference by those not involved. But prevalent understandings and ideas of a particular policy issue can change over time because the same public issue has different “images” among coalitions. Images or ideas are crucial and are the driving force in stability and instability primarily because issue definition has the potential for mobilizing the previously disinterested (Baumgartner and Jones 1993, 2009, p. 16).

When a new idea, supported by a disadvantaged group, succeeds in prevailing over the idea of the advantaged group, the policy monopoly constructed by the strong coalition may be weakened or disintegrated, leading to policy change (Baumgartner and Jones 1993, 2009). Baumgartner and Jones explain “technical expertise, inside contacts, and legal skills may prove to be of no value where an emotional public media campaign is waged. So if a challenging group is able to choose an arena where its special skills are reinforced and where the skills and resources of its opponents are

rendered useless, then it may win [...] These reversal in fortune are not taken for granted but they do occur from time to time” (1993, 2009, p. 9). To historical institutionalism the influence of a new idea depends on the political and economic circumstances of the day, and are conditioned by the institutional framework within which policy is made and power over policy acquired (Hall 1992). In other words, policy change or path dependency will ultimately depend on particular economic contexts, the government in office, and the policy core beliefs pursued by different advocacy coalitions interacting within the domestic institutional framework.

In addition, when prevalent policy understandings are altered, policy processes and agenda status change as well. To Baumgartner and Jones it is more important to focus on the consequences these changes have, instead of focusing on the reasons for change. As Baumgartner and Jones, “focusing on consequences directs our attention to institutional structures” (1993, 2009, p. 12). “All political institutions channel conflict in a particular way; all are related to the mobilization of bias. Noting the structure of bias inherent in any set of political institutions not only shows who is advantaged, however; it also shows what changes might come about from destruction or alteration of an existing arrangement [...] if the structures are changed, then dramatic changes in the mobilization of bias may result” (Ibid, p. 12). Institutions are important for the PE framework because when a new policy monopoly emerges its “policymakers establish new institutions to support the policies they favor or alter existing ones to give themselves greater advantage” (Ibid, p. 12). This entails a difference with historical institutionalism that tries to explain the reasons for changes in policy understandings. For example, Peter Hall (1992) points out that “the problem is to explain why (certain) ideas, rather than others, were taken up by key actors and why those actors, rather than others, were able to secure influence over policy” (p. 96). In the next section 2.4 it is possible to see more details about the concern of historical institutionalism to search for reasons conducting to path dependency or path change.

When looking at actor’s interactions comparatively—in different systems—it is important to know how national political systems function. Actors’ interactions are constrained by the political system and its institutions. Institutions are the formal structures, regulations, and rules that frame the interactions of the actors. Hall (1992) describes the concept of institutions “to refer to the formal rules, compliance

procedures, and customary practices that structure the relationships between individuals (called actors) in the polity and economy” (p. 96). The set of these formal structures, regulations, and rules is the institutional setting in which actor’s interactions are produced. Hall (1992) points out “institutions may be more or less formal but invariably serve to regularize the behavior of the individuals who operate within them” (p. 96). Institutional settings or institutional frameworks set the structure that conditions the emergence of new policy sub-sectors or “policy subsystems” in a particular historical process. Institutions in the electricity system can be more closed or more open, being more likely to hamper or to facilitate the building and development of a policy subsystem.

To understand policy change—or the lack thereof—within different electricity systems, it is essential to pay attention not only to the advocacy coalitions, which hold a monopoly on policy core beliefs, but also to the institutions reinforcing these ideas and beliefs that were established in the past. Thus, to comparatively examine renewable and nuclear energy politics in two political and socioeconomic transition countries, I will apply the ACF and the PE framework linked to historical institutionalism. The ACF, together with the PE, and the historical institutional theory will be linked to shed light on the relationship between changes in policy core beliefs and institutional change (*path change*) or between lack of changes in policy core beliefs and institutional stabilization (*path dependency*).

## **2.4 Historical Institutionalism: Importance of Policy Change and Path Dependency**

Historical institutionalism is generally described as “how political struggles are mediated by the institutional setting in which (they) take place” (Ikenberry 1988, found in Thelen and Steinmo 1992, p. 2). Historical institutionalism is theoretically significant in four ways (Thelen and Steinmo 1992, pp. 12-13). First, historical institutionalism follows a more inductive than deductive logic, rejecting the idea that political behavior can be analyzed with the same techniques that are used in economics. Second, its theoretical relevance resides in the relationship and interaction between different variables (not only institutions) to explain a complex political issue. Third, the explanation of political phenomena is structured by the historical

institutional approach, which identifies how these different variables relate to one another. In other words, structuring factors are placed at the center of the analysis. Fourth, historical institutionalism builds powerful explanation for policy outcomes (policy continuity or “path dependency” and policy changes) over time—here more than a decade—as well as across countries.

To historical institutionalists there is always a set of new and old elements interacting within policy processes to produce certain outcomes (Hall 1992; Immergut 1992; King 1992; Thelen and Steinmo 1992). Whilst the new elements are classified as actors, their policy beliefs (ideas, values, interests, perceptions), the current economic and political context, the old elements refer to components—established in a crucial moment some time ago—like institutional characteristics and attitudinal or cultural legacy. The older elements tend to constrain the newer ones that enter into the policy process. Institutions should be viewed as more or less dynamic. Old institutions may evolve and experience institutional change although they may remain more stable at different points in time. As new policy monopolies begin to emerge old institutions may be altered pursuing new additional goals or even destroyed and replaced for new institutions.

Kathleen Thelen and Sven Steinmo (1992) describe four sources of institutional change: 1) broad changes in the socioeconomic or political context can result that previously latent institutions suddenly become salient; 2) changes in the socioeconomic context or political balance of power can produce a situation in which old institutions are put in the service of different ends, as new actors come into play who pursue their (new) goals through existing institutions; 3) exogenous changes can produce a shift in the goals or strategies being pursued within existing institutions, as old actors adopt new goals within the old institutions; 4) as the stronger source of change, it happens when there are changes in the institutions themselves. This can occur in moments of dramatic change, but it can also be the result of more piecemeal change resulting from specific political battles within institutional constraints (pp. 16-17). The concept of the sources of institutional change, elaborated by Thelen and Steinmo (1992), will be applied in this dissertation to explain how exogenous changes in the socioeconomic or political context may provide more favorable opportunities for weak coalitions, while dominant coalitions seek to protect and reinforce their positions.

Historical institutionalism focuses on the divergences between the “institutional landscapes” of different nations, which are particularly important for comparative case studies. Countries project dissimilar sets of incentives and constraints, depending on each national context (Thelen and Steinmo 1992). To Desmond King (1992) ideas, politics, and institutions matter. New ideas are translated into policies appropriate for political decision-making, a process that often results in an adaptation of the original ideas, according to established domestic institutions (King 1992). That explains why similar political and socioeconomic challenges and problems generate different reactions and policy responses in each country producing also diverse outcomes, as has been shown in several case studies (Hall 1992; Immergut 1992; King 1992; Lieberman 2002; Putman 2002; Rathgeb Smith 2002; Rothstein and Steinmo 2002; Thelen and Steinmo 1992). It is, therefore, a useful approach to apply to comparative case studies that analyze different national reactions and responses to similar challenges in similar temporal frameworks.

One of the main concerns of historical institutionalists has been to explain why different responses among countries to similar challenges exist. To answer this question, historical institutionalists have focused on “how institutions emerge from and are embedded in concrete temporal processes” (Thelen 1999, p. 371). It is in the origins of the institutions and the subsequent evolution and stabilization or path change and path dependency that the explanation of divergent political decisions adopted to address similar problems can be found. The path dependency approach basically states that in a sequential evolution of events, the latter decisions are not (entirely) independent from those made in the past.<sup>17</sup> In political science, it means that historical processes are strongly relevant for the analysis of policy change, or the lack there of. There are some different path dependency approaches. The “trodden trail” or “trodden path”, which is more deterministic, refers to a particular path chosen spontaneously and then crystallised through the subsequent repeated use by other individuals (persistent diffusion). The “road juncture” or “branching pathways”, which is more flexible, enables several forms of institutional change (Ebbinghaus 2005, p. 5). This is a more developmental approach that sees institutions in a permanent evolution since the moment of their creation (also called “critical

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<sup>17</sup> The path dependency approach came first from the economy at the mid 1980s and afterwards, end of the 1980s, was expanded to social and political sciences.

juncture”). In the words of Bernhard Ebbinghaus “in contrast to the deterministic path dependence theorem that assumes (small) chance events will have long-term consequences, the developmental approach focuses more on the particular historical origin of institutions. The path dependency literature, especially historical institutionalists, explains that macro-social changes are rather the result of action by group of actors at critical junctures than *small chance events*” (2005, p. 14).

Institutions and policies are in permanent evolution since the moment of their creation. They can follow a path dependency, changing incrementally with only small changes, or if the path dependency is broken, a more intense and radical policy change can occur. Thelen (1999) interrelates the critical juncture literature together with the policy change and path dependency literature in an effort to reveal the specific political mechanisms of reproduction and reinforcement on which institutions rest. Looking at the reinforcement mechanisms of the institutions within the broader electricity systems of Argentina and Uruguay will provide us with more arguments vis-à-vis changes in policy monopoly—or the lack thereof—over time.

- **Ownership Structures**

In the case of electricity systems, ownership structures matter. In general, ownership structures in the electricity sector can be state-owned, partially state-owned and partially privatized (foreign and domestic investments), or entirely privatized. Regarding the ownership of energy in oil rich states throughout the developing world, Pauline Jones Luong and Erika Weinthal (2010, p. 7) focus on four different ownership structures. Although this classification focuses on the sector of fossil fuels, its insights are useful because they consider the complexity of different kinds of ownership forms that are to some extent similar in the electricity sector:

1. State ownership with control. The state must own the rights to develop a particular electricity source and hold the majority of shares (> 50 percent) in this subsector. Private involvement is limited either to participating in contracts that restrict their managerial and operational control.
2. State ownership without control. The state must own the rights to develop a particular electricity source and hold the majority of shares (> 50 percent) in this subsector. Private investors are allowed to participate through more permissive

contracts, such as production-sharing agreements (PSAs), which grant them significant managerial and operational control.

3. Private domestic ownership. Private domestic companies can own the rights to develop a particular electricity source and hold the majority of shares (> 50 percent) in this subsector.

4. Private foreign ownership. Private foreign companies can own the rights to develop a particular electricity source and hold the majority of shares (> 50 percent) in this subsector, usually via concessionary contracts.

The concept of ownership structure refers to “a set of relations between direct and indirect claimants to the proceeds (or rents) from the exploitation of ... (a) natural resource” (Jones Luong, and Weinthal 2010, p. 11). For example, in the case of a state ownership with control, governing elites together with company bureaucrats are the direct claimants, while domestic population is the indirect claimant. In the case of a state ownership without control, governing elites and private investors are the direct claimants, while population and governing elites serve as the indirect claimants. What matters within ownership structures is the claimant status that governing elites and private investors have, because of the implications for the relationship between the state elites and domestic population. Depending on who are the owners of the energy companies, there will be more incentives for a government to choose a particular fiscal regime as well as for the domestic population to demand this particular fiscal regime.<sup>18</sup> “Ownership structure generates the transaction costs and societal expectations that influence whether the main claimants (direct and indirect) to the proceeds [...] have an incentive to support a fiscal regime that can effectively constrain and enable the state and the power relations that influence how such institutions emerge, and thereby serve to reinforce these incentives” (Jones Luong, and Weinthal 2010, pp. 11-12). The present dissertation will focus on the aspect of societal expectation to explain the incentives to support a particular fiscal regime.

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<sup>18</sup> According to Jones Luong, and Weinthal (2010) fiscal regimes are defined as “a set of institutions that embody decisions about (1) the primary sources of government revenue (including stability, scope, and composition of taxation); and (2) how this revenue is allocated (including how much, how, and on what it is spent)” (p. 33).

For example, when a government exercises direct control or is involved in a portion of the electricity generation sector as the direct claimant of electricity rents, it has the right to use the revenues for diverse purposes and in different ways. In this case, the domestic population (indirect claimants) may increase their social demands towards political elites and the latter may make discretionary use of their economic resources to finance wide social programs as well as universal subsidies for electricity consumption. Countries with governments involved in the electricity generation area tend to generate high societal expectations, “that is, the popular perception that the state should have an enlarged societal role in generating and allocating [...] rents” (Jones Luong, and Weinthal 2010, p. 12). In such cases, the government will have no incentive to supply and the population will have no incentive to demand institutions that limit the state’s ability to extract and use the rents from the electricity sector (Jones Luong, and Weinthal 2010). As a result the government and the population may choose weak fiscal regimes.

Weak fiscal regimes are characterized by two main features: “(1) a tax system that is unstable, based largely on the (energy) sector, and that relies primarily on indirect and implicit taxation (i.e. excessive fines) across sectors, and (2) a system of expenditures that undermines budgetary stability and transparency” (Jones, Luong, and Weinthal 2010, p. 12). In contrast, strong fiscal regimes have: “(1) a tax system that is stable, broad-based, and relies primarily on direct and explicit taxation, and (2) a system of expenditures that emphasizes budgetary stability and transparency” (Jones, Luong, and Weinthal 2010, p. 12). There are also nuanced fiscal regimes, called “hybrid” (Jones, Luong, and Weinthal 2010), which contain characteristics of weak and strong fiscal regimes enabling and constraining the state; this case is common when both the government and private investors are the direct claimants. What is important for the present study is to refer to the second characteristic of weak fiscal regimes, “a system of expenditures that undermines budgetary stability and transparency” (Jones, Luong, and Weinthal 2010, p. 12). A weak fiscal regime is used as a mechanism to support distributive and extensive social spending whereby governments build and maintain their political legitimacy over time. Indirect and universal electricity subsidies correspond to these extensive expenditures. They may act as a barrier for investments in renewable energy, which can’t compete against subsidized fossil fuel and nuclear energy.



The electricity system has the particularity that it is divided into power generation, transmission, and distribution. Power generation includes all kind of facilities that produce electricity, coming from different sources. Transmission lines in the electricity system carry electricity from one point to another, and the distribution sector includes the lines, poles, transformers, and other equipment needed to deliver electricity to end users. Ownership structures can also vary in these three areas. In Argentina the wholesale electricity market is liberalized; both domestic and foreign investors are allowed. In terms of electricity generation, fossil fuels changed from being fully privatized to being partially state-owned and partially privatized. Hydropower is privatized. Nuclear remains state-owned. In terms of transmission and distribution, ownership changed from completely privatized to partially state-owned and partially privatized (domestic investors). Governing elites retain control over a portion of mineral reserves and over the whole nuclear energy sector, being the direct claimant to the rents generated from both sectors. Domestic population serves as the indirect claimants that tend to ask for indirect subsidies for electricity consumption (Jones Luong, and Weinthal 2010, p. 11). In Uruguay, transmission lines and distribution are both state-owned, while electricity generation, which used to be a fully controlled by the state, was partially liberalized and opened to private (domestic, and foreign) investors. Changes like liberalization or partial liberalization in the area of electricity generation are important because they can influence the potential for innovation, as new actors—private investors—may be able to invest in the generation of electricity coming from renewable energy sources.

In this doctoral research I call for paying more attention to the processes of liberalization, partial liberalization, or the exercise of more state control in the electricity system than is done in the strict classification of ownership structures explained by Jones Luong, and Weinthal (2010). Still the mechanisms described in the concept of ownership structures about the incentive to support a particular fiscal regime that can effectively constrain or enable the state are useful to understand why Argentina and Uruguay have chosen particular systems of expenditures including or excluding indirect subsidies. Renewable energy and nuclear power are studied here in relation to electricity generation; the primary focus will be on the liberalization, or the exercise of more state control in electricity generation. Since fossil fuels include other sectors than electricity (e.g. heating and transport) they will remain only as a context

but will not be analyzed in detail. The ownership structure of the transmission and distribution areas will be also considered only as a contextual factor.

## **2.5 Analytical Framework**

Based on these theoretical insights I will present the analytical framework for the comparative case study. The present doctoral research will seek to explain why and how the introduction of different energy sources (renewable energy or nuclear power) in the public agenda has been either constrained or favored by different factors, which will be presented below. The empirical focus is on the discussions about different electricity sources, especially the debate regarding renewable and nuclear energy, in Argentina and Uruguay.

The theoretical framework will help identify and explain the interaction of the weaker and more dominant coalitions, their policy core beliefs, the institutional constraints they face, and the external dynamic conditions. This in turn will shed light on the policymaking processes in terms of path dependency and policy change. As we will analyze the choice between different energy sources is on the public policy development process rather than policy outcome.<sup>19</sup>

Agenda-setting is directly related to the choices made during policymaking processes “because changes in issue definition often lead to the appearance of an issue on the public agenda” (Baumgartner and Jones 1993, 2009, p. 12). Issue definition is then crucial for subsequent greater changes and is often conducted by strategic political actors that try to change political rhetoric. “Where the rhetoric begins to change, venues changes become more likely. Where venue changes occur, rhetorical changes are facilitated [...] the interactions of image and venue may produce a self-reinforcing system characterized by positive feedback [...] there may be a snowball effect, as image and venue changes continue to reinforce each other over time”

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<sup>19</sup> Policy analysis defines policy outcome as the result of the direct implementation of different specific actions (Windhoff-Héritier 1987). Policy analysis assesses policy outputs, outcomes, and impacts over a particular temporal and geographical policy process that is divided into non-linear and dynamic cycles. The policy cycle normally covers a sequence of phases or stages that start with problem definition and move on to agenda setting, policy formulation, implementation, and evaluation. After evaluation, policy makers usually decide to either end, reformulate, or improve a policy or its specific aspects (Windhoff-Héritier 1987).

(Baumgartner and Jones 1993, 2009, pp. 37-38). Positive feedback can explain path stability and path change, depending on the monopolistic control over a policy. As Baumgartner and Jones (1993, 2009) point out “where images are in flux, one may expect changes in institutional jurisdictions. Conversely where venues change, the terms of the debate may be altered still further. Where venues are tightly controlled, on the other hand, changes in image are less likely; where changes in image are ruled out, the odds of effecting changes in venue are correspondingly lower. So, image and venue can combine to produce rapid change, or they may interact to reinforce the current assignment of authority” (p. 38). ). I will study this interaction process in Uruguay and Argentina. Like Baumgartner and Jones (1993, 2009) I will also explore whether there is more rapid or a more incremental policy change.

As it was mentioned when it was explained the ACF, policy subsystems are composed by different groups of actors and their policy belief systems. Sabatier classifies the elements composing policy subsystems as internal and external. The internal elements are: 1) actors and 2) policy belief systems. Actors can be classified in two types—advocacy coalitions, which were already explained, and policy brokers. Policy brokers are the actors concerned with keeping the level of political conflict within acceptable limits as well as to reach some reasonable solution to a particular problem. In developed and stable democracies, this is a traditional function of some elected officials such as chief executives. Beyond chief executives, it is possible to include some technical researchers and neutral bureaucrats as policy brokers (Sabatier 1993, pp. 24-27).

The external factors of policy subsystems are distinguished between relatively stable parameters, and dynamic system events (Sabatier 1993, pp. 20-23). Although relatively stable parameters are likely not to change, they can be altered over long periods of time. Under the relatively stable parameters are included:

- 1) Basic attributes of the problem area that affect the policy options of the subsystem actors as well as their perceptions over time, often because of the activities of an advocacy coalition.
- 2) Basic distribution of natural resources.
- 3) Fundamental cultural values and social structure.
- 4) Basic legal structure.

Dynamic system events refer to factors that are exposed to changes in short periods of time, altering the constraints and opportunities that confront subsystem

actors. To Sabatier (1993), the following factors constitute the principal dynamic elements affecting policy change:

- 1) Socioeconomic conditions and technology.
- 2) Public opinion.
- 3) Systemic governing coalitions.
- 4) Policy decisions and impact from other subsystems.

This classification of the subsystem factors described by the ACF (Sabatier 1993) is presented here because some elements are used for the analytical framework. The elements included in the present analytical framework are: advocacy coalition's policy monopoly of policy core beliefs reinforced by consequent institutional structures in the electricity generation (e.g. the legal structure and energy policy framework). In addition, contingent conditions will be analyzed in relation to the changes in policy core beliefs of governmental programs in both electricity systems. The conditions will be: socioeconomic and technology conditions (e.g. socioeconomic growth, reduction of technology costs); changes in systemic governing coalitions or political balance (e.g. new political regimes); impact from other subsystems or from the broader system (e.g. changes in the electricity generation area like liberalization or re-nationalization); and influence from international experiences in renewable and nuclear energy policies (e.g. learning from pioneer countries). These external circumstances are independent variables that influence the decision to set renewable and/or nuclear energy goals.

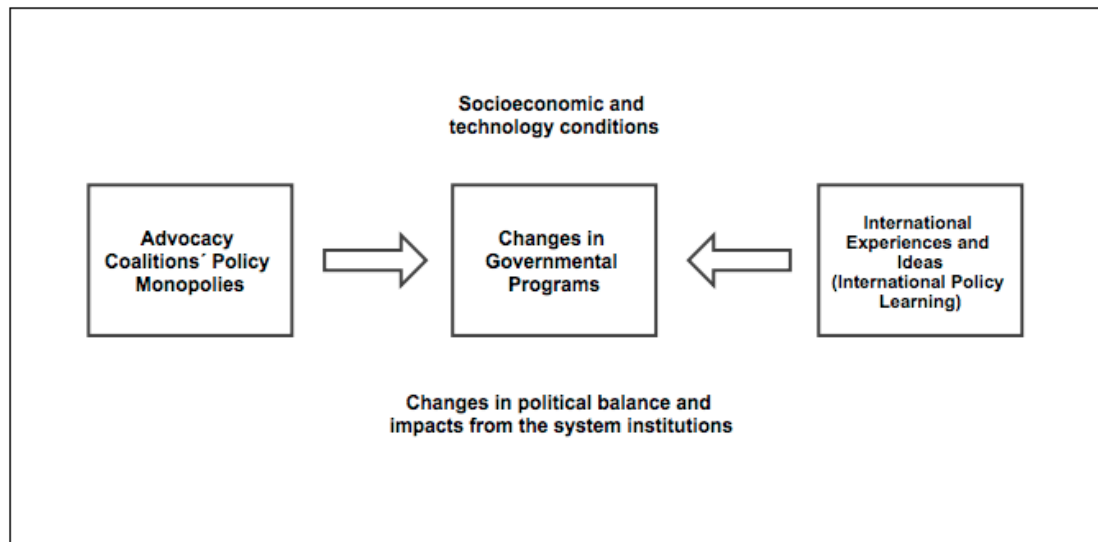


Figure 2.2. Elements of Policy Change

Source: Author.

Figure 2.2, shows the relation of the causal variables from the independent variables that composed so-called “contingent conditions” and that exert indirect influence to the shift of the advocacy coalition’s policy monopoly from which it depends that a governmental program would be, or would not be, significantly revised (see hypotheses below). This analytical structure (figure 2.2) will help to answer the main research questions presented in chapter 1 (Section 1.3) as well as the sub-questions and hypotheses presented below.

### 2.5.1 Definition of the Hypotheses

Advocacy coalitions compete according to their common policy core beliefs and collective long-term interests, which they try to defend and impose seeking a dominant influence in a particular policy system. When an advocacy coalition is strong enough to have a policy monopoly over one or more advocacy coalitions, it will try to hinder the access of the weak coalition to the agenda-setting process. Similar to Jankowska (2011), the ACF approach will be linked to the PE theory to explain the relationship between the policy monopoly an advocacy coalition possesses and policy change or path dependency. Of interest are how changes—or the lack thereof—in the policy monopolies of the advocacy coalitions have either driven to deeper policy change and the decision to start developing different energy sources or left the status quo basically in place (path dependency). The observed causal relationship between the policy monopoly of the system advocacy coalition, as an

independent variable, and policy core attributes of governmental programs in different energy sources in Argentina and Uruguay, as dependent variables leads to investigate the following hypothesis (H1):

H1. The policy core attributes of a governmental program in a specific jurisdiction will not be significantly revised as long as the system advocacy coalition that instituted the program has a policy monopoly within that system. Conversely, the policy core attributes of a governmental program in a specific jurisdiction will be significantly revised if the system advocacy coalition that instituted the program loses the policy monopoly within that system.

Two elements can be inferred from this hypothesis. First, in a policy system there may be either one or more strong advocacy coalitions having policy monopolies, which are challenged by different weak advocacy coalitions that have little access to the decisions. Second, the strong coalitions may lose their policy monopoly and be fully replaced by other coalitions, or they may just be weakened giving more room to other coalitions. In the latter case, when the policy monopolies of the strong coalitions are weakened, the weaker coalitions get into the system bringing with them their policy core attributes.

In electricity systems, there are diverse understandings about the security of different forms of energy according to the policy beliefs of advocacy coalitions. A policy monopoly is based on two components. First it entails policy styles or worldviews which in the words of James Jasper (1990) are defined as “distinct clusters of images, symbols, rhetoric, and techniques that an individual or group can use in thinking about public problems, developing solutions, and persuading others” (p. 11). For example, being self-sufficient and having economically affordable, safe, and clean energy constitute goals to be reached for any country, including Argentina and Uruguay. But the different priority assigned to a particular policy core belief over another policy core attribute and thus the different appreciation of which kind of energy source meets the privileged policy beliefs and is indeed more important to develop may vary by country. When analyzing the role of nuclear energy, Jasper (1990) includes the priorities that politicians and bureaucrats in France, Sweden, and the United States assigned to different policy beliefs (i.e. cost-benefit, technological

autonomy, and moral concerns). These priorities will be analyzed to understand how they may affect policy choices.

In the context of electricity supply scarcity, a quandary between the choice between renewable energy and nuclear power can emerge. Which route to take will be influenced by different values and understandings of the technologies. For some actors, nuclear power is seen not only as a reliable, cost-efficient, safe, and clean energy source but also as a way to develop an innovative local industry. For such actors, while renewable energy may be accepted as a supplementary source that is also viewed as safe and clean, it is viewed as non-reliable, less cost-efficient, and less technologically developed than nuclear. For other actors, nuclear power is accepted as a reliable and relatively clean energy source but it is considered to be too expensive and to entail too many other environmental impacts and risks. For these actors, wind energy is the more desirable of the two because it is in general appreciated as less expensive, safer, cleaner, and, in combination with other renewables, also quite reliable. The priority assigned to these values is also relevant. For example, for some people, it is more important that a technology is more cost-efficient, safer, and cleaner, while for others technological considerations matter more than cost-efficiency and even more than environmental concerns.

This kind of competition among coalitions supporting different policy beliefs can be observed in Germany and France. Germany is a country without gas and oil but with a significant share of coal, renewable energy and nuclear. The decision to develop more renewable energy—and to phase out nuclear—was principally due to the imposition of the demand for what the public understands as a more environmentally friendly energy source and the building-up of an innovative industry. France is a country with an insignificant share of fossil fuels but with a significant share of nuclear and a moderate participation of renewable energy, and especially hydropower. Before the oil crisis, France decided to develop nuclear power significantly as a mean of developing French heavy industry, making it competitive on international markets; this is a position that was strengthened when the oil crisis was triggered in 1973.

Second, policy monopoly entails an institutional component aimed to reinforce policy core attributes. The institutional component is anything but the legal regulations and the policy framework established as a consequence of changes in

issue definition and its appearance on the public agenda. An adequate and stable legal and policy framework favorable to a new energy source matters. As Baumgartner and Jones (1993, 2009) points out “if the structures are changed, then dramatically changes in the mobilization of bias may result” (p. 12). These changes of bias have long-term consequences and that’s the reason why there is an extensive literature that recognizes the importance of the intervention of the political support to develop an innovative sector or subsector (Jänicke 2002; Jänicke 2007; Jänicke and Jacob 2006; Mendonça 2007; Mendonca et al. 2009).

The legal and policy framework is referred as one of the objective limitations of the political or institutional capacity’s concept as applied by Martin Jänicke (2002) to the environmental sector. Environmental capacity “points to the objective limits to (and necessary preconditions of) successful solutions of a given type of problem, limitations beyond which failures set in, even cases of good luck, skill and highly motivated actors” (Jänicke 2002, p. 1). I introduce the energy policy framework element to analyze its effect in the domestic development of renewable, especially wind, energy as an innovative energy industry. The legal and energy policy framework is particularly appropriate to apply in the renewable energy sector because as an infant—not a mature—industry, it requires more the intervention and regulation of the state. In the case of nuclear power, although it is a quite mature industry in well-developed countries, in transition countries it is still an underdeveloped subsector. The importance of the legal and energy policy framework is accentuated in the present cases because renewable energy, as an innovative industry subsector, is at the very beginning of its development in both Argentina and Uruguay and nuclear power, despite its long trajectory in Argentina, it has been sidelined for several years.

I identify the lack of an adequate and stable legal and energy policy framework as a limitation that hampers the ability to find sufficient financial support for renewable energy developers. In contrast, the nuclear energy industry has a more stable and adequate legal and policy framework in Argentina that enables the state-owned nuclear companies to accomplish the projects assigned by the government with the funding coming directly from the national treasury. Being financed by the state, nuclear energy projects need the legal framework to establish the objectives and guarantee state funding. Policy and deployment of innovative energy technologies are both interrelated. In the case of renewable energy, private investors and developers



need a long-term and stable regulatory and policy framework to execute their projects, stimulating its development from a niche to a mainstream technology. Indeed, “environmental innovations are not only stimulated by the higher environmental standards of consumers in a country as compared with those in other countries, but also by special promotional measures, or by political intervention in the market” (Klemmer, Lehr et al. 1999; Jänicke, Blazejczak et al. 2000, found in Jänicke and Jacob 2006, p. 33). There are several examples that address the importance of public policies implemented by the leader countries to promote and stimulate environmental innovations and renewable energy technologies (Jänicke 2007; Mendonça 2007; Mendonca et al. 2009). Feed-in tariffs, implemented for the promotion of renewable energy sources in Germany and other countries in Europe, constitute an example. Feed-in tariffs guaranteed that renewable energies, as a public good, were being effectively deployed, which otherwise—were they required to compete without such support in the market—would not have been so successful. A lack of stable energy policy and regulatory framework in the electricity system hampers also the possibility to obtain sufficient financial funding for renewable energy projects and the necessary investments for the required network transmission infrastructure. Building and introducing a new energy source in the electricity system requires investments in new infrastructure.

The relevance of particular regulatory and policy frameworks as well as policy instruments can change over time.<sup>20</sup> They are linked to usually long-term frameworks and national requirements. In the words of Michael Howlett and M. Ramesh (1993) the election of policy instruments does constitute an experience, learned by the state and social actors. This experience, called policy learning, is normally extended over time (“intertemporal dimension”), space (“transnational dimension”) and policy areas (“intersectoral dimension”) and it finally leads to either small changes or to paradigmatic shifts in the use of policy instruments. The continued transformation of the German Renewable Energy Act (EEG from German “Erenewerbare Energie Gesetz”) since 2000 has occurred due to small changes or adjustments that have been

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<sup>20</sup> Policy instruments are public policies set within the policy process to achieve particular goals. They can be oriented either more to conflict or more to consensus, depending on their character—distributive, redistributive or regulative. This is though a relative orientation because public policies are quite complex and it is thus impossible to classify them unequivocally and specifically in only one category. They tend to include several aspects of the distributive, redistributive, and regulative category (Windhoff–Héritier 1987, pp. 52-53).

necessary to meet the changing conditions experienced by the renewable energy industry. Like the historical institutionalists, Howlett and Ramesh also point out that the election of a given policy instrument depends more on the social and political conditions of a country and less on the efficiency and effectiveness of the instruments (1993, p. 250). “The actual (instrument’s) choice is a political one, bound by political institutions and made by political actors often responding to political pressures” (Howlett and Ramesh 1993b, pp. 4-5). Since social and political conditions differ from one country to another and across different temporal circumstances, the choice of policy and regulatory frameworks as well as policy instruments made by countries over time is also different.

The second and third research questions in this dissertation refer to the relationship with international actors and other external circumstances that have influenced Argentina and Uruguay in their energy policy decisions. Policy changes in the electricity systems can occur not only as the result of a loss of an advocacy coalition’s (or coalitions’) policy monopoly but also because of external conditions that influence larger or smaller changes in the policy beliefs of governmental programs, especially in moments of issue definition. In historical institutionalism, institutions are understood to mediate the interaction of relevant coalitions when they compete pursuing the introduction and development of a new policy idea. The adoption of a new international idea is shaped and mediated by the political balance of power, socioeconomic circumstances, and the institutional framework (Hall 1992). To analyze energy policy decisions in Argentina and Uruguay, it will be examined exogenous socioeconomic and technology conditions, systemic governing coalitions or political balance, and institutions from the electricity system as key external elements but they will not be considered the dominant variables. Institutional theory will be linked with the ACF to examine how the influence from international ideas, as the dominant independent variable, has shaped changes in policy core beliefs of governmental programs. This leads to the following hypothesis (H2):

H2. Changes in policy core attributes of a governmental program (policy change) in a specific policy system are influenced by international experiences and ideas (international policy learning).

The influence that international developments may have on domestic renewable and/or nuclear energy policies (e.g. learning from pioneer countries) is examined as the other relevant independent variable. One important action domestic decision makers can take in the current globalized world is to initiate relationships with international actors aimed to seek successful foreign experiences and see what can be learned from these inputs. Advocacy coalitions in a particular policy subsystem interact not only among themselves but also with international actors. In particular, domestic actors tend to look for foreign examples that are well-known to be successful and learn from or be inspired by these experiences (Weyland 2004; Nelson 2004). International policy learning based on good foreign examples may have a potential influence on a policy direction (here renewable and nuclear energy). The influence of the MERCOSUR on domestic policies will not be discussed in detail, as its relevance was found to be rather low in the case studies. However, the potential influence that nearby countries, which are members of the MERCOSUR, may have on domestic policy will be analyzed.

As mentioned above, historical institutionalism also sees the potential importance of exogenous socioeconomic and political changes in policy change. From the perspective of Thelen and Steinmo (1992) policy change can be the result of changes in the institutions themselves, or it can be also possible that policy change occurs within stable institutions, due to changes in the external context (mainly socioeconomic and political conditions).

Changes in socioeconomic and technology conditions can include financial crisis, or conversely, socioeconomic growth, and variations in technology costs. In transition countries, socioeconomic conditions tend to be unstable and in permanent change. Socioeconomic context can undermine certain energy policies and legal regulations implemented to build a new policy subsystem but it is very difficult to know and predict its specific impact in the development of a subsector. Sometimes changes in socioeconomic conditions can even provide an opportunity framework to introduce and foster the development of a new energy technology. For example changes in the socioeconomic context may entail great consequences in the electricity system influencing changes of patterns in energy demand.

The role of the socioeconomic context in the process of the introduction and development of renewable and nuclear energy is important because it might impose

external specific conditions that constrain or facilitate the development of a new policy subsector or subsystem. As Sabatier (1993) points out “changes in socioeconomic conditions and technology can either undermine the causal assumptions of present policies or significantly alter the level of political support for specific advocacy coalitions” (p. 22). This is important to consider since socioeconomic crises can undermine the purpose of certain legal regulations or policies implemented to promote a development of a new technology like wind energy. Accordingly, “if a standard technological solution is available, the probability of improvement is highest in rich countries” (Jänicke 1992, found in Jänicke 2002, p. 11). Socioeconomic context is thus a constraint for the transition countries that are trying to foster renewable and nuclear energy but it is a very dynamic component and can fluctuate a lot over relatively short periods of time.

Changes in systemic governing coalitions refer to the establishment of new political regimes such as for example the emergence of new political forces or parties that may alter the balance of power. The formation and access of new political parties, or the resurgence of old ones may condition changes in policy core attributes of a governmental program in favor of, or against, a particular advocacy coalition. Socioeconomic and technology conditions as well as systemic governing coalitions or political balance are both elements taken by historical institutionalism and Sabatier (1993) as dynamic factors that influence policy change or the lack thereof. Sabatier (1993) incorporates the impact from other subsystems. Here this is called the impact from the broader system, including the conditions set by the system’s institutions as is done in historical institutionalist analyses. In particular, here it will be considered the impact from the energy or electricity system.

Outputs and impact from the energy or electricity system can affect the priority assigned to introduce new policy ideas. The paradigmatic examples of the impact from the broader system to which renewable energy and nuclear subsystems belong are the electricity reforms. These may entail a change of the ownership structure in the electricity generation, transmission or distribution, or may just be referred to processes of liberalization, partially liberalization, nationalization, or more state control in the electricity system. Liberalization in the electricity generation can play a significant role challenging the policy monopolies of dominant advocacy coalitions because new actors with new understandings can be brought into the

system. This may facilitate the redefinition of issues and the weakening of the previous industries (e.g. fossil fuel and large hydropower), opening the door for other energy sources. Conversely when there is more state control within the electricity system, it may hamper or slow the disintegration of the original industries and the penetration of other coalitions.

From the main questions presented in chapter 1 and in order to have a complete understanding of the characteristics and evolution over time (path dependency or path change) of the different energy paths in the electricity systems of Argentina and Uruguay, several sub-questions emerge. These sub-questions will also be addressed by this study:

- 1) Who are the main actors? What are their principal ideas, collective interests, perceptions or policy core beliefs?
- 2) How did they act and interact to achieve their goals? With whom did they interact? Which were the institutions that channel their interactions?
- 3) Did international agreements play a role?
- 4) How have other international experiences in renewable and nuclear energy policies influenced their decisions?
- 5) How have socioeconomic and technology conditions, changes in systemic governing coalitions, and impact from the broader electricity system influenced their decisions?
- 6) Which are the institutions and policy core beliefs that have changed and which have remained stable?
- 7) Are there any lessons from the French decision to go for nuclear energy and the German one to pursue renewable energy that can be applied to Argentina and Uruguay?

The aforementioned hypotheses (H1, H2,) will be tested throughout the empirical analysis of the two case studies. The theoretical framework helps explain the importance of the why question and the other questions asked regarding the decision to develop renewable and, or nuclear energy by looking at how and why relevant actors have interacted in different electricity systems. This research interest corresponds to the purpose of the theories of policy-making processes aimed to explain how engaged political actors interact within political institutions to adopt, produce, and implement public policies (Schlager 2007, pp. 296-297).

### **3 Methodological Framework**

#### **3.1 Methodological Approach**

The scientific purpose of the present study is explanatory because it seeks to answer ‘how’ and ‘why’ questions. Unlike surveys and archival analysis, which are more used to answer the “what”, “who”, “where”, “how many”, and “how much” questions, case studies—together with history and experiments—are more appropriate to answer the “how” and “why” questions. Case studies allow one to examine a contemporary set of events within which relevant behaviors cannot be manipulated, while experiments always seek to control variables and values. History can also study contemporary events; situations in which the method begins to overlap with that of the case study. Case studies, as well as history, rely on primary and secondary documents, physical artefacts but they also add two characteristic sources of evidence that enable one to study contemporary events without exerting a control: direct observation of the events and interviews with the stakeholders involved in such events (Yin 2009, p. 11).

Qualitative research has both advantages and limitations and its selection must contemplate this fact. It should always follow four conditions to be scientific: (1) the goal is a descriptive or an explanatory inference based on empirical information, (2) the procedures are public, (3) conclusions are uncertain, (4) and the content is the method (King et al. 1994, pp. 5-7). The advantages of qualitative research methodology and case studies is that they enable one to go deep and to reveal not only whether the policy of an innovative sector like renewable energy is implemented but also ‘how’ and ‘why’ it is implemented in each case. Case studies rely on ‘*process tracing*’, that is, in-depth investigations of the way in which the different phases of the policy process connect, like here the phases of the renewable and nuclear energy policymaking, “enabling the investigator to identify the reasons for the emergence of a particular decision through the dynamic of events” (George and McKeown 1985, pp. 34-41, found in Brady and Collier 2010, pp. 173-174; Weyland 2004, p. 26). Process tracing is “a way to strengthen results by identifying a causal process that could lead from the independent to the dependent variable” (George and Bennett 2004, p. 185). For this purpose “the researcher examines histories, archival documents, interview transcripts, and other sources to see whether the causal process

a theory hypothesizes or implies in a case is in fact evident in the sequence and values of the intervening variables in that case” (George and Bennett 2004, p. 6).

Process tracing has many advantages for theory testing and theory development in case studies within political science. As Alexander L. George and Andrew Bennett (2004) point out “it is a useful method for generating and analyzing data on causal mechanisms. It can check for spuriousness and permit causal inference on the basis of a few cases [...] It can point out variables that were otherwise left out in the initial model of comparison of cases...” (p. 223). These advantages are thanks to its historical support that focuses on relevant past events to find explanations. In such a way “process-tracing can strengthen the comparison by helping to assess whether differences other than those in the main variable of interest might account for the differences in outcomes” (George and Bennett 2004, p. 81). Relevant for the present case studies is the potential application of process tracing to address the problem of the so-called equifinality (or “multiple convergence”), that is offering the possibility of identifying “alternative causal paths to the same outcome and alternative outcomes for the same causal factor” (George and Bennett 2004, p. 224). In this doctoral research I will apply the same causal factors to Argentina and Uruguay, and process tracing will be used to help analyze alternative outcomes.

Single- and multiple-case studies are two variants of the same methodological framework, e.g. the case study method. The multiple-case design may involve a small number of cases (two or three) in detail, to see whether events unfold in the manner predicted, whether actors speak and act as the theory predicts, and finally whether cases predict similar results (*the literal replication*) or different ones (*the theoretical replication*). Moreover, the multiple-case design needs the development of a rich and solid theoretical framework, which states the conditions under which such events and actors are likely to unfold in the predicted manner (Yin 2009, p. 54).

One of the critiques of small-N comparative studies is that the small number of cases and multiplicity of potential causes (independent variables) make it difficult to determine the relative weight and significance of different variables. However, historical process tracing can provide useful evidence because the detailed analysis of the cases has the advantage of uncovering the precise operation of these causes, that is, how the causal factors operate in a certain (policy) process and give different results. Sometimes they can produce data that is otherwise very difficult to obtain.

One alternative to overcome the problem of multiple potential causes is to determine and find the most relevant independent variables through the analyses of primary and secondary documents and the conduction of a preliminary field research (including some first approach interviews). This for example enabled to find the most relevant causal factors and research questions in relation to the field of different energy policies in the electricity systems of Argentina and Uruguay from the mid 1990s.

The chances of doing a good case study are better with a ‘two-case’ than a single-case design. There are more analytic benefits from having two cases than having just one case because in the latter there is only one possibility to verify the hypotheses. Analytic findings independently arising from two contrasting case studies will represent a strong start toward *theoretical replication*, strengthening the findings compared to those coming from a single case alone. Yet, the justification of a single case must be in the sense of its uniqueness, that is, because is a ‘crucial case study’ (Yin 2009, pp. 60-61; King et al. 1994, pp. 222-223).

### **3.2 Election of the two-case studies and the period of time**

The focus on the renewable energy and nuclear power choices made in Argentina and Uruguay was done for empirical reasons. There is already an extensive literature on renewable and nuclear energy policies in industrialized and developed countries; however fewer studies have been conducted in less industrialized and transition countries, especially in the Latin and South American regions. Yet the emergence in recent years of different energy models and new alternative energy sources to diversify the electricity mix in South America makes it essential to investigate more in-depth the implication of these changes in the public agenda. My purpose is to compare Argentina and Uruguay as two transition countries in South America that were faced by electricity supply shortages and decided to begin developing renewable and nuclear energy around the same time albeit with different emphasis in their energy mix choices. While Argentina decided to develop more nuclear than renewable energy, Uruguay opted not to develop nuclear energy and instead to develop renewable energies. The reason for selecting Argentina and Uruguay is that both countries were suffering from an inadequate electricity supply at the same time (from 2004) that had similar origins. Indeed, the energy problems of Argentina



triggered the electricity crisis in Uruguay to a large extent, making these interesting cases for analysis. One might think why not incorporate Chile in the study since it was also dependent on the Argentinean natural gas exports and the energy problems of Argentina caused the same electricity supply problems as Uruguay in this country. The main reasons are simply that first the electricity problems of Chile were too similar to that of Uruguay, both heavily relying on their hydropower capacity and Argentinean gas exports, and second, Chile is too different to both Argentina and Uruguay in the sense that it has already reached a stable level of strong economic development. Therefore, its analysis would not have added much valuable explanatory power to the inquiry.

The present study covers the period extending from the mid 1990s to 2014. In 1997 Uruguay executed electricity reform, liberalizing electricity generation and forbidding nuclear energy. In the case of Argentina between 1994 and 1998 there were the first wind energy developments and the first renewable energy law was issued. In each country these events are relevant for their subsequent influence on the main period of study (2003-2014). As background information of the political systems, the most relevant events of the previous years are described in chapter 4, beginning with the mid 1980s.

I started from the basic assumption that trying to figure out who are the relevant actors; what are their policy core beliefs, ideas or collective interests; and the institutional frameworks established by the main advocacy coalitions to achieve their goals and how these have influenced policymaking in Argentina and Uruguay, would require studying these two cases at the national level. The influences of the regional level, if any, as well as the potential influence of international developments and actors are also considered. The unit of analysis is, in the two case studies, renewable and nuclear energy policymaking (Yin 2009, pp. 29 – 31). To assess which factors influenced the decision to set different renewable and nuclear energy goals on the public agendas of Argentina, and Uruguay, and why political commitments towards both energy sources was stronger or weaker in one case than in the other, it is necessary to seek the causes and the actors behind the policy decision making that were either supporting or rejecting renewable and nuclear energy. Important to highlight is that in order to facilitate understandings of renewable and nuclear energy policymaking in Argentina and Uruguay, I present an in-depth analysis of the agenda-

setting process in two separate chapters, each one corresponding to each case study. An introduction of the principal differences and similarities concerning their political systems and how they work is presented and compared in a single chapter preceding the case study chapters. The concluding chapter contains a systematic comparison of both cases and the consequent results.

The objective of this work is to analyze and show the changing policy core beliefs or *images* of renewable and nuclear energy over time. As Baumgartner and Jones (1993, 2009) highlight “longitudinal studies (are those) that stress temporal variation in policy visibility, mobilization, and support [...] with the emphasis on policy dynamics more common in case studies of single issues over time” (p. 41). Thus a longitudinal study of renewable and nuclear energy in Argentina and Uruguay was chosen.

### **3.3 Sources of evidence for the two-case studies**

Reviews and content analysis were done in relation to documents, reports, documentaries and official discourses in television channels as well as Youtube. Additionally, semi-structured interviews with experts were conducted and direct observation of a few installed wind parks in the areas where they are placed was done. Also, secondary literature about all the relevant identified aspects of the subject, including those that are directly related to the topic and those that are indirectly related, were reviewed. The following topics were considered: wind and renewable energy policies in Argentina, Uruguay, other transition countries like Brazil, Germany, France, as well as the European Union (EU); nuclear policy in Argentina, Uruguay, France, Germany, and other countries; energy policy linked with the electricity and in particular in relation to our two case studies; environmental policies in South American countries, in other transition countries, in Germany, and the EU; political legitimacy of renewable and nuclear energy; political systems, institutions and political parties.

The primary sources used included: official documents and legal texts; administrative documents like proposals, progress reports and presentations of events; official discourses and announcements; scientific studies and expert evidence; press releases and other articles in the mass media, including radio interviews. For some

official discourses, announcements, and documentary material Youtube sources were used. Regarding the hierarchy of evidence sources, it does not exist better evidence sources than others. On the contrary, they complement each other and the most sort of sources are used the better the case study is (Yin 2009, p. 101).

Although secondary and primary sources were extensively drawn upon to build up an understanding of renewable and nuclear energy development in Argentina and Uruguay, expert interviews and direct observation were of paramount importance. Without them it would not have been possible to obtain deeper insights into developments. I highlight the relevance of the data obtained from interviews and direct observation in my study because the availability of the information in primary sources is very limited. This is also noted by Weyland who states: “given the deficiency of archival documentation in Latin America and the prevalence of informal patterns of decision making, case studies commonly rely on interviews with leading decision makers. These interlocutors have exclusive access to information about crucial aspects of policymaking, including the actual participants, their issue positions, and their efforts at exerting influence. The perspective of these ‘practitioners’ is particularly important for studying the cognitive aspects of policymaking” (Weyland 2004, p. 26).

Most of the interviews were semi-structured focused interviews—either conducted personally, through video call, or by telephone—but I also did a few structured interviews per Email for practical reasons. Since I live in Germany (Berlin) and my two main case studies are in South America, it was difficult for me to meet some interview partners personally or even per video call. For these two contacts I used structured interviews via Email. I started with two (one for each case study) *in-depth interviews* that helped me to find other interview partners. The difference between *focused interviews* and *in-depth interviews* is that the former consist in relative short interviews – normally one hour-, which may still remain open-ended and assume a conversational manner, but are more likely to follow questions of the case study protocol. For example, a major purpose of such an interview might be simple to corroborate certain facts that the researcher thinks have been already established and avoid asking about other broader topics. In contrast, the *in-depth interviews* consider the facts of a matter as well as the interviewee’s opinions about these events. Thus, it is also possible to ask the interviewee to propose his/ her own

insights into certain occurrences. Logically, these interviews take place over an extended period of time (Yin 2009, p. 107).

My initial plan was to conduct 34 interviews but in the end only 32 could be carried out. The first interview partners were selected based on the review of the main documents in the electricity and renewable energy fields aimed to see who were the most significant actors from the different sectors (i.e. governmental bodies, NGOs, private companies, and associations). After that, interview partners were obtained from the first contacted interviewees, employing the *snowball technique*. Indeed, in order to be sure that the number of interviews was sufficient to provide a good explanation for each case, I used the *snowball technique*, which means that the researcher asks each interview partner who else should be interviewed. This process continues until the discourses and the events are repeated. In the three cases where I could not conduct interviews, official documents and discourses as well as secondary literature were reviewed to obtain missing information.

The experts I interviewed were actors working and coming from the following sectors: NGOs, foundations, citizen's initiatives (only in Germany), political parties, Parliament, energy ministries, commercial chambers, business associations, and private companies. I conducted a total of 32 semi-structured interviews (see list of interview partners), of which 27 were particularly interesting and useful. In general, the interviews lasted between one and two hours (focused interviews). However, a few contacts were interviewed several times, personally, per email and video call, and they facilitated me providing up-to-date information regarding the renewable, especially wind, and nuclear sectors. Two of my interview partners asked me to treat their answers as their personal perspectives and not as the views of the organizations where they are affiliated. One of these two interviewees remains anonymous because I did not obtain authorization to expose his/her identity. Since two of my contacts were impossible to reach, interviews with them did not take place. One of these excused him/herself due to lack of time and the second asked me to send the interview questionnaire per e-mail and then answered he/she will not conduct the interview without giving any specific reason. Different interview guidelines were created for each case study (see the appendices) and questions were sometimes adapted to the expertise of the interviewees.

The questions of the case study protocols were formulated according to the main

initial study questions and sub-questions as well as the theoretical framework used for the two case studies. The answers of the interviewees were contrasted with other sources of evidence and then with other interviews to increase the reliability of the data. Multiple sources of evidence were used to contrast the information and see its reliability, the so-called “data triangulation” method suggested by Robert K. Yin (2009, pp. 114-116), which means that case study findings are likely to be more convincing if they are corroborated on different sources of information.

Field research was conducted on two occasions. One field research visit was from November 2010 until February 2011. During this time I conducted direct observation. I went to areas where wind parks are installed and had informal conversations with the personnel working there as well as people living nearby and local authorities. These personal impressions as well as photographs helped me to gain another image of the situation that complemented the interviews in the reconstruction of decision making processes. Yin (2009, pp. 109-110) discusses such *casual direct observation* and highlights that it might be made throughout a field visit, including occasions like personal interviews, during which this type of evidence can be collected. He notes as an example that the condition of a building tells a lot about the climate or impoverishment of an organization (Yin 2009, pp. 109-110). The second field research was conducted from December 2012 to January 2013. During this occasion I did mostly face-to-face semi-structured interviews and in addition set up interviews per e-mail or video call for interview partners who were not available *in situ*. These eight interviews were conducted later in 2013 and 2014.

## **4 Political Contexts of Argentina and Uruguay**

### **4.1 Introduction**

Argentina and Uruguay constitute young democracies that have experienced great transitions in their political systems. Argentina constitutes a cyclical democracy that traditionally alternated between democracy and authoritarian regimes. To Marcelo Cavarozzi (2000) one of the main components of the cyclical democracy “was statist management of the economy, which continually expanded, simultaneously weakening the institutional framework” (p. 30). Thus, after the last coup d'état finished the 10 December of 1983, democracy could succeed because the “hybrid political formula”—together with its component of the economy’s statist management—was economically and politically exhausted. But democratization was a gradual process characterized by some patterns of socioeconomic and political instability. In fact, in two occasions (1989 and 2001) presidents were forced to resign before the end of their mandates. Cavarozzi (2000) explains that democratization was gradual because “the transition to a stable democracy was the result not so much of dislodging a dictatorship that had successfully become entrenched in power, but rather of breaking a cycle in which democracy and authoritarianism intertwined in a complex, hybrid political formula” (p. 30). In contrast, in the Uruguayan case the democratic regime was interrupted in only one occasion in the twentieth century, from 27 June of 1973 until the 1 March of 1985. After the coup d'état in 1985, Uruguay “returned to its pre-coup constitutional rules” (McCoy 2000, p. 1) and regained the democratic social character that traditionally has prevailed in the country.

Due to the emergency of democratic regimes new political patterns were introduced in several countries of South America. The state-centric matrix was exhausted (Cavarozzi 2000, 2013) and replaced by a retraction of the state in various social and economic areas. Neoliberal ideas were imposed and became dominant in almost all the countries in South America between the years 1983 and 2001–02. New privatization and deregulation processes were followed in various countries, although to different extents, as it will be seen more in detail in chapters 5 and 6 for Argentina and Uruguay. However, since 2002–03 this tendency was reverted in several countries, including Argentina and Uruguay, which both began to be dominated by the so-called Latin American “new left”. While the new left in Argentina came along

with the administration of Nestor Kirchner in 2003, in Uruguay it came with the government of Tabaré Vázquez in 2005. The latter was the first government in office of the Broad Front (from the Spanish name “Frente Amplio”). The new lefts governing Argentina and Uruguay are more pragmatic than the ideological left. The programs of the new left tend “to adapt to local traditions, not ideologies, to search for pragmatic solutions and solve concrete social problems” (Dömény 2011, p. 4). However, in their functioning both new lefts are different. In Argentina, the new left is self-oriented, nationalist, secessionist and more traditional in the sense of populist, which will be detailed below. In contrast, the new left in Uruguay is more open to changes, modern, international, and more in favor of the reforms (Castañeda 2006, in Dömény 2011, pp. 4-5).

Beyond Argentina, some other examples of countries with traditional populist, nationalist, and secessionist groups are: Bolivia, Ecuador, Peru, and especially Venezuela. In the open, modern, international, reformist, and strongly institutions-based group are Chile and Uruguay. These two countries are often typified to be similar examples of European social democracies (Gudynas 2009, pp. 189-190). Because the influence of the political system in the renewable and nuclear energy policy of this comparative case study research is crucial, it was a decision here to compare two countries, whose political systems function differently. Although Argentina and Uruguay share a similar political history characterized by their parallel military dictatorial periods followed by their parallel return to democracy, similar free public education and health care systems, as well as being middle-income countries, their institutional settings are quite different.

#### **4.2 The political context of Argentina and Uruguay**

Argentina is a country rich in natural resources, having an economy traditionally supported by resource extraction. Despite its natural resource wealth, a precarious and unstable political and economic situation drove the country into several crises. After the return of democracy, two political and socioeconomic crises were triggered in 1989 and 2001–02, provoking the early resignation of Raúl Alfonsín (1983–1989) and Fernando de la Rúa.

After the economic crisis triggered in 2001–02, Nestor Kirchner (2003–2007) and his wife Christina Fernandez de Kirchner (2007–2011 and 2011-present) took charge of the Argentinean government. Their governments have been characterized by populism, the main aspect of *Peronism*<sup>21</sup> as a political ideology. The Peronist party was inspired by the European national regimes of the 1940s and the ideology of Benito Mussolini’s party, with whom he cooperated particularly in the development of common political strategies. Coming from a military background, Peronism is based on a strong personalized politics concentrated in one figure (as demonstrated by the Peron, Menem, and Kirchner administrations, all named Peronism, *Menemism*, and *Kirchnerism*) and on nationalist and populist public policies usually with a strong socialist component. In the words of Beatríz Sarlo “... (Argentinean) democracy is a system undermined by verticalism, centralism and a plebiscitary character. All the forms of Peronism—Kirchnerist or not—have deepened these characteristics throughout its history” (*El País*, 22.10.2011). Ernesto Laclau (2005) refers to the populism as the real politics that is able to draw a boundary between multiple demands, intentionally polarizing the society between opponents and followers or allies (found in Sarlo 2011, p. 146). This strategy hampers the possibility of negotiation between and among different political fractions. Populist regimes tend to emerge in contexts of economic and political crises, where a strong and pragmatic leader drives all the fragmented forces into two different groups (the claimants or followers and the adversaries) leading a secessionist political process. Political pragmatism tends to be emphasized when populist leaders use state resources to achieve electoral support, becoming patronage leaders. The leader relies on the permanent creation and recreation of the political discourse as a source of legitimacy. In populist regimes, leaders’ discourses constitute an essential component of politics. This is probably one of the reasons why the Kirchner presidents began building this leadership figure—with an aggressive populist style—based on a strong discourse component, especially after they calmed the political and economic conflicts deriving from the economic crisis of 2001–02 (Sarlo 2011, p. 147).

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<sup>21</sup> *Peronism* is the name commonly used to refer to the Justicialist Party. Peronism comes from the name of President Juan Domingo Peron that founded the Justicialist or Peronist party in 1947.



Economic and political conflicts have favored the emergence of the Kirchners as political leaders. They were supposed to reconstruct and organize the damaged society in which many demands remained unmet. The other possible reason for the strong leadership of the Kirchners was the existence of other strong political leaders in the Latin American region. Hugo Chavez and Nicolás Maduro in Venezuela, Evo Morales in Bolivia, and Rafael Correa in Ecuador were exerting similar populist-based leadership. Populist leaders in Argentina have traditionally relied on the participation of the lower social classes. They also usually strengthened social policies and intervened in the provision and control of public services. This was the case for Juan Domingo Peron during his presidential terms (1946–1952; 1952–1955, and 1973–1976) and, to a lesser extent, it has also been the case for both Kirchner administrations. During the first administration of Juan Domingo Peron in 1949 the oil company “Yacimientos Petrolíferos Fiscales” (YPF) was nationalized, assigning the monopoly of the hydrocarbons production to YPF; the railway company, which had been in British hands, was also nationalized in 1948; the national company for gas distribution, State Gas (Gas del Estado) was established; the Commission for Atomic Energy (CNEA) was created; foreign trade in agricultural products was monopolized and centralized through the creation of the “Instituto Argentino de Promoción del Intercambio” (IAPI) in 1946 with the objective to transfer resources from the agrarian sector to the industrial sector, fostering domestic industries; and it was implemented the women’s suffrage (1947). During Cristina Kirchner administration the most relevant programs were the universal allocation for children (“Asignación Universal por Hijo”) and the social plan “Jefas y Jefes de Hogar”, an economic compensation for unemployed people.

In the case of Uruguay there has also been a strong political participation of the working class but unlike in Argentina, participation is not conducted by populist leaders and tends to include a wider scope of social sectors. Among Latin American political regimes, Uruguayan democracy has been always compared to European social democracies. The comparison with European social democracies has its origins in the modernization of the country conducted by President José Batlle y Ordóñez, especially in his second period in office (1911–1915). Several political, social, gender, and educative reforms were executed at that time, inspired by the European social democracy model. Among the most prominent reforms it can be mentioned: the

split between religion and politics (already started by the previous government of Claudio Williman between 1907–1911, abolishing religious education in schools); free access to social security and health care; the creation of a “feminine section” to foster the attendance of women at the University of the Republic; divorce right (allowing women to file for divorce without specific reason); the approval of the eight hours working day law; nationalization of the public services, including the creation in 1912 of the State Electric Power Company (UTE from the Spanish name “Administración Nacional de Usinas y Transmisiones Eléctricas”) monopolizing electricity generation, transmission, and distribution.

During the twentieth century until the dictatorship in 1973 Uruguay had two main political parties, the major Red Party (in Spanish “Partido Colorado”), and the minor White Party or National Party (in Spanish “Partido Blanco” or “Partido Nacional”).<sup>22</sup> The Red Party is the oldest political party in Uruguay, founded in 1836, and is the political party that has governed the longest in the country. The Broad Front was formed two years before the coup d’état (1971) but it did not succeed as a significant political force after democracy was restored in 1985. As a consequence, Uruguay regained its social democratic character and the Broad Front emerged, breaking with the traditional two-party system. The Broad Front was a political party formed by several minor leftist parties that after the collapse of traditional socialist regimes and motivated by the prospect of gaining access to government decided to redefine their political positions. Indeed, these groups “abandoned their past radical postures, somewhat blurring their profiles” (Costa Bonino 2000, p. 79). But leftist groups were not the only ones to blur their ideological differences, the Red and the White Parties, also named traditional parties, have blurred their ideological boundaries too. Both traditional parties have changed their political identities and have shifted from a more social democratic posture, representing the working classes, to a more neoliberal message. Also, the three parties have changed their political discourses. In the Broad Front case, as I have already mentioned, the discourse became more pragmatic and less ideological. “For traditional parties, a more ‘modern’, technical style has become the *modus operandi* preferred over the old populist formula” (Costa Bonino 2000, p. 77). In other words, the discourse of

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<sup>22</sup> Note: Here National and White Party will be used without distinction.

traditional parties identifies with the ideas of the political and economic liberalism, while the Broad Front represents the modern and moderate ‘new left’.

In Argentina, however, ideological boundaries of the political parties are not so well defined and they usually change over time, according to the political alliances they form and the resulting new political parties or fractions. There are at present five major political parties. The Justicialist Party or Peronism, which is also fragmented in two major political wings—“Frente para la Victoria”, also called Kirchnerism due to the Kirchners, and the “Frente Renovador”, also called Massismo due to its leader Massa. The Radical Civic Union (UCR from the Spanish name “Union Cívica Radical”), which constitutes the oldest political party, has traditionally represented the social democracy fraction. The Republican Proposal (PRO from the Spanish name “Propuesta Republicana”), which is more a liberal right party, is the dominant political party in the city of Buenos Aires. Finally, the Broad Progressive Front (FAP from the Spanish name “Frente Amplio Progresista”), which is the newer political party founded in 2011, represents the moderate left wing. It is important to highlight that the two referred wings of Peronism are both currently the most important political parties in Argentina, being difficult to define and separate the ideological boundaries of these two political parties. The common characteristic is that they both share the construction of *personalist*, self-oriented, and populist leaderships.

Cavarozzi (2013) points to three divergent presidential action models in Latin America—coalitionist, weak, and hegemonic. The coalitionist type includes Uruguay, together with Brazil and Chile, while Argentina, jointly with Bolivia, Colombia and Venezuela, are categorized in the hegemonic type. In the latter case, institutional rules tend to be weak or absent, “being temporarily replaced by the presidential discretionary nature as well as the citizen’s resignation to the exercise of sovereignty and to the control of the authoritarian features of the incumbent” (Cavarozzi 2013, p. 2). In contrast, “the coalitionist model rests on a double pillar: the exercise by the president of *self restraint* on the use of the several tools of political patronage, and the proclivity to agree consensually between the two coalitions the amendments to the rules of electoral competition” (Cavarozzi 2013, p. 3).

### 4.3 Natural Resources and Economic Development in Latin America

Environmental policies in the region have followed a difficult path. Latin American countries have concentrated on economic growth based on the diversification of exports; the promotion of environmental policies has not been a priority for the “new left.” Mires (1996) explains, “as part of the new device—‘diversification of the exports’—have emerged new sectors that act as producers, distributors, and financiers of the export economy. In contrast to the traditional oligarchies, which were accused of not getting the maximum out of their country, the new economic groups are exploiting all out without caring to a sufficient extent for the regeneration of soils, forests or cultivation...” (p. 70).<sup>23</sup> In fact, the “new left” or progressive governments have fostered the exploitation of non-traditional export products. This tendency is called by the literature “neo – extractivism” (Gudynas 2009) to differentiate it from the conventional extractivism.<sup>24</sup> First, the conventional extractivism was dominated mainly by the classic extractive sectors like oil fuels and mining, whereas the neo-extractivism includes also new agrarian activities of intensive monocultures (Gudynas 2010). The other main difference is that compared to the decades of the 1980s and 1990s, with progressive “neo-extractivism,” the state plays a more active role, having clearer rules— Independently from the fact that they are good or not—with direct and indirect interventions in the extractive sectors (Gudynas 2009, p. 195).

It is possible to find several examples of nationalization in South America during the last decade including Argentina as well as Venezuela, Bolivia, and Ecuador. Indeed, in 2002 president Hugo Chavez brought the Venezuelan oil company PDVSA back under state control. Also, in 2006 Bolivian president Evo Morales started the nationalization of the gas and oil resources, whereas in 2010 Rafael Correa enacted reforms to the hydrocarbons law in Ecuador that aim to renegotiate contracts with foreign companies (Blanke 2013, p. 2). Following the same

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<sup>23</sup> “Im Zuge der neuen Devise –‘Diversifizierung der Exporte’– haben sich neue soziale Sektoren herausgebildet, die als Produzenten, Zwischenhändler und Financiers der Exportwirtschaft fungieren. Im Unterschied zu den traditionellen Oligarchien, denen man vorwarf, nicht das Maximale aus ihrem Land herauszuholen, beuten die neuen wirtschaftlichen Gruppen alles aus, ohne sich im ausreichenden Maße um die Regenerierung der Böden, der Wälder oder des Anbaus zu kümmern...” (Mires 1996, p. 70).

<sup>24</sup> Source: The term neo-extractivism appeared for the first time in the publication “*Diez tesis urgentes sobre el nuevo extractivismo. Contextos y demandas bajo el progresismo sudamericano actual*” of Eduardo Gudynas (2009).

path, in 2012 Argentina nationalized the fossil fuels company YPF obtaining all shares of the Spanish oil company Repsol.<sup>25</sup> Svenja Blanke (2013) affirmed, “even in countries with moderate left-wing governments, such as Brazil under Luiz Inacio Lula da Silva (2003–2010) and the actual President Dilma Rousseff, or under Tabaré Vázquez in Uruguay (2005–2010) and the present, José Mujica, the role of the state was also strengthened” (p. 2).<sup>26</sup>

Progressive governments make extractivism the pillar of economic growth within their respective countries, insisting on the fact that this economic wealth is used to finance wide social programs, especially addressed to the most vulnerable sectors of the society. This message brings along the political legitimacy of extractivism as a necessary component to achieve social justice, which was always defended by the Latin American left (Gudynas 2010, p. 152). However, as Gudynas explains, “the *neo-extractivism* responds to commercial and financial interests insert in the process of the economic globalization in which South America continues to maintain a subordinated role” (2009, p. 198). This international political pattern is also called “the alibi of the dependency” in the literature. In this kind of dependency, unlike during the 1960s, there is a concealment of national and local responsibility concerning the attacks on the nature and consequently on the population of the respective countries (Mires 1996). This behavior is justified by different political leaders in the region through their nationalistic discourses.

Mires (1996, pp. 72-73) identifies the three main arguments that dominate the nationalistic discourse of the ecology question. First, the ecological issue is solely a worry for rich countries because in poor countries there are more urgent priorities like combating hunger, misery, and poverty. Second, there is the idea that ecological ideology is a manoeuvre of imperialistic countries to impede the economical development of poor countries (this discourse is supported by the Brazilian authorities in the discussion about the internationalization of the Amazon). Finally, it is the comfortable alibi that imperialistic countries have principal responsibility for the ecological problems and, therefore, they have also the responsibility to solve them.

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<sup>25</sup> The Spanish company Repsol had the 51% of the shares of YPF.

<sup>26</sup> Source: <http://library.fes.de/pdf-files/iez/10213.pdf>.

These arguments can be also observed in the political discourses of other transition countries like India, China, and Russia, usually manifested in the international climate change negotiations. The problem is that *neo-extractivism*, as well as the conventional extractivism, produces several environmental impacts that have severe consequences for local populations living close to the area of the extractive activities. Indeed, environmental impacts cause various health problems in local populations which live directly nearby and which do not necessarily receive concrete benefits from the extractive activities (Gudynas 2010 and Mires 1996). In some cases population displacements may take place.

Since socioeconomic growth has become the political priority for the progressive governments in South America, political leaders often argue that some environmental impacts, with their natural and social implications, are inevitable to drive socioeconomic development. In particular, they agree that developed countries have also followed the same path when they industrialized. South American governments agree that it is now the turn of developing countries to become developed and they will not miss this opportunity because of external demands. As a consequence, a faster and greater socioeconomic development rather than environmental and ecological concerns motivate policy-makers to take political decisions that boost economic progress, but cause environmental degradation. This political pragmatism has become a pattern in Argentina and to a lesser extent also in Uruguay. In particular, the difference between both countries is that while in both countries economic growth has been mainly supported by agribusiness sector (intensive agriculture and livestock), in Argentina mineral exports has also played a role. To explain why—in spite of its mineral wealth—Argentina has a precarious economy, the concept of ownership structures is very useful. Identifying the ownership structure of mineral wealth (Jones Luong, and Weinthal 2010) helps to clarify the functioning of the Argentinean energy system. The concept of ownership structure refers to “a set of relations between direct and indirect claimants to the proceeds (or rents) from the exploitation of ...(a) natural resource” (Jones, Luong, and Weinthal 2010, p. 11).

The mineral wealth sector, especially gas and oil, is dominated not only by (mainly foreign) private investors but also by governing elites. According to Jones Luong, and Weinthal (2010, p. 11) in a situation where governing elites and foreign

investors retain control over a portion of their respective mineral reserves, they are both the direct claimants to the rents generated from the mineral wealth. Since government players have traditionally been tied to the extractive economy, governing and bureaucrat elites have supported weak fiscal regimes that enabled the state to proceed without limits on the ability to use and spend the rents from mineral exports during the past decades until the 1990s. These rents have been the principal financial source of their broad social expenditures and subsidies, and have formed the base of their political legitimacy. It is important to clarify that currently rents in Argentina come principally from agribusiness exports and less from the mineral sector. In fact, gas and oil reserves have been greatly diminished since 2004, as it will be explained in-depth in chapter 5. However, as it will be shown in chapter 5, the system of expenditures is still a system that tends to undermine budgetary stability and transparency (Jones, Luong, and Weinthal 2010). I assume that having fossil fuels is not the main problem in Argentina but rather how their revenues are allocated (implicit and universal spending versus explicit and targeted spending), and why.

Michael L. Ross (2012) highlights that social studies often link the problems of rentier states with corruption, rent seeking, social inequality, weakened institutions, and shortsighted policies (p. 5). Although we can find some of these characteristics in Argentina, these are not necessarily the consequences of having fossil fuels. The mere existence of fossil fuels does not explain why political and socioeconomic systems are corrupted, weak, socially unequal, or authoritative. Additionally, some of these characteristics—social inequality, and weakened institutions—have evolved over time. In Argentina social inequality has fluctuated over time; it increased after the return of democracy, between 1983 and the first years of 2000s, but since 2003 it began to be reduced. Institutions can still be improved but we cannot say they remain the same as before the establishment of the democratic regime. During the 1980s democracy was installed in several South America countries some with and others without fossil fuels. This is important because some hypotheses try to explain why Latin American countries are the exception in the sense that they became democratic, even though they have fossil fuels. Ross (2012) explains that “oil wealth would only block democratic transitions in countries whose citizens had never been exposed to democratic rule. Indeed, most of Latin America’s oil producers, including Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, and Peru, had earlier spells of democracy”

(p. 86). In the Argentine case, YPF was founded under a democratic regime in 1922 and it was the first state-owned oil company in Latin America and one of the first in the world.<sup>27</sup> Another reason for the South American exception may be that the economy of several of these countries does not rely principally on the hydrocarbon sector.

For the two case studies the ownership structures will be studied but more focused on the area of the electricity generation and how these have changed over time. For example, in Argentina until 1946 the successive governments favored more privatized ownership structures in regard to the electricity companies. However, when Peron entered office in 1946 a nationalization wave started; YPF as well as most of the electricity companies were nationalized. New state-owned companies such as CNEA for nuclear energy generation, Water and Electric Energy (AyE) for electricity generation, distribution, and commercialization, and provincial electricity companies emerged. In 1958, the partially state-owned company Electricity Service for the Great Buenos Aires (SEGBA) was created with the objective to generate, distribute, and commercialize electricity to greater Buenos Aires. AyE was to be more responsible for national transmission and the generation of electricity. Subsequently, the state took possession of the full ownership of SEGBA; this period was characterized by the greatest state intervention in the electricity system. However, due to inefficiency and high public debts the sector was completely liberalized in 1992; almost all the electricity companies including YPF were fully privatized. There have been some experimental changes since 2004 when the state began to take more control in the electricity system, taking possession of a portion of some energy companies. This constant alternation between a more private and a more national ownership structure, caused by opposite policy beliefs of the governing elites, might contribute to build an unstable energy policy and regulatory framework that has until now repercussions in the electricity system, as it will be shown in chapter 5.

In contrast, electricity generation in Uruguay, which lacks fossil fuels, underwent fewer changes in its ownership structure. Indeed from the creation of the “Administración General de las Usinas Eléctricas del Estado” (UEE) in 1912, which

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<sup>27</sup> YPF was funded at the end of the first administration of Hipólito Yrigoyen (1916–1922). Yrigoyen, the candidate from the UCR, was the first government resulting from democratic elections in Argentina thanks to the *Sáenz Peña Law* (1912). This law established the free, universal, and secret voting for adult males.



in 1931 adopted the name of UTE, a nationalization process began that was completed around 1947 with the monopolization of the generation, transmission, and distribution of electricity throughout the national territory. Until 1997 electricity generation was always a monopoly of the state-owned company UTE. After 1997, electricity production was liberalized opening the electricity generation market to private investments but keeping UTE as a state-owned company. This more stable ownership structure contributed to the building of a more stable energy regulatory and policy framework, as will be explained further in chapter 6.

#### **4.4 International Policy Learning in Latin America**

International policy learning is focused as a form of policy diffusion. Although international learning in the sector of social policies may be different from international learning in the electricity system, it is still worth to mention some of its findings here because of parallels observed with policy developments tied to the introduction of renewable energy. Weyland (2004) has found in his study regarding social policies in Latin America that “although the economic troubles of the Latin American countries during the last two decades (as 1980 and 1990) have strengthened the bargaining power of the International Financial Institutions (IFIs), the influence of these actors (was) limited and they (had) great difficulties inducing domestic actors, especially politicians, to comply with their demands” (Weyland 2004, p. 18). During the 1990s, international policy learning in the social sector in Argentina and Uruguay has resulted more from autonomous learning by both countries than from the inducements or pressures exerted by foreign actors. Foreign countries have provided an initial impulse against the internal inertia and opened up new policy options to be considered. The ultimate decision on how to implement and adapt external models was, however, taken by domestic policy makers in Argentina and Uruguay, according to their specific needs and political priorities.

Nelson (2004) explains how foreign ideas of the social sector were applied and adapted in Latin America in an autonomous policy learning process. He points out “in Latin American countries the local capacity to filter, assess, and modify imported ideas regarding social sector reforms is rapidly increasing. External models provide crucial inputs to the process of designing and gaining an adequate consensus

on directions for change. But internal circumstances, judgment, and politics determine how those models are used. Ideas, and experiences from other countries interact with and complement, rather than substitute local experience and objectives” (Nelson 2004, p. 51). These main findings arise from empirical research on international policy learning in the reforms implemented by Latin American countries during the 1990s in the social sector. Still, it is possible to see that there are some similarities in both sectors vis-à-vis how actors in Uruguay and Argentina have learned from developments abroad. Both can be characterized by an independent—versus an induced—international policy learning process that has not replaced domestic priorities.



## **5 Case Study: Argentina**

### **5.1 Introduction**

The development of renewable energy in Argentina, as a developing country, started only a few years ago when the country faced three energy-related issues: a rapid increase in energy demand, demands for greater access to energy in rural and peri-urban areas without grid connection, and to a lesser extent as a response to concerns about increased GHG emissions and pressures on Argentina to play a role in the global climate regime. In particular it should be highlighted that the increase in electricity demand—related to GDP growth periods (Recalde and Guzowski 2012)—has not been met because the energy capacity has been exhausted. In the words of Recalde “in the Argentinean case the problem of inadequate energy supply has reached a point at which it is actually causing great difficulties to the whole economy, including both macro and microeconomics” (M. Recalde, video call interview, 10.12.2013). The lack of an adequate, stable, and long-term energy policy framework has affected the electricity system, especially the renewable energy sector. Only a few efforts have been carried out to promote renewable and wind energy goals in the agenda and these seem to be insignificant in comparison with the national capacity for renewable energy.

The renewable energy Law No. 26190 states that by the year 2016, 8% of the electricity power supply must come from renewable energy sources. It provides a fixed premium tariff on top of the electricity price for 15 years and exemption of VAT payment in purchase, manufacture, construction and importation of renewable energy infrastructure as well as exemption of the profit tax. At the same time that Law No. 26190 went into effect, the government launched the auction scheme GENREN to achieve the 8% of renewable energy electricity, announcing that 50% of this 8% must come from wind energy production. However, from a total of 895 MW of renewable energy projects allocated in 2010 by the GENREN only 136.4 MW have been constructed, mainly wind projects. There are five large wind parks connected to the central national grid, including the three of GENREN and two constructed by the province of La Rioja, some small scale wind farms, three photovoltaic power stations, and one small scale hydropower plant. Most of the small-scale wind farms are in the south of Argentina in the region of Patagonia (provinces of Chubut, Santa Cruz and

Neuquén) as well as south of Buenos Aires. Additionally, there are three nuclear power plants (Atucha I, Atucha II and Embalse).

Some authors highlight that “political uncertainty [...] causes investment risks for renewable energy developers, because it is difficult for them to find the means of funding the high initial investment costs” (Bravo 2011, Recalde 2011; both found in Urakami 2011, p. 59). In fact, from the four groups of barriers (i.e. economics, financial, institutional and regulatory) the authors assign major importance to the lack of both financial support and an appropriate national renewable energy policy (Guzowski and Recalde 2008). The cases of two Argentinean wind companies, which are among the most important wind power companies in South America, illustrate that phenomenon: IMPSA Wind is investing more in Uruguay and Brazil than it does in Argentina, owning a big factory of wind turbines in Brazil<sup>28</sup> and Corporación América is investing in wind energy exclusively in Uruguay, whereas in Argentina it is investing in fossil and bio-fuels.<sup>29</sup>

The aim of this chapter is to explain the policymaking processes behind adopted decisions related to wind and nuclear energy. In the first part of the chapter, the political events related to the electricity system from the early 1990s will be presented with a special focus on electricity reforms. The renewable and nuclear energy deployments in Argentina will be described and the main conflicting advocacy coalitions and their principal policy core beliefs identified. In addition, the legal and policy framework, the current status of the country’s national energy and electricity supply as well as the current state of renewable and nuclear energy in the country will be sketched. In the second part of the chapter (Section 5.7) the factors that have facilitated or constrained the development of renewable and nuclear energy will be explained and the hypotheses presented in chapter 2 will be considered.

## **5.2 Political System**

To better understand the positions of the advocacy coalitions in the electricity energy system, it is necessary to refer briefly to Argentina’s political background. After the

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<sup>28</sup> Source: Oral interview to Tobias Winter, Director of the “Deutsch-Uruguayische Industrie- und Handelskammer” (AHK Uruguay), 15.12.2012. Note that, “Impsa Wind is planning to produce towers of concrete in Uruguay” (S. Mullin from the AUdEE, video call interview, 27.07.2013).

<sup>29</sup> Source: <http://www.corporacionamerica.com/energia>.

last coup d'état in 1976, democracy was restored on the December 10, 1983 and has, since then, persevered. Since the return of democracy, Peronism<sup>30</sup> has been the governing credo with only two exceptions. The first exception corresponds to the presidency of Raúl Alfonsín from the Radical Civic Union party, who was in office from 1983 until 1989. The second exception was the administration of Fernando de la Rúa, from Alianza (a coalition of the Radical Civic Union and minor party "Frente País Solidario") who ruled between 1999 and 2001.

After President Alfonsín resigned, his successor Carlos Saúl Menem (1989–1999), following the example of Chile and to a certain extent the suggestions of the IFIs (Weyland 2004), completely changed political direction and entered into a new phase of neoliberal reforms like the Currency Convertibility Plan<sup>31</sup> and privatization of the main public services (i.e. social security, telecommunications, transport as well as generation, transmission, and distribution of electricity). This new wave of privatization promoted new international investments in the country, especially in the energy sector. The areas of electricity transmission and distribution were completely privatized, and electricity generation was largely—not entirely—privatized. The hydrocarbon sector, which between 1920 and 1990 had always had limited private sector (domestic and foreign) participate due to the state ownership of YPF, was privatized. 98.23% of the main state-owned fossil fuels company YPF was sold to the Spanish firm Repsol (Sennes and Pedroti 2008). Several hydropower plants were also privatized. In contrast, since its creation nuclear energy has remained state-owned. Although it was allowed the possibility to privatize nuclear plants, this has never happened.

The electricity reforms implemented in Argentina during the 1990s were considered a success by some (Pollit 2008; Vagliasindi 2013) and a failure by others (Recalde and Ramos-Martin 2012). In the words of Vagliasindi "Argentina provides one of the best examples of full-scale power market reform in the world to date [...] the reforms that had been implemented in Argentina were therefore deemed to have

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<sup>30</sup> Peronism has won office on eight occasions since its foundation; in 1946, 1952, 1973, 1989, 1995, 2003, 2007 and 2011.

<sup>31</sup> The Currency Convertibility Plan was a law issued in March 1991 to control inflation rates. The Argentine peso was pegged to the US dollar in an attempt to stabilise the currency, and to give long-term confidence to foreign investors in order to achieve the wider privatisation project of president Menem (Bulla and Postolski 2004, p. 1; Haselip and Potter 2010, p. 1168).

been a success” (2013, pp. 278-280). In contrast, in the perspective of Recalde and Jesús Ramos-Martin, “the liberalization and deregulation process led to an overexploitation of non renewable energy resources and to an abandonment of energy policy and planning” (2012, p. 124). Between these two contrasting views, I argue that the real issue was not the implementation of electricity reforms as the reforms were required to reorganize and restore an indebted and undercapitalized electricity system. The problem was that the different governments failed to set a proper regulatory and policy framework or to introduce adequate energy planning to attract sufficient long-term investments in the energy sector, including the renewable energy sector.

Economic circumstances after the end of the government of President Menem had an indirect impact on the stability of the energy sector. Two years after Fernando de la Rúa (1999–2001) won the presidential elections the socioeconomic crisis of 2001–02 hit. The country underwent another significant period of economic and political destabilization resulting in the premature resignation of President de la Rúa in December 2001 and the devaluation of the Argentinean peso in 2002. The Argentine currency dropped sharply in relation to the US dollar affecting especially investments in the energy and electricity sector. “... in the wake of the macroeconomic crisis and the devaluation of the peso, generators and gas suppliers found themselves in critical financial difficulties, which caused a halt to additional investments” (Vagliasindi, p. 280). During the economic crisis, new broad and indirect subsidies to the energy and electricity sectors were introduced by President Eduardo Duhalde to compensate the lower level of energy consumption of the domestic population.

However, after Peronists won “critical elections” (Burnham 1970, found in Sabatier 1993, p. 22), President Nestor Kirchner (2003–2007) not only continued with the previous electricity subsidies but also began to be more involved in the energy and electricity system.<sup>32</sup> During the administrations of Nestor and Cristina Kirchner (2007–2010; 2010–present), a moderate nationalization wave as well as a few fiscal

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<sup>32</sup> Source: “‘Critical elections’ (Burnham 1970) normally require that the same coalition control the chief executive’s office and both houses of the legislature” (in Sabatier 1993, pp. 22). However, the author explains, “Such changes in the system-wide governing coalition are quite rare. More limited changes are more common but also have lesser effects” (Sabatier 1993, pp. 22). The present case is one of these exceptional cases.

reforms followed the wave of the last privatizations. The public airline (Aerolineas Argentinas); the social security system; the fossil fuel company, YPF, and part of the electricity transmission system were taken once more into public ownership. In the words of James Haselip and Clive Potter “certainly, far from being a neoliberal administration, the Kirchner/Fernandez governments have sought to reign in some of the excesses of the market forces liberated during the 1990s by micro-managing industry specific reforms, as evidenced by the contract renegotiations ongoing since 2002 [...] In the case of the electricity sector, elements of the market model have been preserved and combined with a limited return to state intervention, via price controls, subsidies and both supply and demand-side management policies to produce a hybrid and contradictory set of relations” (2010, p. 1173).<sup>33</sup>

At the time of the economic crisis, the implementation of electricity price controls and indirect subsidies were considered transition policies, which were part of a fiscal and monetary macroeconomic policy based on an expansion of the level of consumption; only meant to be in place until the recovery of the national economy. However, the government authorities decided to continue this policy and even decided to implement subsidies for activities which were not considered before. The main objective of this policy was to preserve the population’s purchasing power. Some years after the national economy was recovered, the Kirchner administration moderately reduced energy subsidies in 2008, mainly for high consumption households and industrial customers but suspended the tariff increases in 2009. The Cristina Kirchner administration, under pressure from unions and Congress, decided to suspend the reduction of energy subsidies at least during the winter months (Vagliasindi 2012). The government was afraid that a complete elimination of tariffs could lead to a severe decrease in purchasing power and would, thus, be an unpopular decision. In late 2011, the government announced the intention to reduce energy subsidies again but there was harsh criticism. As a result the question of the indirect

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<sup>33</sup> As the authors explain “there have been three distinct phases to the contract renegotiation process, as outlined by the Ministry of Economy, with an anticipated fourth phase concluding the process [...] The first two phases were completed within 5 months, though the third phase has been ongoing since then—some 6 years to date (as of January 2009). In total contract renegotiations refer to the 59 contracts that have been renegotiated across all areas of public services. Within this, 21 contracts with private energy companies are under review including 7 electricity transmission companies and the 3 distribution companies supplying the Greater Buenos Aires Metropolitan area: EDENOR, EDESUR and EDELAP” (Haselip and Potter 2010, p. 1171).



or universal electricity subsidies not only remains unresolved but also it has severely affected the electricity system and hampered renewable energy deployment.<sup>34</sup>

Here the purpose was to highlight the socioeconomic context and the electricity problems in which specific renewable and nuclear energy policies were discussed in the agenda-setting process. The impact of the socioeconomic crisis on the initial wind energy developments as well as the policies implemented afterwards regarding both renewable and nuclear power will be studied in detail below.

### **5.3 Analysis of the Argentinean Electricity Policy System**

A dominant advocacy coalition within a subsystem or system attempts to translate the policy core and secondary aspects of their belief system into governmental programs which, although they involve some compromise with other minority coalitions, usually result in policies that reflect the dominant coalition's policy core beliefs (Sabatier and Jenkins-Smith 1993). In Argentina it is possible to identify multiple coalitions. The most dominant is the fossil fuels coalition that comprises conventional fossil fuels (mainly gas) and since the announcement of the extraction of unconventional fossil fuels (especially shale gas) they will probably begin to incorporate these into their policy goals in the next years. The hydropower coalition occupies a less dominant position because even though large hydropower has about a 30% share of the electricity mix its contribution has been constantly reduced since the early 2000s. Hydropower advocates have the objective to increase this share significantly and they have on many occasions announced plans for the construction of large hydropower plants. These plans have not been achieved.

The weaker competing advocacy coalitions are the nuclear and the renewable energy coalitions. Still there are differences between these two sources. In comparison with renewables, nuclear energy has a longer historical trajectory in the country and the coalition has better established institutional structures as well as a quite positive image among policymakers and political parties. Since renewable energy is a newer source than fossil fuels, and to a lesser extent than large

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<sup>34</sup> Indirect subsidies and universal subsidies will be used interchangeably referring to subsidies that are not targeted according to the economic incomes of the population.

hydropower and nuclear, the renewable energy coalition remains under the dominance of the fossil fuel coalition in the first place, being also limited by the large hydropower and nuclear coalitions. Still, it is possible to identify the actors that are working together for the promotion of renewable (especially wind) energy in the country. As will be described below, it is possible to distinguish actors belonging to the “Nuclear Energy Coalition” and “Renewable Energy Coalition”. These are two competing advocacy coalitions. There is also a hydropower coalition. The role of non-conventional fossil fuels is not discussed in this dissertation due partly to the novelty of the decision vis-à-vis the plans for fracking in 2014. This political decision was only brought to light when the partially state-owned fossil fuels company YPF signed an agreement with the American company Texaco Chevron during the second half of 2013. The other reason why the roles of shale and conventional natural gas are not discussed is that the focus here is on wind and nuclear energy as part of the national electricity system and not on the entire energy sector. Conventional and unconventional fossil fuels will remain uniquely as a context giving some references when pertinent.

From the second half of the last century the government supported fossil fuels, hydropower and nuclear energy.<sup>35</sup> In 1956 the first hydropower plant was installed in the province of Tucuman, where hydropower has since been particularly promoted since the early 1970s and into the late 1990s. There has always existed a positive belief in nuclear energy. It has been historically entrenched since President Peron issued the first decree (No. 10936) on the 31 of May 1950 that promoted nuclear energy and founded the CNEA.<sup>36</sup> The idea to develop a nuclear energy came from an Austrian scientist named Ronald Richter who proposed to Peron the construction of a nuclear energy pilot plant to produce controlled nuclear fusion. The scientist gained the confidence of the president and the construction of the installations began on Huemul Island in Southern Argentina. “... on February 16, 1951, Richter supposedly achieved ‘thermonuclear reactions under controlled conditions at technical scale’ on Huemul Island (and the same year) the government announced Richter’s ‘achievements’ [...] While Richer’s objectives—not Richter’s achievements—indirectly contributed to accelerate independent research in thermonuclear fusion

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<sup>35</sup> The support of natural gas in the past has the origin in the discovery of the great basin (Loma La Lata) in 1976-77.

<sup>36</sup> Source: [http://www.cnea.gov.ar/que\\_es\\_la\\_cnea/historia.php](http://www.cnea.gov.ar/que_es_la_cnea/historia.php).

outside Argentina, his project was a fraud investigated in 1952 by Jose Antonio Balseiro, Mario Bancora, Manuel Beninson, Pedro Bussolini and Otto Gamba” (Montenegro 2005, p. 259). They reported the findings to Peron and the government discontinued the project. Then, Balseiro and Bancora together with other scientists began a new official nuclear programme for Argentina and CNEA was entrusted with the direction of all nuclear program activities (Montenegro 2005). The government assigned generous resources for the accomplishment of nuclear objectives that were dramatically reduced after the return of democracy in the mid-1980s.

Due partly to the economic crisis of the late 1980s, the government focused on the liberalization of the electricity sector and privatization of the fossil fuel industries and hydropower companies. It also added one large-scale hydropower plant to the system (Yacireta). Between 1990 and 2004 there was an abundance of natural gas supplied from national reserves. Argentina’s electricity supply capacity from mainly gas and hydropower was sufficient to meet demand. During this period, the fossil fuels and hydropower coalitions could sideline the nuclear energy coalition. But with the reserves of natural gas greatly diminished and a supply problem emerging in 2004, the government again began to bolster nuclear power and, to a lesser extent, large hydropower. Regarding renewable energy, between 1994 and 1998 actors coming from environmental NGOs and the government of Chubut began to push for wind power and the first renewable energy regulations came into place. Yet, wind as well as solar were considered as simply supplementary sources. Environmental NGOs questioned the government’s nuclear energy policy beginning in the early 1980s and began to push for renewable energy sources in the end of the 1990s. In fact wind energy deployment has gone through different phases, having a good start with off-grid wind parks in some regions of the Southern Argentina in 1994, going through a period of stasis since the end of 2001, and re-starting in 2006.

In order to have a complete view of the central actors that compose the Argentinean electricity system, the next section will introduce in more detail the actors in the “Nuclear Energy Coalition” and the “Renewable Energy Coalition” as well as their principal policy core beliefs.

### 5.3.1 Composition of the Advocacy Coalitions and their Policy Core Beliefs

- **Nuclear Energy Coalition**

Governmental actors and non-governmental actors compose the nuclear energy advocacy coalition. Among the governmental actors, the Kirchnerists parliamentarians in Congress have favored nuclear legislation; the Secretary of Energy which is part of the Ministry of Federal Planning, Public Investment and Services (MINPLAN); the National Commission of Nuclear Energy (CNEA) together with the Bariloche Nuclear Centre, and the Nuclear Regulatory Authority (ARN) created in 1997 to control safety of the nuclear sector.

Among the non-governmental actors, large industries and companies specializing in nuclear energy predominate. These include companies like the state-owned nuclear power utility Nucleoeléctrica Argentina (NASA), the state-owned and most important nuclear technology company “Investigaciones Aplicadas Sociedad del Estado” (INVAP), and the state-owned Dioxitek. There are also related industrial and nuclear labour unions. Also relevant is the Balseiro nuclear research institute, and one of the most important national journals, named *Página 12*, which has shown in many occasions a pro-nuclear position

It is important to highlight the role of CNEA. Casarales (1999) points out “for other departments and offices of the Argentinean public administration, the years between 1950 and the early 1980s were marked by instability [...] But CNEA was the exception. All its activities showed remarkable continuity” (pp. 52-53) and it remained unquestioned up to the return of the democratic regime. Until 1983 there was scarce room to question the activities of CNEA, as all its leaders were always officers of the Argentinean armed forces, with three long-term heads coming from the Navy. Since its foundation, CNEA has always been the unifying agent of the nuclear sector, participating actively in the creation of Invap and NASA. During the last military dictatorship in 1976, it was created Invap as the state-owned nuclear technology company through an agreement between CNEA and the Province of Rio Negro. The purpose was to assist in the execution of the Argentine Nuclear Plan 1975-1985. NASA was set up in 1994 to operate Atucha I and Embalse, and oversee construction of Atucha II. CNEA owns 20% of the NASA shares and the rest is owned by the state. Dioxitek was created in 1982; CNEA owning 99% of the shares

and the rest 1% belonging to the province of Mendoza. The company is responsible for the supply of uranium dioxide.

The belief system of the nuclear energy coalition stresses strategic and pragmatic content decisions. The coalition supports: (1) increasing energy self-sufficiency, stability, and electricity diversification, reducing dependency on imported fossil fuels by increasing native sources like nuclear energy and some large hydropower, and to a lesser degree renewable energy; (2) increasing the electricity supply capacity to meet an increasing demand due to the economic growth; and, (3) keeping low domestic energy prices. It argues that (4) technological development and socioeconomic growth depend largely on the level of development achieved by the nuclear industry and (5) consolidation of the national nuclear sector protects indigenous industries. And, it (6) prefers state-owned control in the electricity system.

- **Renewable Energy Coalition**

The relatively new “Renewable Energy Coalition” tries to encourage both the implementation of more transparent electricity policies (direct and lower subsidies, and real prices) and a long term energy policy to promote renewable energy, especially wind energy.

Among the governmental actors in the renewable energy coalition are a few parliamentarians or ex-parliamentarians from FAP like Hermes Binner, from the newly formed political party UNEN (Fernando Solanas), and the Kirchnerist parliamentarian for Chubut (Marcelo Guinle). The role of the province of Chubut is important because it is unique in having two relevant governmental bodies: the Regional Centre of Wind Energy (CREE) and the Provincial Agency for Renewable Energy. Additionally, the National Institute of Industrial Technology (INTI), Secretary of Energy together with MINPLAN, and the Argentinean Energy SA (ENARSA) are important. The latter has been also responsible for the promotion of renewable energy since 2009.

ENARSA together with MINPLAN, CREE and provincial governments launched the National Strategic Plan of Wind Energy (by 2005), establishing a goal to install 300 MW by 2012 in the provinces of Chubut, Santa Cruz, Buenos Aires, La

Rioja, Neuquén and Rio Negro<sup>37</sup>, though this was never implemented. In the framework of the National Strategic Plan of Wind Energy MINPLAN, CREE as well as the National Technological University (UTN) developed the Wind Atlas Potential for southern Argentina, including the provinces located in the south of the country. Subsequently, ENARSA launched the Electricity Generation Program for Renewable Energy (GENREN) program and the construction of a wind park in the province of Chubut—through its subsidiary company Vientos de la Patagonia I (ECOFYS Germany GmbH 2009). ENARSA created Vientos de la Patagonia with the objective of boosting local wind industries. Its unique wind park so far comprises two wind turbines (1.5 MW each), both produced by the national industry (IMPESA Wind and NRG Patagonia).

Among the most relevant non-governmental actors are: Wind energy industries and developers like IMPESA Wind, NRG Patagonia, and INVAP, which works in the nuclear and wind sectors; active NGOs like Greenpeace, Environment Defense Foundation (FUNAM), Tierralerta, “Fundación Vida Silvestre” (FVS), “Fundación de Recursos Naturales” (FARN), and Avina Foundation; local environmental movements such as the Anti-Nuclear Movement (MACH) and “Unión de Asambleas Ciudadanas” (UAC) of Chubut; the social and political movement The Greens (“Los Verdes - FEP”) with its leader Juan Carlos Villalonga; renewable energy associations such as the Argentinean Wind Energy Association (AAEE founded in 1996), Argentinean Chamber of Renewable Energy (CADER, founded in 2006), and Argentinean Association of Renewable Energy (ASADES, founded in 1974); Argentinean Chamber of Wind Turbines (founded in 1999); German-Argentinean Chamber of Industry and Commerce (AHK Argentina).

After the return of democracy some environmental movements were created, questioning Argentina’s nuclear program. During the 1980s, the roles of FUNAM, Tierralerta, and MACH were crucial; “FUNAM revealed information kept secret by CNEA, denounced abuses of public interest, and make clear the risks of radioactive materials and radioactivity” (Montenegro 2005, p. 260). Afterwards the actions were strengthened by Greenpeace Argentina (Ibid., p. 260), which by 1990 actively supported renewable energies.

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<sup>37</sup> Source: More details about the *National Strategic Plan of Wind Energy* in [http://soloenergia.com.ar/aprendamas/enarsa/enarsa\\_proyectos.html](http://soloenergia.com.ar/aprendamas/enarsa/enarsa_proyectos.html).

The belief system of the renewable energy coalition stresses that decisions related to renewable energy are based on: (1) stop the national plan of the nuclear sector, which promotes additional nuclear power plants through supporting mechanisms such as fiscal incentives and subsidies; (2) increasing the number of national suppliers to diversify the energy mix (mainly composed by natural gas, oil, and large hydro), exploiting native renewable sources like wind, small scale hydropower, and solar, through better incentive mechanisms; (3) increasing energy efficiency; (4) reducing dramatically indirect electricity subsidies; (5) and supporting a general consensus for a long lasting, sustainable and more transparent energy policy.

### **5.3.2 The Beginning of Renewable Energy (1994-2002)**

When the ex-Secretary of Energy Alieto Guadagni was asked about those whom actively supported the first wave of wind energy development, he noted the government authorities of Chubut (A. Guadagni, oral interview, 10.12.2012). The government of Chubut together with the provincial electricity cooperatives were at the forefront of wind energy development. In fact, the first wind turbines in Argentina were installed in Chubut, mostly in Comodoro Rivadavia, by different provincial cooperatives such as the Limited Popular Cooperative Society (S.C.P.L.).<sup>38</sup> Also, the first renewable energy regulation in the country was the wind energy Law No. 4389 and its Decree No. 235 enacted in Chubut in 1998. As a result, in 2001 the province had the largest installed wind energy capacity in the country with about 17.5 MW. Other Southern provinces (e.g. Neuquén, Rio Negro, Santa Cruz) also experimented with wind energy during these years. This was done mainly by electricity cooperatives.

Subsequently, the first renewable energy law (No. 25019) and its regulatory decree (No. 1597/99) intended to foster wind and solar energy were enacted in 1998 under the Menem administration. This law (No. 25019) was commonly called “wind subsidy law”, due to the leading role assigned to wind energy (J. Casavelos, video call interview, 13.07.2012). Pressure from civil society, including the cooperatives of Chubut and especially Greenpeace with the support of other environmental NGOs,

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<sup>38</sup> For more details see: 1) <http://www.scpl.coop/index.php?page=verandnid=68>; 2) [http://energia3.mecon.gov.ar/contenidos/archivos/Reorganizacion/contenidos\\_didacticos/publicaciones/EnergiasRenovables.pdf](http://energia3.mecon.gov.ar/contenidos/archivos/Reorganizacion/contenidos_didacticos/publicaciones/EnergiasRenovables.pdf).

and the Parliament were crucial in the creation of the law.<sup>39</sup> “... when the Congress approved the text of Law 25019 the executive branch did not support it and exercised its veto power. The executive veto was, (however), overridden by the Congress” (Lythgoe 2009, p. 293). Juan Casavelos and an ex–member of FARN, Belén Esteves, said that Law No. 25019 was driven by civil society, principally from Greenpeace achieving parliamentary support during the 1990s (B. Esteves, video call interview, 11.06.2012 and J. Casavelos, video call interview, 13.07.2012).

It is important to highlight the role of the cooperatives in the run up to a wind energy regulatory framework. It was a similar bottom-up policy-making process as this initiated in Denmark. Mendonça et al. (2009) provides an analysis of the role of wind cooperatives in Denmark as the main drivers of wind energy deployment. In his case study the author demonstrated the existence of a relationship between stable and transparent political institutions—including policy instruments and financial support mechanisms—as well as a strong participatory civil society (called *innovative democracy*)<sup>40</sup> with the rapid deployment of wind energy in industrialized western countries (Mendonça et al. 2009). This theoretical demonstration is impossible to apply in the case of Argentina because is not an industrialized western country and is furthermore beyond the scope of this study. Nevertheless it provides background for this case study regarding the role of wind cooperatives during wind energy’s formative years in Argentina. As was the case in Denmark, they provided some of the first investment capital in wind energy.

Some authors considered law 25019 as a sort of FIT. The 1998 law, also known as the “National Wind and Solar Energy Rules”, declared wind and solar generation a national interest and introduced a top up feed-in tariff mechanism to set up additional payment per generated kWh, which in 1998 meant a 40% premium over market price (ECOFYS Germany GmbH 2009). The tariffs were set in Argentine peso that in 1998 was pegged to the US dollar. It also granted tax exemptions for 15 years from the law’s implementation. Approximately ten small-scale wind farms (mainly owned by electric cooperative initiatives) were built in the southern region of

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<sup>39</sup> For more details see: <http://www.apie.com.ar/articulos/art-energias%20renovables.html>.

<sup>40</sup> Source: *Innovative democracy* attempts to bring all actors into the decision-making process (Mendonça et al. 2009, p. 379).



Patagonia under Law No. 25019.<sup>41</sup> However, they have not generated reasonable profits and have not sold their electricity to the wholesale market but instead have used it for local consumption (Recalde 2011, found in Urakami 2011). The lack of adequate interconnection infrastructure might hamper the possibility to sell electricity to the wholesale market. Montamat explained that “the lack of the interconnection between the Patagonian system and the national system made it hard for potential investors in wind power generation because they could not access the most profitable markets located in the rest of the country; only the South. However improvements to interconnection infrastructure might help to overcome this physical restriction and the electricity generated by the wind parks of Patagonia will be able to reach the areas that consume most of the national energy” (2007, p. 207).

The socioeconomic crisis of 2001–02 had the greatest negative impact on the management of the wind farms. Renewable energy investors were unwilling to develop renewable technologies using FITs (Urakami 2011). Indeed, devaluation of the national currency made Law No. 25019 unfit for its designed purpose (ECOFYS Germany GmbH 2009) because the tariffs were set in Argentine peso. The result was the suspension of the wind energy projects. The national deputy Eduardo Arnold stated, “the criterion selected in Argentina by the Law No. 25019 has failed because it has never covered the gap between the energy wholesale price and the total cost of a wind energy project” (Arnold 2006, n.p.). This was especially emphasized after the economic crisis, the monetary devaluation, and the price freezes in the electricity sector. Therefore, the economic crisis of 2001–02, relevant technical barriers as well as an inappropriate policy instrument selected in Law No. 25019 made wind energy projects difficult to take-off. Wind energy policy entered in a phase of stasis until 2006.

In this period nuclear industry was not a priority for the national government. The budget received by CNEA had already been reduced before 1994 and this year the construction of the Atucha II nuclear plant was suspended. The reduction of the budget affected also Invap and NASA, which depended greatly on CNEA for

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<sup>41</sup> According to ECOFYS Germany “electric cooperatives are defined as organizations of investors who gather in cooperatives in order to increase size and economic capability to be able to participate in large projects and to create an effective lobby group to defend their interests” (ECOFYS Germany GmbH 2009).

domestic projects. Menem administration was more focused on the ratification of international agreements of non-proliferation of nuclear weapons like the *Treaty for the Prohibition of Nuclear Weapons in Latin America* (Tlatelolco), ratified in 1994, and the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT), ratified in 1995. In addition, uranium mining plants were closed. Due partly to the US-Dollar parity of the national Peso, production costs of uranium soared, which together with cheaper uranium imports from international markets caused the shutdown of uranium mining activities (Heinrich Böll 2011).<sup>42</sup> The actions of the environmental NGOs, especially FUNAM, Tierralerta and MACH, may contribute indirectly to this decision. Finally, since the mid 1980s CNEA projected the development of a repository for high-level waste (HLW) in Gastre (Chubut) but the plan was finally dismissed in 1997 after a large local demonstration opposing the HLW.

Principal nuclear activities have been seen in the international market. In 2000 Invap signed an agreement with the Australian Nuclear Safety Organization (ANSTO) for the design and building of a 20 MW OPAL research nuclear reactor to replace an old reactor located in Lucas Height (Australia). One of the clauses of the agreement stated that Australia will send its spent nuclear fuel to Argentina to be processed in the country and then send it back again to Australia. This provoked a great debate, especially from the side of environmental movements, declaring the anti-constitutionality of the clause. In fact, Article 41 of the Argentinean Constitution prohibits the entry of radioactive wastes into the national territory. Despite the environmental movements' protests, in the following year the Ministry of foreign Affairs from Argentina and Australia signed a "Cooperation Agreement about the Pacific Uses of Nuclear Energy", which strengthened the agreement between Invap and ANSTO.<sup>43</sup>

### **5.3.3 Searching for Alternatives: The Years of Electricity Shortage (2003-2014)**

When Nestor Kirchner entered office in 2003 there were already signals of energy supply problems. One of the first actions undertaken by the government was the creation of the state-owned and operated company ENARSA in 2004 for the exploration, exploitation, distillation and wholesale of oil and by-products. The public

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<sup>42</sup> Source: <http://www.boell.de/en/navigation/climate-energy-argentina-uncertainty-nuclear-future-11771.html>.

<sup>43</sup> See Funam Campaigns: <http://www.funam.org.ar/fundamento.htm>.

company is also responsible for generating, transporting, distributing, and marketing fossil fuels and electricity.<sup>44</sup> Its mandate was due to the political necessity of the government to establish a regulated state-owned company in an almost completely privatized oil market.

Regarding renewable energy, after the financial default of 2001–02 the Renewable Energy Law was rendered void. The devaluation of the Argentinean Peso ended the “convertibility law” of Peso and the US Dollar. “The premium payment (in Peso-Dollar) for renewable generators set at 40% above wholesale market price” (DB 2011, p. 71), was not valid anymore.<sup>45</sup> Facing an unmet energy demand, the possibility of a renewable energy regulatory framework to supplement the worthless law was discussed. National Deputy Arnold proposed a bill in 2006 to replace the law but it was not approved. Instead of Arnold’s bill, authorities issued Law No. 26190/06. As the interviews with Casavelos and Spinadel confirmed, this law was the result of the International Conference for Renewable Energies-Renewables 2004, held in Bonn in June 2004 as part of the framework of REN21. By invitation of the German government, 3600 high-ranking representatives of governments, international organizations, business associations and non-governmental organizations from 154 countries met to discuss possibilities to significantly increase the share of renewable energy in industrialized and developing countries. Discussions about how the energy potential of natural resources could be better harnessed were also part of the meeting.<sup>46</sup> The goal of this international declaration that formulates a political vision for the global energy transition was to agree a percentage for renewable energy in the next years.

Thereafter in 2006, Argentina approved the FIT Law No. 26190 aimed to develop renewable energy sources, especially wind power. However it was not until regulatory Decree No. 562 was issued in 2009, under the first term of Cristina Fernández de Kirchner (CFK), that Law 26190 went into effect. Although this was a good re-start for renewable energy, the FITs set in the law were too low to attract investments. The previous year the Kirchnerist Senator Juan Carlos Romero in

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<sup>44</sup> Source: Law 25943: <http://www.enarsa.com.ar/index.php/es/queesenarsa/72-leyenarsa>.

<sup>45</sup> Source: [http://www.dbcca.com/dbcca/EN/\\_media/GET\\_FiT\\_Plus.pdf](http://www.dbcca.com/dbcca/EN/_media/GET_FiT_Plus.pdf).

<sup>46</sup> Source: [http://www.bmz.de/en/what\\_we\\_do/issues/energie/international\\_energy\\_policy/renewables/index.html](http://www.bmz.de/en/what_we_do/issues/energie/international_energy_policy/renewables/index.html).

collaboration with the AAEF presented a draft for a renewable energy law with an improved FIT, but the bill was not passed. The government decided to regulate renewables under the original FIT law but at the same time to implement an auction-based scheme, called GENREN, to accelerate renewable energy development. The scheme confirmed a target of 8% electricity from renewable energy sources by 2016, and 4% for wind energy. In 2009, Argentina also signed the IRENA statute.

In the case of nuclear power, a plan to reactivate the nuclear sector with peaceful objectives was launched by the government of Nestor Kirchner in 2006. The goals were to complete the construction of Atucha II, a nuclear power plant that started its construction in 1981 but was suspended in 1994, and relaunch other objectives of the previous nuclear program that had been sidelined since the mid 1980s due mostly to increasing economic hardship. The previous nuclear program, dubbed Nuclear Plan 1975-1985, had two main goals: the achievement of the complete nuclear fuel cycle and the construction of four nuclear plants (additional to Atucha I and Embalse) using progressively more Argentinean technology until the accomplishment of a technological autonomy. The nuclear fuel cycle objective was accomplished by the year 1983 including uranium mining, conversion, slightly enriched uranium, and nuclear fuel fabrication together with the storage technology. However, the construction of Atucha II, which was initiated in 1981, was suspended in 1994 and the other nuclear power plants were never constructed. Twelve years later, the government announced the Strategic National Plan of the Nuclear Sector, highlighting the following goals: completing Atucha II (745 MW); extending the life of Atucha I and Embalse; promoting the application of nuclear power for domestic industry and public health, and the construction of a prototype of the reactor “Central Argentina de Elementos Modulares 25 MWe net” (CAREM 25).

Atucha II constitutes a larger version of Atucha I and both are unique units of a Pressurized Heavy Water Reactor (PHWR) designed by Siemens. NASA sought expertise from Germany, Spain and Brazil to complete Atucha II and in 2003 the company presented to the government the plans for completing the 692 MW Atucha II reactor (World Nuclear Association 2014).<sup>47</sup> Construction of Atucha II started around 2008 and the plant went in operation at the end of 2014.

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<sup>47</sup> Source: <http://www.world-nuclear.org/info/Country-Profiles/Countries-A-F/Argentina/>.

CAREM 25, launched through Decree No. 1107/006, is a modular simplified pressurized water reactor with integral steam generators and primary coolant system within the reactor pressure vessel. CAREM 25, which will have 70% of components locally manufactured, was designed by Invap and CNEA in 1983 and promoted as an “inherently safe” reactor. It pertains to the category of small nuclear reactors dubbed *small modular reactor* (SMR) that use special safety features.<sup>48</sup> Safety features means that reactors do not need outside input or human control to work. As the World Nuclear Association (2014) explained “today due partly to the high capital cost of large power reactors generating electricity via the steam cycle and partly to the need to service small electricity grids, there is a move to develop smaller units. These may be built independently or as modules in a larger complex, with capacity added incrementally as required [...] There are also moves to develop independent small units for remote sites”. Countries like China, India, Japan, Russia, South Korea, South Africa, UK, US have considered SMRs a good alternative as they are simpler, more cost-effective, and require less capital investments. However some SMR projects have been abandoned because they found it hard to find either financial support or customers. The most common critiques are that smaller units increase the capital cost per MW electricity and are not 100 percent reliable; they cannot be shut down and cooled in every circumstance without the need for intervention (Union of Concerned Scientists 2011).<sup>49</sup>

The doubtful reliability of the CAREM as an “inherently safe” reactor is addressed by environmental NGOs in Argentina, like Greenpeace. Antinuclear movements had a few achievements during these years, especially in the province of Córdoba. In 2008, thanks to the actions of antinuclear movements, Law No. 9526 that forbids uranium and thorium mining activities in the province was issued. Several protests against the uranium dioxide plant Dioxitek based in Córdoba originated an executive ordinance (No. 8133) in the municipality of Córdoba that prohibits dioxide plants in certain areas of the city. Despite the ordinance, operations of the plant still continue.

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<sup>48</sup> The International Energy Agency (IEA) considers SMRs, units with an electricity output of less than 300MWe.

<sup>49</sup> Source: [http://www.ucsusa.org/news/press\\_release/nuclear-expert-dispels-myths.html](http://www.ucsusa.org/news/press_release/nuclear-expert-dispels-myths.html).

In 2009, the same year of GENREN, Cristina Kirchner administration introduced the *Nuclear Act* (Law No. 26566), which declared nuclear power a national interest and gave tax incentives and reductions to all future nuclear power projects (i.e. Atucha II, Atucha III, and CAREM 25) as well as to the extension of old ones (Embalse, and Atucha I). While the following year ENARSA launched a second auction under GENREN to allocate 200 additional wind energy megawatts, no project has yet been achieved. Both nuclear and renewable energy have been pursued and advocacy coalitions have translated their policy core beliefs into the following programs: Strategic National Plan of the Nuclear Sector, the *Nuclear Act*, the FIT Law 26190, and the GENREN program.

However, the government has assigned different importance to both electricity sources. In a National Energy Plan for 2030, which was briefly announced by the Secretary of Energy but was never officially presented, two scenarios were highlighted (the trend analysis and structural scenarios) for the electricity mix in 2030. The difference between both scenarios is that the structural scenario includes policies for energy efficiency. For renewable energy the goals are 9.4% and 9.6% in the trend analysis and structural electricity mix respectively and for nuclear power targets are projected at 19% and 21.2% in the trend analysis and structural scenarios respectively (Villalonga 2013).<sup>50</sup> This reflects the different levels of importance placed on nuclear and renewable energy.

Policy core beliefs of the governmental authorities correspond to the fundamental positions of traditional Peronism (named Kirchnerism after 2003).<sup>51</sup> Kirchnerism has had mostly a nationalist, traditional, and centralized position, having sometimes also an innovative attitude in support of energy sources. This is the result of the mixed ideological composition of Kirchnerism, a mix of tradition and innovation (Sarlo, *El País*, 22.10.2011) as well as of a pragmatic position, which sometimes seeks to incorporate some of the policy beliefs of the opponent coalitions in order to maintain its political legitimacy. Sabatier (1993, p. 34) explains “... a

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<sup>50</sup> Source: More details of the two scenarios are available in the document published by the Renewable Energy Alliance in Argentina (2013, p. 25): [http://awsassets.wwfar.panda.org/downloads/energias\\_renovables\\_14\\_vf.pdf](http://awsassets.wwfar.panda.org/downloads/energias_renovables_14_vf.pdf).

<sup>51</sup> Kirchnerism is the informal name given to the official Peronism (formally the name of this Peronist fraction is ‘Frente para la Victoria’) after President Nestor Kirchner. Kirchnerism also dominates the political arena in comparison with the opponent Peronist fraction called Dissident Peronists.

coalition will not abandon those core beliefs merely to stay in power, although it may well abandon secondary aspects and even try to incorporate some of the opponents' core as secondary aspects of the program" (p. 34), probably in order to merely stay in power or to conceal weaknesses in their policy core. Accordingly, the national government that favored mostly the fossil fuel coalition, tried to incorporate the policy beliefs of the renewable and the nuclear energy coalitions as the secondary elements of its electricity program to preserve legitimacy. Of the coalitions, the nuclear energy coalition is the most favored due to their greater political importance and positive image, as suggested before.

The weak support of the national administration regarding the deployment of renewable energy is indicated by three facts. The first was the delay in passing Law No. 26190, after various unsuccessful endeavors from different legislators (e.g. the failed proposal of Deputy Arnold in 2006). The second was the bureaucratic delay in announcing the regulatory decree to implement the FIT law, and the third was the resulting bidding process, GENREN. Delays and contradictions caused uncertainty among investors (Urakami 2011). Also, as the Director of the AAEE, Erico Spinadel (radio interview, 2010) said "there is actually an unwillingness of the Congress to announce a new law extending the economic compensations for renewable energies up to 20 years, and improving the tariffs of the existing law, which remain too low in comparison with the energy market prices". The government has issued a few policies supporting renewable energy and to include attributes of innovation policy, possibly a step to include some of the opponents' policy core beliefs as secondary aspects of an electricity program otherwise focused increasingly on the development of nuclear energy.

Fossil fuels and hydropower coalitions dominate the electricity system. In the case of nuclear energy, although its participation is still limited the coalition has well-established actors like CNEA that responds directly to the government head, and controls part of NASA, Invap, and Dioxitek, which are also state-owned, having already a subsystem within the electricity system. This is not the case for the renewable energy advocacy coalition that is subsumed in the electricity system and has not built a subsystem yet. For example, Invap, apart from nuclear energy, has also developed wind technology and it represents one of the three wind industries in Argentina. CNEA has a section that is advocated to solar energy, being part of a

renewable energy network called Renewable Energy Alliance in Argentina (AERA) founded in 2010. ENARSA, which has mainly advocated fossil fuels, has also launched GENREN as part of its renewable energy development strategy. This means, the government also sees renewable energy as a good alternative to diversify technological development even though it is given less importance than nuclear.

The position of the principal peronist sector opposing Kirchnerism, dubbed “Frente Renovador”, claims that it is necessary to create a legal framework that promotes long-term energy investments and self-sufficiency as well as a fossil fuels national agency but it is not very clear about the role of the rest of the energy sources in the electricity mix. There are political parties which are more in favor of renewable energy like FAP and UNEN (ideologically close to European socialist parties) as well as PRO (the liberal party), though, with a few exceptions, they are not antinuclear. Apart from environmental NGOs and social movements that originated in the areas close to the nuclear plants and the nuclear waste dumps, there is scarce opposition to nuclear energy. Although they could not stop nuclear activities, environmental NGOs could influence the achievement of a renewable energy regulatory framework. In the next section, the legal framework of renewable energy will be explained.

#### **5.4 Policy Framework for Renewable Energy**

The legal framework promoting renewable energies and especially wind power at the national and regional levels began in 1998 with the first implementation efforts for renewable energy in Argentina. The *National Regime of Wind and Solar Energy Act* (No. 25019/1998), consisted of a fixed compensation of 10 Argentinean pesos for each MW—at the time, due to the convertibility law, this represented 10 US dollars—to cover the gap existing between the energy market price and the high costs of investments. During this phase, some off-grid wind power projects were developed in the south of the country. Then, because the compensation was insufficient to cover the real high costs of investment, especially after the devaluation of the currency in 2002, its impact on wind energy deployment became insignificant. As a result, after 2002 all wind power projects were halted as explained previously.

Renewable energy policy was re-introduced in 2006. The most important renewable energy act is Law No. 26190 “Régimen de fomento nacional para el uso de



fuentes renovables de energía destinada a la producción de energía eléctrica”, regulated by Decree 562. The law dictates that until the year 2016, 8% of the electric power supply must come from renewable energy sources; that means 1000 MW in total. It also set economic compensation levels for electricity generated from each renewable energy source. Compensation payments are steady over 15 years. The law also creates an investment regime for ten years in order to promote the construction of renewable energy generation projects. The value-added tax is refunded for all renewable energy investments and the taxes on the profits from these investments are set to decrease over time. Nevertheless, “Law No. 26190 was not enough to promote renewable energy technologies because the tariff level was set far too low to obtain a rational profit when compared to the investment costs because of political objections. The congress passed this law in 2006 after various unsuccessful endeavours by a number of senators” (DB 2011; Mendonça et al. 2010, p. 57, found in Urakami 2011, p. 48). Indeed, attempts at more generous renewable energy legislation, like the aforementioned project of the Deputy Arnold, were not successful. Another challenging issue was the gap between the market prices and the marginal costs of generation due to the electricity subsidies implemented after the economic crisis of 2001–02.

The shortcomings of Law 26190 are threefold. One of the most important, also highlighted by Spinadel (oral interview, 15.11.2010), is the limitation of the remuneration tariff to 15 years, when in Germany and other European countries 20 years has become somewhat of a standard (due to the technical longevity of renewable energy equipment). The second important shortcoming of the law is that it offers unrealistic tariffs for renewable energy projects (in fact they are extremely low tariffs based on Argentinean pesos) awarding all renewable energy sources the same tariff (0.015 peso/kWh), with the exception of solar photovoltaics (0.9 peso/kWh). It was explained that the reason was to avoid costs and control the governmental budget and avoid an increase of the electricity price, which could negatively impact consumers (Urakami 2010, p. 69). The third limitation, as Urakami describes, is that “the government regulates a premium on top of the wholesale electricity market price instead of a proper price. This premium tariff is a maximum price and is not fixed” (2010, p. 69). This scheme does not guarantee a minimum price and must, therefore, be negotiated by the renewable energy investors.

The consequence of this insufficient regulatory framework was the plan to tender auction capacity. The auction-based scheme, which was called GENREN program, was launched by ENARSA under the direction of MINPLAN in 2009. GENREN confirmed the target of 8% electricity from renewable energy sources by 2016, and claimed that 500 MW would come from wind energy (Secretary of Energy 2010).<sup>52</sup> In June 2010, tenders equaling 895 MW for renewable energy were issued including 754 MW for wind energy, 110.4 MW for biofuels, 20 MW for photovoltaics, and 10.6 MW for small scale hydropower. They also have relaunched auctions from other renewable energy sources such as biogas, geothermal, thermal solar, and urban solid wastes, to achieve the goal of 1000 MW for the electricity power supply (Ibid. 52). Under GENREN, ENARSA would be the auctioneer, purchasing the electricity generated from renewable energy sources for 15 years and giving it to the Argentinean wholesale electricity market.

Yet the president of the AAEE, Spinadel, said that “GENREN was an advancement in this area because was the first time that the government has given an economic guarantee to investors in a foreign currency (USD); however it was an executive order and not a law and this did not resolve the problem of the legal uncertainty. It was therefore necessary to implement a larger and more comprehensive legal framework” (E. Spinadel, oral interview, 15.11.2010). The inadequate policy framework in the electricity sector meant that financial entities were not willing to fund the required investment. Jacob from Juwi argued that a stable and adequate energy legal framework was fundamental when the company decided to invest in Uruguay and Chile rather than other South American countries (J. Jacob, oral interview, 16.11.2012). That is why despite the GENREN program only three wind parks (Rawson I, II, and Loma Blanca IV) have found financial support to begin construction, while the rest of the projects could not obtain the required funding.

In addition to these two main laws, there are others laws at the national, regional and local levels promoting renewable energy as well as an agreement in the context of MERCOSUR. For example at the national level there is Law No. 26123/2006 “*Promoción del Hidrógeno*”, for hydrogen energy; Law No. 26093/2006

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<sup>52</sup> Source: “Resumen GENREN”  
[http://energia3.mecon.gov.ar/contenidos/archivos/Reorganizacion/informacion\\_institucional/discursos/genren/resumen\\_genren.doc](http://energia3.mecon.gov.ar/contenidos/archivos/Reorganizacion/informacion_institucional/discursos/genren/resumen_genren.doc).

(Decree 109/2007) “*Régimen de regulación y promoción para la producción y uso sustentable de biocombustibles*”, for biofuels and Decree No. 1119/1999 “*Energías Renovables en Mercados Rurales*”, for the deployment of renewable energy in rural markets. In September 2012 the mitigation action PROBIOMASA was launched to foster the generation of thermal energy and electricity from biomass at the local, provincial, and national level. PROBIOMASA is an initiative of the Ministry of Agriculture, Livestock and Fish together with MINPLAN through the Secretary of Agriculture, Livestock and Fish, and the Secretary of Energy with the technical support of the Food and Agriculture Organization of the United Nations (FAO).

At the regional level, the provinces with more significant wind resources such as Chubut and Santa Cruz, in the south of the country, as well as Buenos Aires have their own provincial laws which provide wind energy producers with additional subsidies (on top of the national subsidies) and tax benefits. Noteworthy among them was legislation in Chubut, where the first law promoting wind power was enacted in July 1998, being regulated the same year. This confirms the hypothesis that, in some cases, a national subsystem—concerning a particular issue—begins with initiatives organized around local and regional levels (Sabatier and Jenkins-Smith 1993). It is clear that political authorities and local cooperatives of the province of Chubut have played a key role as one of the major actors within the renewable energy coalition, pushing for regulatory framework promoting wind energy.

At the local level, the localities of Comodoro Rivadavia and Chubut, in Chubut, as well as Mar Chiquita, Buenos Aires, and Mar del Plata, in Buenos Aires, have also issued promotional norms in the renewable energy field. Moreover, the international framework of the MERCOSUR may have an external indirect impact. In 2001 Argentina signed an agreement to work together with the other members (Brazil, Paraguay, and Uruguay) in different environmental policies. The agreement, called “Acuerdo Marco sobre Medio Ambiente”, includes the issue renewable energy sources under the thematic area ‘Life Quality and Environmental Planning’. However it has not produced any type of concrete output so far.

Since the auction program GENREN began, it has seen the construction of a few wind parks at a large scale. The year 2009 represents the beginning of the auction phase as the second phase of renewable energy development. Under GENREN Argentina has put a priority on the development of wind energy among all other

renewable energy sources. In fact, “offers were mainly addressed to wind energy, as is one of the renewable energy technologies that requires less investment and less financial risks” (Voloj, *La Ley* 04.07.2011, p. 2). Although GENREN was launched to boost development of renewable energy technologies, from the point of view of the private sector the program has not caused the expected impact due to the lack of financing. Also the FITs set in the law to supplement and compensate the price obtained in the auctions, around USD 126/MW, are too low. The entrepreneur Farrace said, “FITs do not exist in reality because they are not valid. Several large renewable energy firms, especially wind companies wanted to participate in the GENREN program but they did it without any previous carefully evaluation. They did it because they thought they could make a good profit” (E. Farrace, video call interview, 17.04.2012).

Despite the enactment of legislation and the introduction of the auction scheme GENREN, the deployment of wind and renewable energy is still very marginal. As suggested by Bernardo Voloj “... the goal established by Law 26190 will be difficult to achieve without an urgent implementation of policy regulations, alternative financial incentives, and instruments focusing on the wind, biomass and mini-hydro power projects development” (*La Ley* 04.07.2011, p. 2). It is not clear which schemes the government would prioritize, either an improved FIT law or a second auction for renewable energy projects under GENREN—after the first phase of GENREN will be implemented—or ideally both (Voloj, in *La Ley* 04.07.2011, p. 2; Urakami 2011, p. 50). Also, technical barriers are a big issue facing deployment of renewable energy technologies. It was only very recently that proper grid infrastructure was installed in the country. That factor might exert a positive impact on new and future energy projects.

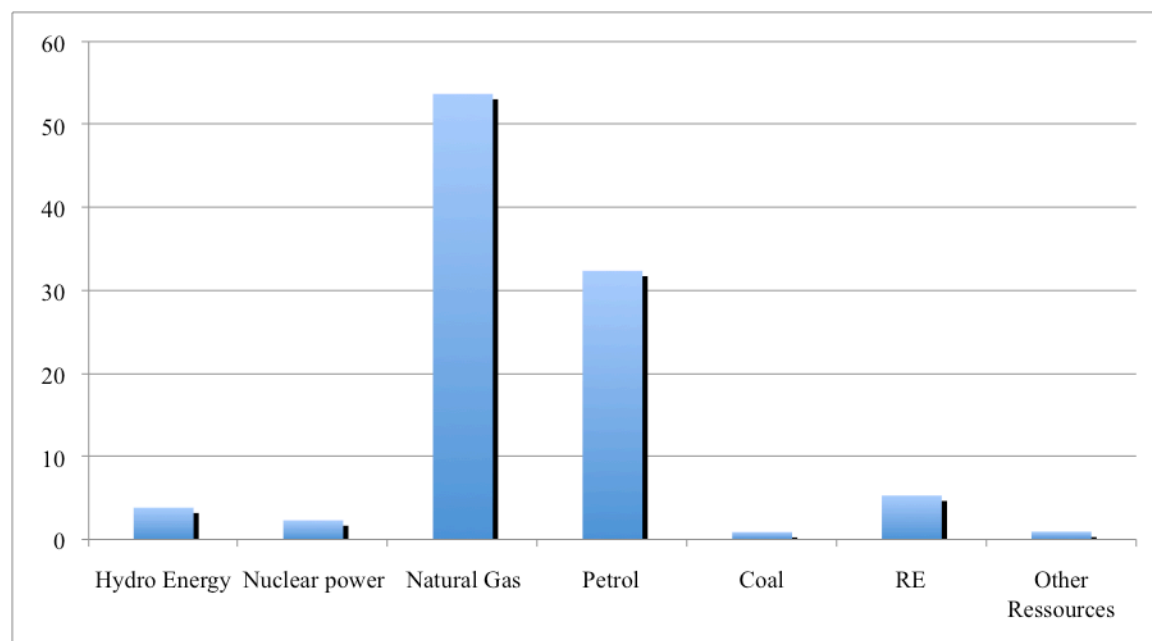
## **5.5 Energy Supply and Electricity Mix**

### **5.5.1 Internal Primary Energy Supply 2012**

Shown in figure 5.1 is the internal (primary) energy supply for 2012, measured in percentages, from 79140 tone of oil equivalent (toe). From 79140 toe in the internal energy supply, 73051 toe came from domestic production and the rest (11506 toe) were imported. In 2011, from a total of 79666 toe in the primary energy supply,

75610 toe came from domestic production and the rest (8247 toe) were imported (“Balance Energético 2011”, Secretary of Energy). Almost 86% of the 2012 internal primary energy mix came from gas and oil, followed by hydro and nuclear power with 4% and 2%, respectively. Under renewable energy principally biodiesel as well as bagasse, wood, and some bioethanol representing a total of 5% of the internal energy supply, are included. Coal has a marginal share of 1% (Figure 5.1). Wind energy production had a share of 0.2% in the primary energy supply for 2011 (De Dicco 2012).<sup>53</sup>

**FIGURE 5.1. INTERNAL ENERGY SUPPLY (2012)**



**SOURCE: ELABORATED FROM DATA OF “BALANCES ENERGÉTICOS (BEN) 2012” OF SECRETARY OF ENERGY. MINPLAN.**

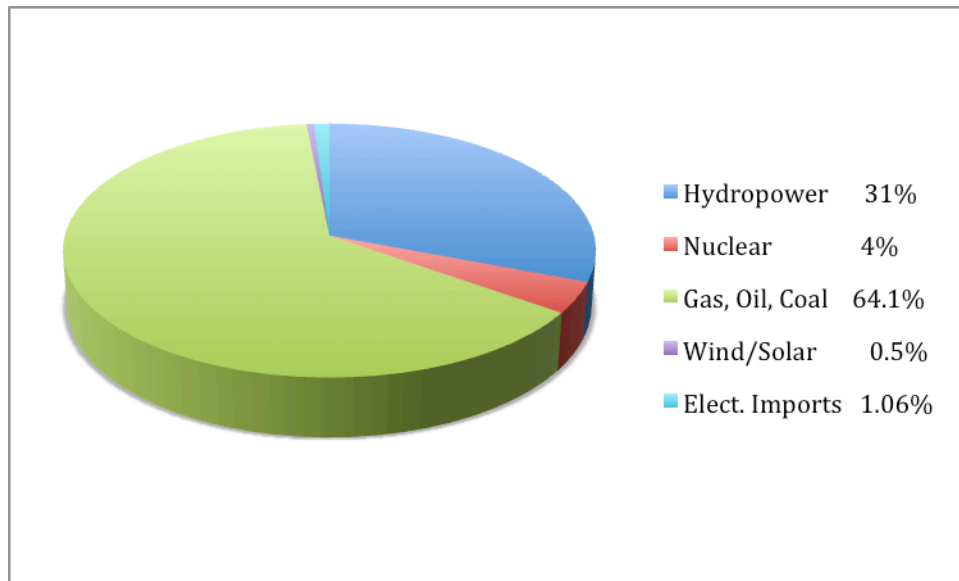
### 5.5.2 National Electricity Generation Mix 2014

Since 2010, due to the successful public tender of the GENREN program, the deployment of renewable energy and especially wind energy seemed to be beginning on a new phase because the allocated capacity of wind energy (754 MW) exceeded the 500 MW announced by the GENREN program in 2009. Yet, from the allocated projects of GENREN only 128.4 MW (three wind parks) of wind energy, 7 MW of solar, and 1 MW of small hydropower have been constructed. The total installed capacity of wind energy and solar power is 218.2 MW and 7 MW respectively,

<sup>53</sup> Source: [http://www.cienciayenergia.com/Contenido/pdf/051211\\_rad\\_arg.pdf](http://www.cienciayenergia.com/Contenido/pdf/051211_rad_arg.pdf).

representing both 0.5% of the gross generation national electricity mix in 2014. Comparatively, the total installed capacity of nuclear energy is 1005 MW, representing 4.1% of the gross generation national electricity mix in 2014 (Cammesa 2014).<sup>54</sup> At the end of 2014 nuclear capacity was increased by an additional 745 MW and it is expected to represent about 4% in the 2015 gross generation national electricity mix.

**FIGURE 5.2. NATIONAL ELECTRICITY GENERATION MIX (2014)**



**SOURCE: ANNUAL REPORT 2014 - “MERCADO ELÉCTRICO MAYORISTA DE LA REPÚBLICA ARGENTINA” (CAMMESA).<sup>55</sup>**

Shown in figure 5.2 is the electricity generation mix, measured in percentages, accumulated to 2014. In this chart the proportion for wind and solar energy is 0.5%, representing mostly wind energy. The objective of achieving 8% of the total electric power supply from renewable energy sources (i.e. biomass, small-scale hydro, solar, and wind) by 2016 seems to be far from a realistic scenario. Regarding small-scale hydropower, it is not possible to know from this chart the distribution between large- and small-scale projects since it is not clear whether small-scale is included and if so how much. On the contrary, the proportion of conventional energy (gas, coal, nuclear

<sup>54</sup> The gross generation of nuclear electricity has decreased since 2010 from 5.8% to 4.4% because the Embalse nuclear power plant operates currently at 80% of its capacity. Source: *La Política Energética como Política de Estado*:

<http://iae.org.ar/exsecs/Ex%20Secretarios%20de%20Energia%20-%20La%20Politica%20Energetica%20como%20politica%20de%20Estado%20.pdf>.

<sup>55</sup> Source:

[http://www.cammesa.com/archcount.nsf/LinkCounter?OpenAgent&X=InformeAnual\\*2014\\*Vannual14.zip&L=/infoanu.nsf/WInforme+Anual/5485544A5806855203257E3C0066C1E4/\\$File/Vannual14.zip](http://www.cammesa.com/archcount.nsf/LinkCounter?OpenAgent&X=InformeAnual*2014*Vannual14.zip&L=/infoanu.nsf/WInforme+Anual/5485544A5806855203257E3C0066C1E4/$File/Vannual14.zip).

and oil) represents almost 70% of the electricity mix. According to the Cammesa report of 2014 electricity imports have represented 1.06% (Figure 5.2). The current state of the electricity production in Argentina is as follows:

- 1) Argentina is a producer of gas, oil, and uranium. The majority of the domestic energy supply comes from natural gas, which is partially produced domestically and partially imported from Bolivia, among other countries.
- 2) There are three nuclear power plants in operation (Central Nuclear Embalse in Cordoba, Central Nuclear Atucha I in Buenos Aires and Central Nuclear Atucha II), but the new nuclear plant Atucha II started to be operative at the very end of 2014. Thus, it has not contributed to the gross generation electricity mix of 2014; the 4% represents nuclear generation of Embalse and Atucha I. It is estimated an increase of nuclear capacity to around 7.7% with the start of operation of Atucha II, which is located very near to Atucha I (World Nuclear Association 2014).
- 3) Hydropower is also a relatively important source of energy in Argentina with a few large-scale hydro power plants, being the most important Yacretá, Salto Grande, El Chocón, and Arroyito.

### **5.5.3 State of Wind Energy**

Although there have been a few attempts to promote the development of wind energy as well as a coalition pushing for wind power deployment, only very limited results have been demonstrated so far. These results seem paradoxical if one considers that a few Argentinean wind energy companies; such as IMPSA Wind, INVAP, NRG Patagonia and Corporación América; are becoming increasingly important in the industrial markets of other South American countries. For example, IMPSA Wind and Corporación América also operate in Uruguay and Brazil. Yet, greater wind energy development is expected in the next years, at least to achieve the goal of 754 MW of total installed capacity (about 6% in the electricity generation mix).

- **Existing Wind Parks**

In 2014 there were 18 wind parks in operation. Most of these projects, with the exception of six, are small-scale wind parks belonging to local cooperatives and

supplying local electricity networks used by the cooperative's customers.<sup>56</sup> Any surplus is put into the national grid. From the other six wind projects, Arauco I was the first large-scale park connected directly to the national grid in 2010. It is unique in that it was constructed by IMPSA Wind but financed by the national administration and the provincial government of La Rioja. Tables 5.1 and 5.2 outline all existing and planned wind parks.

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<sup>56</sup> The first wind park (500 kW) called Antonio Morán, was installed in 1994 in the province of Chubut (Comodoro Rivadavia) by the S.C.P.L. This cooperative together with the Danish wind company Micon and the Danish IFU formed a society named PECORSA, which has always been responsible for the park. See:

1) <http://www.scpl.coop/index.php?page=verandnid=88>.  
2) <http://www.ifu.dk/en/Investments>.



**TABLE 5.1. EXISTING WIND PARKS (2014)**

<b>Wind Park</b>	<b>Province</b>	<b>Installed Capacity in MW</b>	<b>Year of Operation</b>
Comodoro Rivadavia	Chubut	2.9	1994 - 1997- 2001
Cutral Co	Neuquén	0.4	1994
Pehuen Co	Buenos Aires	0.4	1995
Pico Truncado	Santa Cruz	Out of service	1995
Tandil	Buenos Aires	0.8	1995
Rada Tilly	Chubut	Out of service	1996
Mayor Buratovich	Buenos Aires	1.2	1997
Darregueira	Buenos Aires	0.75	1997
Punta Alta	Buenos Aires	2.2	1998
Claromeco	Buenos Aires	0.75	1998
Pico Truncado	Santa Cruz	2.4	2001
Gral Acha	La Pampa	1.8	2002
Barrik Gold	San Juan	2	2008
Parque Arauco (I, II)	La Rioja	50.4	2011
Diadema	Chubut	6.3	2011
Rawson (I, II)	Chubut	50+30	2012 (Emgasud)
El Tordillo	Chubut	3	2013
Loma Blanca IV	Chubut	51	2013 (Isolux Corsán)
<b>Total Installed Capacity</b>		<b>218.2 MW</b>	

**SOURCE: AUTHOR FROM AAEE AND AERA.**<sup>57</sup>

In Table 5.1 one can see that since 2011 the new wind parks are many times larger than the earlier ones installed by the electricity cooperatives. Also, table 5.1 shows that only three wind parks (Rawson I, II and Loma Blanca IV) with 128.4 MW of installed capacity have been constructed from the 17 allocated by the GENREN. In

<sup>57</sup> Source: 1) <http://www.argentinaeolica.org.ar/portal/images/stories/Eolica%20en%20Argentina.pdf>.  
2) [http://awsassets.wwf.org/downloads/energias\\_renovables\\_14\\_vf.pdf](http://awsassets.wwf.org/downloads/energias_renovables_14_vf.pdf).

the case of wind parks that were not allocated by the GENREN, a construction of a third phase of Arauco is announced, Diadema is a project financed by the IDB, and El Tordillo was installed by ENARSA together with the Chubut province. 218.2 MW was the total of the installed capacity in 2014 but not all these megawatts were connected to the central grid.<sup>58</sup>

- **Projected Wind Parks**

A few of the allocated wind projects are now under construction, expected to be operative in the coming years (see the table 5.2).

**TABLE 5.2. PROJECTED WIND PARKS (JANUARY 2014)<sup>59</sup>**

Wind Parks in Project	Locality and Department	Projected Installed Capacity in MW	Projected Year
El Jume	Santiago del Estero	8	2013 (Enerse and Sapem)
Loma Blanca (I, II, III)	Chubut	150	From 2013 (Isolux Corsán S.A and Alstom)
Malaspina (I, II)	Chubut	80	From 2014 (IMPISA)
Koluel Kayke (I, II)	Santa Cruz	80	(IMPISA)
Puerto Madryn (I, II, Norte, Sur, Oeste)	Chubut	220	(GENNEIA - Emgasud)
Pampa I	Buenos Aires	100	(Viento Reta S.A.)
Tres Picos (I, II)	Buenos Aires	109.5	(Sogesic)
Wind Central Gastre	Chubut	1350	(GEASSA and BCEGI)

**SOURCE: AUTHOR FROM SECRETARY OF ENERGY AND AERA<sup>60</sup>**

<sup>58</sup> Source: [http://awsassets.wwf.panda.org/downloads/energias\\_renovables\\_14\\_vf.pdf](http://awsassets.wwf.panda.org/downloads/energias_renovables_14_vf.pdf).

<sup>59</sup> Arauco park is not included in Table 5.2 as the first phase in operation appears in the first table (see Table 5.1). Yet the second phase of Arauco is expected to be operative in 2014.

<sup>60</sup> Source: 1)

[http://energia3.mecon.gov.ar/contenidos/archivos/Reorganizacion/informacion\\_institucional/discursos/genren/detalle\\_adjudicacion\\_GENREN.pdf](http://energia3.mecon.gov.ar/contenidos/archivos/Reorganizacion/informacion_institucional/discursos/genren/detalle_adjudicacion_GENREN.pdf). 2)

[http://awsassets.wwf.panda.org/downloads/energias\\_renovables\\_14\\_vf.pdf](http://awsassets.wwf.panda.org/downloads/energias_renovables_14_vf.pdf).

Regarding the projected wind parks (Table 5.2), the big initiative Gastre Wind Central (CEG) is a project formed by a partnership between Generadora Eólica Argentina del Sur S.A. (GEASSA) from Argentina and the public company Beijing Construction Engineering Group International (BCEGI) from China. It will be constructed in several phases, from which the first one will cover 150 MW and a transmission line of 500 kV along 295 km. Moreover, GEASSA has obtained the approval from the Regulatory National Entity of the Electricity (ENRE) for the construction of a 500 kV line and its connection to the Argentinean System of Networks (SADI). These two companies are actually searching for credit from Chinese financial institutions to finance the project.<sup>61</sup> It should be noted that Argentinean companies are developing most of the projects while three projects come from foreign investors in partnership with local developers.

## **5.6 Renewable and Wind Energy Goals**

When actors were asked specifically about why the Renewable Energy Acts (No. 25019 and No. 26190) and GENREN have not had a significant impact on the deployment of renewable energy as well as whether these laws are sufficient or they should be supplemented with other regulatory mechanisms, there were predominantly two related arguments.

Two main questions remain among those in the private sector: (1) the lack of an adequate and long-term legal and energy policy framework, and consequently (2) the difficulty of finding financial support because of the inadequate and unsecure regulatory and energy policy framework. One entrepreneur said, “neither the laws, nor the GENREN program are producing the expected results in wind energy because there is a big lack of legal security. Investors need a legal guarantee of around 20 years in order to confidently invest in wind energy, not 15 years...” (E. Farrace, oral interview, 17.04.2012). According to many scholars, the 2016 goal for renewable and for wind energy will be very difficult to achieve due to the lack of financial resources and low electricity tariffs; “the depressed tariffs of the electrical sector move investors and credit institutions away from renewable energy investments and there are some

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<sup>61</sup> Source: <http://noticias.terra.com.ar/empresarios-argentinos-y-chinos-firman-contrato-de-activacion-de-central-eolica-gastre-de-1350-mw,c694459a95038310VgnVCM20000099cceb0aRCRD.html>.

problems related to the high import tax rates of some wind energy supplies” (Di Paola in *La Ley*, 04.07.2011, p. 7).

The WindAr Conference published by the CADER (2010),<sup>62</sup> and Spinadel (radio interview, 11.2010) also mentioned the need of an integral, reliable, and long-term legal framework. This highlights the insufficient nature of the two existing renewable energy laws as well as the lack of synergy between electricity law No. 24065/91<sup>63</sup> and the renewable energy regulatory framework. In a conversation held with an ex-member of an NGO, it was stated that: “from a legal perspective one of the main difficulties of renewable energy deployment is the rigidity of the electricity law (No. 24065/91)<sup>64</sup>, which is not adjusted and adapted to new electricity regime conditions in which new energy sources, like renewable energy, should be developed” (Anonymous, oral interview, 09.12.2012). The interviewee continued, “this rigidity occurs because the generation, transmission and distribution sectors are controlled by the same (either public or private) companies (i.e. ENARSA, Pampa Energía, and Electroingeniería) and within this centralized structure it is more difficult to deploy renewable energy technologies, which ideally need a more flexible development environment” (oral interview, 09.12.2012).

Regarding the renewable energy regulation, a legal consultant from the Federal Council of the Electricity Energy (CFEE) said that, “the electricity law (No. 24065/91) together with its regulations, establish an electricity market in which energy is dispatched according to its economic costs. Because of this, renewable energy regulation has set up a subsidy mechanism and fiscal benefits but they are insufficient to make renewables economically attractive and, therefore, the regulation has not been applied so far. Thus, the present regulation must be reformed so that it enables renewable energy to compete on the wholesale electricity market” (E. Díaz Araujo, written interview, 04.07.2013).

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<sup>62</sup> Source: “Precios y competitividad de la energía eólica en Argentina”, Fernandez, H., WindAR, December 2010. [http://windar.com.ar/wp-content/uploads/62\\_WindAR\\_H.Fernandez\\_62.pdf](http://windar.com.ar/wp-content/uploads/62_WindAR_H.Fernandez_62.pdf).

<sup>63</sup> Source: Legal text No. 24065 (1991). [http://www.efn.uncor.edu/departamentos/electrotecnia/cat/ecoen/material\\_coloquio/ley%2024065.pdf](http://www.efn.uncor.edu/departamentos/electrotecnia/cat/ecoen/material_coloquio/ley%2024065.pdf).

<sup>64</sup> The law was issued under the Menem administration and its objective was to regulate the privatization of the three power sectors, controlled at that time by Electrical Services of Greater Buenos Aires S.A. (SEGBA); Agua y Energía Eléctrica-Sociedad del Estado; and Hidroeléctrica Norpatagónica S.A.

Although there is a general claim for a reform of the renewable energy policy and regulatory framework, this has not happened. Renewable energy sources are being developed at a slow pace because of relatively low commitment of the political leaders to deploy significantly these sources; commitment that is reflected in weak renewable energy targets. Goals are an essential part of the agenda-setting process, as Jänicke points out “... ambitious target specifications that are too challenging for a country's capacity tend to be abandoned or neglected. Weak targets also offer no incentive for innovations. The optimum case lies between the two extremes, whereby the country's capacity for action is used in full, but not overloaded” (2011, p. 15). Since renewable energy has such a small role in the current electricity supply mix and just a few wind power projects of the GENREN are being executed, it seems that more ambitious renewable and wind energy goals with their correspondent institutional structures are needed. This would enable the country to use fully its capacity for action. However ambitious renewable energy goals need a firm political commitment.

The National Energy Plan for 2030 was neither presented nor discussed, impeding even more the likelihood to see clearly what the main positions are and how the construction of a long-term energy consensus could be achieved. Bernardo Voloj points out “unfortunately, the formulation of the National Energy Plan did not include any kind of political participation mechanisms or any public debate regarding all the paradigms and challenges which the national electrical and energy sector could face in the long term” (*La Ley*, 04.07.2011, p. 2). This reflects an important policy core value within the belief system of the government, which is the concentration and centralization of policy decisions in government institutions and the small space left for public debate in the electricity system concerning strategic national issues. The politicians and bureaucrats have never promoted a public debate on nuclear energy in Argentina; the support is rather given for granted.

Since 2003, when NASA presented to the government the plan to finish Atucha II, politicians and bureaucrats who were responsible for the national energy policy were strongly committed to develop more nuclear energy. In 2006 this political engagement was confirmed when the national authorities presented the nuclear plan. Due to the strong commitment of the government to position Argentina as a nuclear energy country, commitment that is aligned with the nuclear coalition, and the

decision to not present the national energy plan, it seems that they are not able to open a public debate and try to create a consensus with other minor coalitions like the renewable energy coalition. The government tries rather to incorporate renewable energy as a supplementary source introducing weak goals in the political agenda and implementing restricted renewable energy policies that do not offer enough incentives to deploy significantly wind parks. The nuclear energy coalition also claims that renewable energy must be fostered but they explain that it must be considered their real efficiency in the energy development and they present weak goals for its participation in the electricity mix (APCNEA 2009).

The renewable energy coalition is pushing Argentinean energy policy to move slowly towards renewable technology instead of nuclear energy because the latter is an unsafe technology, while renewable energy meets the expected patterns of sustainability and safety. Villalonga and Belen Esteves (ex-member of The Greens) suggest “for the deployment of nuclear power it was necessary to use funds, which could be spend on the immediate change of the current energy mix we must achieve in the next few years due to climate change and the necessity of an independent, secure, and sustainable energy supply” (*La Ley*, 04.07.2011, p. 3). This tendency belongs to a general global trend, in which several countries are willing to promote renewable energy sources.

In highly industrialized countries this global trend has been consolidated as part of the “*Umweltinnovation als Megatrend*” which posits, “innovative environmental technologies play a central role in the current innovation competition between highly developed countries” (Jänicke 2007, p. 35). In Argentina, where due to the great increase of electricity demand energy imports are growing rapidly, the main argument to defend renewable energy is that it responds to energy security needs, while reducing the economic costs of energy imports. The other argument to defend renewable energy is that, unlike nuclear, it is more sustainable. The president of the AAEE said “countries like Argentina could have a double benefit: economic and environmental. To achieve these benefits it is, however, necessary to establish a clear regulatory framework that will equalize the generation of wind power with the other energy sources” (Spinadel 2009, p. 195).

The lack of an energy policy which benefits the renewable energy subsector but, instead of, benefits fossil fuels is due to the coercive power exerted by the

dominant fossil fuels advocacy coalition in Argentina. Fossil fuel industries may employ their political power within the electricity system according to their collective long-term interests (policy core beliefs); preventing renewable or nuclear energy deployment. Accordingly, “when an industry receives a grant of power from the state, the benefit to the industry will fall short of the damage to the rest of the community... ” (Stigler 1971, p. 10). In the case of Argentina fossil fuel energy coalition has the grant of power from the state, having a policy monopoly in the electricity system. By exerting a policy monopoly the fossil fuel energy coalition is hampering the chance to deploy incipient energy sources like wind power or develop still small energy industries like nuclear power.

This explains the reason why there is a lack of support to change the incentive system that gives sufficient economic support for wind energy. Indeed, Stentzel and Frenzel (2008) explained, “a regulatory framework change provides the initial stimulus for investments into wind power”. At the beginning, Argentina, following the path of European countries (Germany and Spain), implemented FITs. Yet, the FIT policy was not designed in a way that makes projects financially viable (Jacobs et al. 2013) and thus this mechanism did not have the expected impact on renewable energy development. It was then necessary to complement the FIT law with an auction scheme (GENREN), which has not given the expected results either because funds to support allocated wind projects were very hard to obtain. Even though Argentina has a local wind industry, the lack of a stable and reliable energy policy framework discourages banks and credit institutions from financing the investments required by wind energy developers. There is scant financial support from private investors to deploy wind projects as well as scarce public funding from the state in comparison with what is provided to the nuclear energy industry. The current administration has been focusing investment in R&D for nuclear energy projects through its technological institutions such as the Bariloche Nuclear Centre and the Balseiro Institute, where project CAREM 25 is being developed. Thus, state investments in renewable energy technologies remain underfunded.

It is also important to consider that Argentina is currently experiencing rapid socioeconomic transition similar to other emerging economies of regions such as Brazil. This recent economic expansion may eventually influence environmental innovation within the global *Megatrend* driven mainly by European countries

(Jänicke 2007), in which development of some renewable energy sources, especially wind power, plays a crucial role. Still, it is expected that it will be a long time before the renewable energy coalition can be strong enough to exert a greater dominance in the Argentinean electricity system. Likewise, even if the state fosters and supports financially nuclear energy, it will be a long time until the nuclear coalition will play a significant role in the electricity system. Shifts in policy monopolies, that is changes in policy core beliefs and institutional structures, that drive policy change within a particular system may occur very fast like Baumgartner and Jones (1993, 2009) explain or may require longer periods of time. In the Argentinean case, established policy monopolies have been quite resistant to change, though some small changes can be perceived.



**TABLE 5.3. FIRST PHASE**

<b>Phases</b>	<b>Period of Time</b>	<b>Relevant Events &amp; Policies</b>	<b>Main Actors</b>
1998–2009	1998	Government enacted the first law (No. 25019) promoting solar and wind energy through a FIT.	National Administration
	1998	Chubut enacted Law No. 4389 promoting wind energy regulated the same year through Decree No. 235.	Provincial Administration
	1998–2002	Installation of off-grid wind parks in Chubut, Buenos Aires, Santa Cruz and La Pampa. Socioeconomic crisis of 2001/2 = Wind projects were suspended.	Electricity Cooperatives
	2005–2006	Economic growth = increase of electricity demand & electricity shortage since 2004. National Strategic Plan of Wind Energy: the goal was to install 300 MW by 2012 in several provinces.	ENARSA, MINPLAN, CREE & Provincial Administrations
	2006	The Strategic National Plan of the Nuclear Sector was launched with the objective to complete Atucha II.	National Administration
	2006	Law No. 26190 was enacted. 8% electricity from renewable energy (wind, solar PV, geothermal, biomass, biogas, tidal, and small hydropower) by 2016.	National Administration

**SOURCE: AUTHOR.**

**TABLE 5.4. SECOND PHASE**

<b>Phases</b>	<b>Period of Time</b>	<b>Relevant Events &amp; Policies</b>	<b>Main Actors</b>
	2009	The Nuclear Act was issued.	National Administration.
2009–2014	2009–2010	Regulation of Law 26190. GENREN for a call for bids: Under GENREN 895 MW of renewable energy were allocated.	ENARSA & Ministry of Federal Planning, Public Investment and Services
	2011	Installation of Arauco in La Rioja: the first wind park at large scale connected to the national network. Installation of the wind park Diadema in Chubut.	National Administration & Government of La Rioja. Wind turbines from IMPSA Wind. Hychico S.A. Wind turbines from Enercon.
	2012	Installation of the wind parks Rawson I and Rawson II in Chubut.	GENREN & Emgasud Renovables. Wind turbines from Vestas.
	2012	Installation of the solar parks Cañada Honda I and Cañada Honda II in San Juan (5 MW in total).	Emgasud Renovables
	2013-2014	Installation of a small-scale hydropower plant in Mendoza (1 MW); a solar park in San Juan (2 MW), a wind park in Chubut, and finalization of wind park Arauco II.	Centrales Térmicas Mendoza S.A. 360 Energy Province of La Rioja and National Government

**SOURCE: AUTHOR**

### **5.7 Policy Change in the Electricity System**

To explain the introduction and development of nuclear and renewable energy in the electricity system of Argentina I would like to refer to the following questions: Why were certain policy beliefs or ideas (but not others) were adopted in the Argentine’s electricity system? Why, facing the problem of inadequate electricity supply and growing energy demand, was it decided to prioritize nuclear over renewable energy in the agenda-setting process? The answer to these questions will guide the whole section 5.7 of the present chapter and explain the diverse causes for the country’s

anemic renewable energy goals. It will consider why the renewable energy support coalition could not succeed in creating an independent policy subsystem with a more favorable policy framework.

First, how impacts from the broader electricity system have affected changes in the policy core attributes of the governmental program, and how the roles of nuclear and hydropower have constrained or facilitated the ability of the renewable energy advocacy coalition to influence the agenda will be introduced. Subsequently, in section 5.7.3 the hypotheses presented in chapter 2 will be examined.

### **5.7.1 Impacts from the Electricity System: Energy Policy Framework and Subsidies**

- **Unstable Energy Policy Framework**

The traditional instability of the energy policy framework has affected the development of renewable and nuclear energy. The first part of the chapter explained that the weak renewable and wind energy goals introduced by the government and the inadequate regulations to develop renewable energy were a consequence of the policy monopoly exercised by the fossil fuel coalition. Here I will refer to the instability of the energy policy framework that affected the trust of private investors to finance renewable energy deployment. Since December 1983 Argentina has had democratic elections without interruption but substantial differences between each administration have resulted in an inconsistency in decision-making processes. Examples include the purchase agreements that domestic actors (decision-makers) have made with regard to public companies in strategic sectors during the privatization and renationalization periods. A good example is the purchase agreements of public companies in the electricity sector.

Shifts between full privatization and partial renationalization of operations within the energy system have occurred in relatively arbitrary ways, causing a lack of trust and severe financial losses for all sectors within the electricity system, including the renewable and nuclear energy sectors. While in the case of renewable energy there has been scant financial support for the GENREN wind and solar energy projects, the construction of nuclear energy plants was suspended during the privatization period in the 1990s. Only in 2006 did the situation for nuclear energy begin to change because the state started again to financially support nuclear activities (e.g. different kinds of

reactors and researches in the nuclear field) helping the sector to fulfill its uncompleted goals. This was possible because as the nuclear energy sector remained state-owned it was financed by the national treasury but this was not the case for other energy sources, like renewable energy projects that must be mostly developed by the private sector. The lack of legal stability continues to be a big concern for private investors, especially for foreign investors.

- **The Role of the State and the Subsidies**

Two of the principal problems for renewable energy are: (1) indirect electricity subsidies, and (2) the resulting lack of a reference price for the generation of electricity that could be used by renewable energy sources like wind. The problem of the indirect electricity subsidy is related with the ownership structures of the electricity generation sector. In Argentina electricity comes mostly from natural gas, hydropower and nuclear energy. Electricity generation for the three principal energy sources is liberalized and there are both domestic and foreign investors. YPF, the main fossil fuel company is mostly state-owned but there are other private foreign companies in the fossil fuel sector. Hydropower plants are mostly privatized. The nuclear sector is state owned. Despite the great electricity reforms of the 1990s, the most important nuclear power companies, NASA and Invap (both controlled by CNEA), were the only large public companies that remained state-owned. Of importance is not only whether energy companies are state-owned, partially state-owned or fully privatized, but also how the interaction between politicians, bureaucrats and the domestic population is manifested (Jones Luong and Weinthal 2010). In Argentina, both Kirchner governments exercised higher degrees of state control in the electricity system; they favored state-owned nuclear companies as well as the renationalization of YPF. The Kirchner administrations took the reins of the nuclear sector, as one of the first actions taken in the electricity sector. The reconstruction of Atucha II became a symbol of state efforts to recover the investments.

Later in 2012, the CFK government decided to nationalize YPF. When asked whether re-nationalization of YPF will solve Argentinean oil company's current debt problem, one of the former members of the civic platform, The Greens and ex-member of Greenpeace Argentina, answered, "not necessarily, there are some other issues like that of the necessary investments needed to repair the energy system. It is

necessary to make large investments and the state does not have the economic resources. The other problem is the demand for energy, which was recently confirmed to have increased by 40% in the last decade. The decision to nationalize was taken to fix the debt problems that had cursed the energy system and resulted in its collapse during the devaluation of 2001 [sic.]<sup>65</sup>” (J. Casavelos, oral interview, 10.12.2012).

The devaluation of the Argentinean Peso in 2002 impacted severely the electricity sector among other public sectors (i.e. transport and water) and as a result the entire electricity system, not only generation but also transmission and distribution, was broken. According to Casavelos, the reason for the system’s bankruptcy was the lack of investment because “during the times of most need, investments were not made, especially during the 1990s. Subsequently, the electricity transmission sector was damaged along with the two leading distribution companies, Edenor and Edesur<sup>66</sup>, which are currently in the process of meeting with creditors. Although distribution and transmission companies receive subsidies from the state, they are not enough to cover the costs. The most likely scenario is that, Edesur (currently in hands of Distrelec Inversora S.A.) will be nationalized like the electricity transmission company was in 2006” (J. Casavelos, oral interview, 10.12.2012). It should be pointed out that since 2006 the largest electricity transmission company, Transener, is a public limited liability company of which 50% is owned by Pampa Energía (Argentina’s largest private electricity company; they also own Edenor), 25% by ENARSA, and 25% by Electroingeniería.<sup>67</sup> The latter acquired ownership in Transener from the British company National Grid. Although partially nationalized, the electricity transmission company continues having financial problems to invest in the sector. The other seven private electricity transmission companies are under a contract renegotiation process with the Federal Government’s *Renegotiation and Analysis Unit for Public Service Contracts* (UNIREN) (Haselip and Potter 2010, p.

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<sup>65</sup> The devaluation of the Argentinean Peso was not in 2001 but in 2002, as a result of the economic crisis triggered in December 2001.

<sup>66</sup> Source: The last news appeared in the web site of Edesur announce an integral lost of \$ 801,6 millions (net) for the period of the year 2012 (22.02.2013). See: [http://www.edesur.com.ar/edesur\\_noticias/fr\\_edesur\\_noticias\\_1.htm](http://www.edesur.com.ar/edesur_noticias/fr_edesur_noticias_1.htm).

<sup>67</sup> Source: <http://www.eling.com.ar>.

1171).<sup>68</sup> As a consequence, transmission lines are in bad condition and need to be improved through financial investments. One of the interviewees noted that “transmission grids are in very bad condition and it is a big problem for wind energy deployment” (E. Farrace, oral interview, 17.04.2012).

Based on interviews, it is possible to deduce that since the 1990s there haven't been any proper investments in the electricity sector, neither during the privatization era in the 1990s, nor during the partial re-nationalization process from the second half of the 2000s. It was more a shift of visions and beliefs about what the role of the state is, how to control strategic public sectors and how to obtain political legitimacy than a real solution “to fix the debt problems that had cursed the energy system during the 1990s”. Indeed financial problems in companies that have been partially or almost entirely nationalized have not been resolved yet and electricity scarcity continues to be an unresolved issue because, as the interviewee said, there are not sufficient economic resources.

The consequent depletion of energy capacity was the result of a failed energy policy framework to foster investments in the development of different energy sources including renewables and the use of indirect subsidies. The ownership structure of the electricity generation is important here because this can partially explain why the state failed to provide an energy policy able to foster investments in other energy sources like wind and chose to use economic resources to indirectly subsidize electricity consumption. Since the Kirchners' administrations there is a prevalence of state control in the management of the public sector and thus the state (together with private investors) began to act as one of the direct claimants in electricity production and its generated rents. The domestic population remained indirect claimants. This means that government officials became directly responsible for meeting domestic demands and were under great pressure to respond to the demands of the population concerning the use of electricity revenues. When political and bureaucratic elites have more control over electricity rents, the domestic population tends to have higher social demands towards governing elites. Therefore to

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<sup>68</sup> “UNIREN is a joint body of the Ministry of Economy and the Ministry of Planning, which replaced the Commission for the Renegotiation of Public Contracts (CRPC) after the election of the Kirchner administration in May 2003” (Haselip and Potter 2010, p. 1171).

maintain political legitimacy, governments are likely to finance wide and indirect subsidies for energy consumption, opting for weak fiscal regimes.<sup>69</sup>

The problems of universal and indirect energy subsidies often occur in developing countries whose revenues come principally from the exports of their natural resources (gas and oil), which are mostly state-owned, and tend to build weak fiscal regimes. These states are usually called in the literature rentier or distributive states (Vandewalle 1998, found in Jones Luong and Weinthal 2010, p. 4; Ross 2001, found in *The Montréal Review* 2010).<sup>70</sup> Ecuador and Venezuela, both members of the OPEC, are typical South American examples. However I will not discuss the concept of rentier states here as Argentina is experiencing a great decrease in its fossil fuels (especially natural gas) net exports. The net export of fossil fuels has dropped from 33% in 1998 to less than 10% in 2008 (Vagliasindi 2012, p. 272) and they kept dropping since 2011 until 2013 (M. Recalde, video call interview, 10.12.2013), indicating that currently the country's principal revenues come from other economic sectors such as the agribusiness and industry. Due to this reason and, especially, because the focus here is on the development of renewable energy in relation to the electricity system and not on the oil and gas sectors, the discussion of rentier states is beyond the scope. It is more appropriate to study the relationship between the owners of electricity generation and the domestic population. I indeed study the relation between more state control in the electricity generation and the implementation of indirect energy subsidies.

Actors in the renewable energy coalition agree that the problem of indirect subsidies for fossil fuels represents a critical barrier for wind energy development, in contrast to other countries in the region. In an interview with Casavelos he explained that, “energy in Argentina is subsidized and its costs are very low for end users. Therefore, the user does not have an incentive to make an efficient use of the energy, to demand better energy sources or a normative framework that promotes a particular source of energy; there is not a full awareness. The price of the energy distorts the market and does not stimulate producers to seek other energy sources. There is no

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<sup>69</sup> According to Jones Luong, and Weinthal (2010) fiscal regimes are defined as a set of institutions that embody decisions about (1) the primary sources of government revenue (including stability, scope, and composition of taxation); and (2) how this revenue is allocated (including how much, how, and on what it is spent) (p. 33).

<sup>70</sup> Source: <http://www.themontrealreview.com/2009/Oil-and-Democracy.php>.

incentive for private companies to invest in renewable sources because of the low price. The result is that ENARSA is the only company that makes investments in renewable energies; subsidizing the difference in price in order to promote projects. But these projects are very small and insignificant” (video call interview, 13.07.2012). In the case of the nuclear sector, as it remains fully state-owned, the national government is the unique actor that invests in the sector subsidizing the energy price. Similar to this, the ex-Secretary of Energy stated that: “Argentina has implemented an energy policy of development based on contaminant fossil fuels, artificially reducing prices of the gas and oil derivatives and undermining the competitiveness of renewable energies. Argentinean energy policy is a policy that contributes to the deterioration of the environment, because it subsidizes petroleum products [...] Clearly in Latin America, the countries who have the highest subsidies are Venezuela and Ecuador but these two countries are members of the OPEC and are both oil and gas exporters” (A. Guadagni, oral interview, 10.12.2012).

In the nuclear and renewable energy sectors an increased role of the state through CNEA, ENARSA, and provincial governments can be observed. In fact, as Recalde pointed out concerning future wind energy investments, “the development of wind energy will principally come from the southern provinces. It will be mostly these provincial governments, with the help of international financial institutions like the IDB, that will deploy wind energy in the country” (M. Recalde, video call interview, 10.12.2013). The reason is that facing indirect energy subsidies financial options were reduced and only state institutions seemed to be able to make the necessary investments. But, while nuclear energy investments were exclusively financed by the national treasury, renewables were supposed to be financed mainly by private actors. Being expected to be financed by the private sector, subsidies became more problematic for renewable energy than for nuclear power. Thus subsidized electricity has encouraged energy inefficiency and has undermined renewable energy developments.

There are however a few signs that could indicate some development of renewable energy in Argentina. When Guadagni was asked about who is actively working for the renewable energy development, he said, “I think there is a future, though in relative terms it will be small because they will not surpass more than 6 or 7% of the national energy mix by the year 2020. But I do believe that there will be a



general upward trend because Argentina will be forced to increase the price of the fossil energies. Therefore, if fossil energies are more expensive, then renewable energies need fewer subsidies. It is all a relative problem. If all the costs are measured, it is probable that renewable energy will be cheaper than fossil fuels, but only if all the costs are included and measured [...] When I say costs, I do not refer just to monetary costs, but rather to the negative externalities for the environment—or in other words to its contamination” (A. Guadagni, oral interview, 10.12.2012).

In an article from 2011 regarding the issue of energy subsidies reduction, the founder and ex-president of CADER, Carlos St. James said that, “the picture for renewable energy, after the cutback of subsidies, is totally encouraging. The cutback of subsidies was a necessary step that we of the energy industry all knew would come; it was unsustainable and inevitable. Nobody working in the energy sector in Argentina would be surprised that this happened. But it is true that the closer prices are to their real costs, the more transparent the system is and this will attract more investments” (“Como enfrentar la quita de subsidios con energías renovables”, *La Nacion*, 03.12.2011).

After assessing the implementation of the Economy and Infrastructure Ministries decisions in November 2011 and from interviews, it is possible to conclude that a slow progressive decrease of energy subsidies has begun, giving a little room to renewable (especially to wind) energy deployment in coming years. Nevertheless, this room will probably not reach the goal of 8% of renewable energy and 4% of wind power by 2016 as was claimed in an article appearing in *La Nacion* (03.12.2011). Casavelos and Recalde stated that they don’t believe that the objective set by the law No. 26190 will be accomplished either, at least not under current conditions (oral interview, 10.12.2012 and video call interview, 10.12.2013). According to Guadagni, it might be more appropriate to look at an objective of 8% in 2020. The president of the AAEE suggested that it will be difficult to achieve this objective if the country and its political administration continue to think about exploring and exploiting natural gas reserves as well as new coal plants, like the one in Rio Turbio (E. Spinadel, oral interview, 15.11.2010).

Based on the interviews conducted personally as well as those reviewed on the media, it is possible to affirm that reduction of electricity subsidies and a long-term policy framework are seen as requirements for the expansion of the renewable energy

industry. The problem of universal energy subsidies was presented earlier in the theoretical framework, when the type of fiscal regimes was discussed. Weak fiscal regimes are those which have: “(1) a tax system that is unstable, based largely on the (energy) sector and relies primarily on indirect and implicit taxation (excessive fines) across sectors, and (2) a system of expenditures that undermines budgetary stability and transparency” (Jones Luong and Weinthal 2010, p. 12). Argentina has several features of a weak fiscal regime. The country has a tax system that is mostly unstable, relying on indirect taxation across sectors but based on different sectors like industry, hydrocarbons, and other minerals, commerce, and agribusiness (IDESSA 2011).<sup>71</sup>

Concerning the second point, how the expenditures are allocated, the system of expenditures in Argentina is a system that undermines budgetary stability and transparency as the use of quasi-fiscal activities confirmed. Jones Luong and Weinthal (2010) refer to “activities that are not explicitly executed through budgetary mechanisms and can include implicit subsidies to consumers, preferential credits, tax arrears, and subsidized inputs for selected industries, as well as extrabudgetary funds. In mineral-rich states, these routinely come in the form of energy subsidies to households and enterprises (see IEA 1999)” (p. 39). As was explained, the quasi-fiscal activity in the form of electricity subsidies is one of the main barriers to build and develop the renewable energy subsystem. This in turn, causes other problems like lack of budget transparency and stability as well as improvements in energy efficiency. Regarding the problem of energy efficiency, a national program of rational and efficient energy use called “Programa Nacional de Uso Racional y Eficiente de la Energía” (PRONUREE) was introduced in 2007 (regulated through Decree 140) in order to improve the energy supply and reduce the constant increase in energy demand. However, PRONUREE also failed to meet the objectives to promote energy efficiency in the country, principally because the energy subsidies did not stimulate a reduction in electricity consumption (Recalde and Guzowski 2012).

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<sup>71</sup> Although during the first Cristina Kirchner administration the income tax (Decree No. 1426/2008) as well as export business profit taxes were modified and increased in an attempt to reinforce the progressive character of the fiscal structure, the Value Added Tax (VAT) still represents the highest proportion of the total tax collection, followed by the income tax. During the 1990s VAT rate was increased to 21% (Law No. 24073/1992 and Law No. 24621/1996).

The lack of transparency and stability in energy and fiscal policy—caused by energy subsidies—is reflected in the second problem, mentioned above: the lack of reference prices for the generation of different energy sources. Casavelos notes that, “from the market perspective, subsidies constitute a barrier to renewable energy deployment. Particularly, the fact that energy producers do not have a reference price, which is needed to initiate an investment project in renewable energies, because not only the energy price is subsidized, but also because these subsidies change over time and within the country, resulting in a constant change in the price” (J. Casavelos, video call interview, 13.07.2012).

### **5.7.2 Role of Nuclear Energy and Hydropower in Argentina**

Although it was decided to stimulate the development of nuclear power together with renewable energy, a more ambitious plan for nuclear power than for renewable energy was launched. This can be explained due to the particular role of nuclear energy in the country. In comparison with nuclear leader countries, nuclear power does not represent a very large share of Argentina’s energy mix (in 2014 about 4.1%).<sup>72</sup> Still, the strategic nuclear plan and the *Nuclear Energy Act* confirm the commitment of the government to nuclear energy and the importance of certain actors within the nuclear energy coalition, especially CNEA.

A big part of the electricity sector’s budget is directed to finance the nuclear industry (J. Casavelos, oral interview, 13.07.2012). In a document published by the “Centro Latinoamericano de Investigaciones Científicas y Técnicas” it was mentioned that for the reactivation of the nuclear sector, the government invested almost 4.6 billion dollars for eight years, beginning in 2006, in order to boost scientific-technological capacity, which had been inactive since around 1987 (De Dicco 2010, p. 1; De Dicco 2013, p. 31).<sup>73</sup> Patricia Juri from the ARN affirmed “the nuclear industry was in a period of stasis for several years and this caused a great loss of the local scientific-technological capacity, being the main reason of the delay in the operation and functioning of Atucha II from the original projected year (2010) to 2014” (P. Juri, written interview, 20.01.2014).

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<sup>72</sup> Source: *Annual Report* - Cammesa (2014, p. 36).  
[http://www.cammesa.com/archcount.nsf/LinkCounter?OpenAgent&X=InformeAnual\\*2014\\*Vannual14.zip&L=/infoanu.nsf/WInforme+Anual/5485544A5806855203257E3C0066C1E4/\\$File/Vannual14.zip](http://www.cammesa.com/archcount.nsf/LinkCounter?OpenAgent&X=InformeAnual*2014*Vannual14.zip&L=/infoanu.nsf/WInforme+Anual/5485544A5806855203257E3C0066C1E4/$File/Vannual14.zip).

<sup>73</sup> Source: [http://www.cienciayenergia.com/Contenido/pdf/091201\\_rad\\_tn.pdf](http://www.cienciayenergia.com/Contenido/pdf/091201_rad_tn.pdf).  
[http://www.cienciayenergia.com/Contenido/pdf/020313\\_rad\\_tn.pdf](http://www.cienciayenergia.com/Contenido/pdf/020313_rad_tn.pdf).

When asked about the most important arguments for the development of nuclear energy in Argentina, a nuclear engineer who graduated from the Balseiro Institute<sup>74</sup> answered: “Argentina has developed the technology for the complete ‘nuclear fuel cycle’; starting with the uranium mining industry (including the enrichment process if necessary) through to the fabrication of the fuel, its use in reactors as well as the technology of storage and, eventually, recycling. It is a country that does not depend on foreign technology for its nuclear development. Moreover, since it has never developed nuclear energy with military objectives, it represents a unique case in the world” (J. Baron, written interview, 11.06.2012). In other words, Baron’s main arguments relate to energy security and technological autonomy. Energy security and cost-benefit were argued by the engineer when asked about the roles that nuclear and renewable energies should play in the effort to diversify the national energy mix. He said, “there are two different energy needs in Argentina (and in general in the world). One is the availability of large amounts of electricity, for which nuclear power constitutes a sound solution since it’s a relatively economic source of good quality (because of its high availability). The other is the availability of energy fuels, liquid or gaseous, for the transport sector (automotive, shipping and aviation) where I think renewable energy, in particular bio-fuels, have an important role to play, which is currently covered mainly by fossil fuels (oil and gas)” (J. Baron, written interview, 11.06.2012). When asked about renewable energy the nuclear engineer referred to bio-fuels because he thinks that there is a large availability of nuclear power and bio-fuels and both are cost effective; countries like Argentina should develop these energy sources, ensuring constant electricity and energy supply at reasonable costs and without being dependent on scarce resources.

Notable is the fact that not only active nuclear engineers, like the ones interviewed here, believe that nuclear power brings energy security, is cost-efficient, and environmentally respectful, but in general policymakers and researchers think so as well. When asked about energy policy in Argentina and the main barriers for the deployment of renewable energy, the former Secretary of Energy suggested that “the country definitely needs another energy policy. A policy which is consistent with that of the MERCOSUR and respects climate challenges. Due to the dismantlement of the

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<sup>74</sup> Source: Instituto Balseiro (Bariloche, Río Negro, Argentina)  
<http://www.ib.edu.ar>.

fossil fuels sector and its slow recovery, there are favorable conditions for a new energy policy in which renewable energy can play an interesting role. But not only ‘traditional’ renewable sources like wind and solar must be considered but especially hydro and nuclear power. Very relevant is hydropower because despite Argentina having enormous potential, nearly half remains unexploited” (A. Guadagni, oral interview, 10.12.2012).

Regarding the current position in Argentina, Recalde highlights that hydropower is not likely to be significantly developed, “even though it has always been a viable alternative (due to its great potential in the country), no one wants it” (M. Recalde, video call interview, 10.12.2013). But when the researcher Recalde was asked about the position of the country concerning nuclear energy, she explained why Argentina decided to invest in nuclear energy, arguing that due to the urgency of the current inadequate electricity supply “Argentina is not in a position to say no to anything at present” (M. Recalde, video call interview, 10.12.2013). The researcher in energy economics sees that hydropower implies high social costs for the government because the domestic population rejects it. In contrast, with nuclear energy it seems that there is less of a problem and the country needs it to contribute to solving the inadequate electricity supply.

Guadagni added that a great barrier for renewable energy deployment is its high capital cost. “The problem with non-fossil energy sources—meaning non-coal, non-oil and non-gas—which are the most environmentally friendly is that they all are more expensive to produce for each unit of power because they require a greater capital cost for each KW installed. It is also true, however, that after the initial investment solar and wind are free but I’m talking about capital costs. This is a big problem for Argentina” (A. Guadagni, oral interview, 10.12.2012). Like Guadagni, the nuclear engineer Baron also pointed out the issue of the high capital cost for renewable energy sources. He said, “the principal barrier of renewable energy is its high cost. While some renewable sources (like bio-fuels) have potential for cost-reductions in the future, others such as photovoltaics could require intensive R&D. The other problem for renewable energy technologies in Argentina is that of local development. If it’s necessary to import the technology, there’s no added value to the Argentinean economic system, resulting in technology dependence in the long-term. It can be overcome only if local technologies are easy to acquire and easy to foster”

(J. Baron, written interview, 11.06.2012). Thus, high (capital) costs are seen as one of the main problems associated to renewable energy deployment in Argentina; but while Baron is in general quite pessimistic about a possible development of renewable energy in the country (except for bio-fuels), the ex-Secretary of Energy is more optimistic about the chance non-fossil energy sources (i.e. nuclear, hydropower and to a lesser extent also wind) have given the increase in the price of fossil fuels in the last years. Still, it is possible to infer from former Secretary of Energy that he pays a lot of attention to other non-fossil fuel energies besides renewable energy. Indeed, when he speaks about “non-fossil energy sources” he gives more relevance to the development of large hydropower and nuclear than “traditional renewable energies” (referring exclusively to wind and solar). He considers all “non-fossil energy sources” environmentally friendly energies. According to Guadagni nuclear and hydropower are environmentally friendly because they are CO<sup>2</sup> neutral, taking the same position as the nuclear engineer who says nuclear power does not emit GHGs and generates little waste. In contrast, from the perspective of environmental NGOs and local communities in Argentina, nuclear and large hydropower plants are very questionable. Although they are low carbon emission sources, they are quite controversial due to other environmental as well as social costs.

From the above interviews it can be affirmed that Guadagni, Baron, and Recalde address the important role of nuclear energy in the diversification of the national electricity mix to different extents. Guadagni also refers to the importance of hydropower. Nuclear energy was historically viewed as a symbol of technological progress. Since the times of Peron positive beliefs about the competitive advantages of nuclear power have remained strong for a vast majority of Argentinean society and have proved very hard to change. Regarding this Casavelos said “the Argentinean nuclear lobby is very powerful, nuclear energy has been very entrenched in this country for 50 years. There is an extremely established capacity for nuclear research in Argentina. The renewable sector is much younger, and it is very dispersed. For instance the wind energy production chain spans many sectors and firms. On the contrary the nuclear sector is centralized in just one stakeholder, the CNEA. Argentineans, as well as Brazilians, feel that we are first world due to the scientific-technical capacity for nuclear power. And this is not only on behalf of official authorities but rather for all the political parties. Indeed the governing party and the

opposition have a single voice on this issue; in other words, there is a general consensus. It is very hard to break this” (J. Casavelos, oral interview, 13.07.2012).

What Casavelos expressed is related to the positive image CNEA, nuclear research institutes (e.g. Bariloche Nuclear Centre and Balseiro Institute), and Inva possess. There is a general perception that responsible and competent people have managed the nuclear sector in Argentina; they have succeeded in developing a local technology and exporting high value added products. It is also very interesting what one ex-member of an NGO said when he was asked about renewable energy, nuclear power, and the centralized structure of the electricity in Argentina: “there is a lot of status quo in the national electricity system and in the role assigned to nuclear power. In addition, there is lots of ignorance and, therefore, lack of awareness in relation to the subject of renewable energy sources” (Anonymous, conversation held the 09.12.2012).

From the perspective of Casavelos and the former NGO member, a general consensus and status quo supporting nuclear energy together with lack of information concerning renewable energy still have a great influence on policymakers when they are confronted with current challenges coming from the electricity system. Related with these ideas, the director of the AHK Uruguay, Winter, explained, “although the country has the Law No. 26190 of renewable energy, the government does not want to develop these sources because they are afraid of loosing credibility if they change from a centralized power generation, they got used to, into a new model of decentralized production. During the last years the government has invested a lot in the nuclear plant Atucha II and they still have several fossil fuels they want to exploit. They have seen renewable energy as an environmental thing, not so affordable, and they have never imagined that it would be competitive; now renewable energy sources are competitive but they are not prepared. Also, authorities think that renewable energy requires great investments in the electricity grid, which are quite expensive and complicated for the country, especially if the electricity is highly subsidized...” (T. Winter, oral int., 15.12.2012). Winter has addressed many of the problems already mentioned: the role that fossil fuels and nuclear energy play in the government’s legitimacy, unaltered policy core beliefs, and quasi-fiscal activities.

The nuclear energy coalition is premised on the prevalent belief of the benefits of progressive national technological development, the costs of technological

dependence, and the desirability of a large increase in supply capacity. In their perspective renewable energies are supplementary sources, while large hydropower is a relatively good alternative due to local availability.

The AHK and the two NGOs interviewed support strongly renewable energy. Both NGOs are working together with other actors to promote renewable energy, over fossil fuels and nuclear, and impose their beliefs, as will be seen in the next section. The Energy Scenarios 2030 initiative will explain more in detail the role of renewable energy, and especially wind; large hydropower; and nuclear energy.

- **Energy Scenarios 2030**

The Energy Scenarios 2030 business as usual (BAU)<sup>75</sup> projections were organized by FARN, Avina Foundation, the technological institute ITBA, and the center for regulatory energy studies CEARE through the inspiration of an initiative undertaken in Chile, in an attempt to group actors of the civil society, private, and academic sectors. The purpose was to present alternative electricity scenarios to generate greater information and contribute to a future energy national strategic plan. As Casavelos explained, “the frequent interaction between renewable energy actors (i.e. Héctor Mattio from CREE, CADER and NGOs like FVS, Greenpeace, FARN, and The Greens) was confirmed by the collective and coordinated work of the six energy scenarios” (J. Casavelos, oral interview, 13.07.2012). The following actors participated in the initiative:

1. “Asociación de Generadores de Energía Eléctrica de la República Argentina” (AGEERA).
2. “Comité Argentino del Consejo Mundial de Energía” (CACME).
3. Argentinean Chamber of Renewable Energy (CADER).
4. “Los Verdes - Foro de Ecología Política” (The Greens).
5. Engineering Faculty of the University of Buenos Aires (GEA-UBA).
6. “Fundación Vida Silvestre” (FVS).

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<sup>75</sup> Source: The Business as Usual (BAU) projection assumes an increase of the demand of 3.4%. There is another projection that assumes a strong energy efficiency policy and increases the demand to only 1.9% (“Plataforma Escenarios Energéticos Argentina 2030”, p. 11).



The scenarios will not be explained here in depth. Rather some of the findings from the energy scenario final document that may be relevant for this work will be quoted: “Although all the scenarios have a higher level of energy diversification than the current energy mix, there are important differences among them. For example, one difference is related to the most relevant energy source in each of the six scenarios and the other is the importance and the relative weight of each energy source as well as the inclusion of renewable energies. However, in all the scenarios fossil fuels (diesel and fuel-oil) have a diminished stature comes to current levels—with the exception of the BAU scenario of AGEERA and, to a lesser extent, the BAU scenario of CADER”.<sup>76</sup>

The document also mentions, “two organizations have adopted wind energy technology as the most relevant source and one of these two, FVS, has included, in third place, biomass obtained from the forest and food industry as very important”.<sup>77</sup> One of the organizations is the FVS, which is an environmental NGO, and the other is The Greens, a civil and political movement that works actively with environmental NGOs like FVS and Greenpeace. In the scenario of The Greens there is around 50% renewable energy in the energy mix by the year 2030. When Casavelos was asked about the feasibility of the renewable energy scenario proposed by The Greens, his answer was that it was a best case scenario and continued, “it is very ambitious and not unrealistic; if all requirements are met correctly, it is possible” (J. Casavelos, oral interview, 10.12.2012). In The Greens’ scenario the maximal objective is to reach nearly 100% of renewable energies in the national energy mix by the year 2050.

This scenario is, at least for one member of the FARN that was also one of the organizers of the Platform Energy Scenario for Argentina 2030, not feasible, though a good ideal. In a conversation held with this member, he did not expressly say this objective was unreachable but he seemed to be more in favor of the (less ambitious) scenario put forward by the Engineering Faculty of the University of Buenos Aires (UBA) than of those proposed by the NGO sector (including The Greens and FVS) (Anonymous, oral interview, 09.12.12). It is very probable that the ex-Secretary of Energy would also claim that this scenario is very unrealistic, since he said it is an

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<sup>76</sup> Source: “Plataforma Escenarios Energéticos Argentina 2030”, pp. 18–19.

<sup>77</sup> Source: Ibid. 76, p. 18.

illusion to think renewable energy will surpass more than 6 or 7% of the energy national mix in the next five or seven years.

In the scenarios of UBA and CADER, wind power comes in third place. Still, in most cases hydropower, natural gas, and nuclear power remain prominent towards 2030. In particular nuclear energy ranges from a moderate importance in three scenarios (i.e. CADER, UBA, and to a lesser degree FVS) to very important in two of six scenarios (AGEERA and CACME). Surprisingly nuclear energy has moderate importance for renewable energy associations like CADER and even environmental NGOs like FVS. The support of UBA is not surprising since engineers in Argentina tend to be more pro-nuclear. In the only scenario where nuclear power is absent is that of The Greens, which is also the scenario that has the greatest penetration of renewable energy by 2030. The position of The Greens is expectable since it is an environmental civil movement linked with the European organization Heinrich Böll Stiftung, which is clearly antinuclear and in favor of renewable energy. Almost all the actors agree with nuclear (with the only exception of The Greens), hydropower (large or micro), and to different extents also wind.

When Casavelos was asked about the status quo of nuclear power, he answered that “nuclear infrastructure as well as the perception of nuclear power are both very well established in the country. Indeed nuclear energy has proponents from the left and right of the political spectrum. There is a general conviction that we are a world nuclear power and, therefore, we are at little risk of an accident because our nuclear industry is very safe. Still, nuclear waste goes to the Ezeiza Atomic Centre located close to the Buenos Aires’s international airport” (J. Casavelos, oral interview, 10.12.2012). Then he was asked whether there is opposition to waste deposits and he answered “yes, there is opposition in the local population in Ezeiza and also near the nuclear plants of Embalse in Córdoba and Atucha in Zárate; though the movements remain very local. Moreover there is a lack of knowledge of renewable energy and skepticism; a belief that renewable sources are not secure, that they are non-stable energy sources, that they are unable to replace current energy technology and that they kill birds among others reasons” (J. Casavelos, oral interview, 10.12.2012). From Casavelos’ statement it can be concluded that the belief that renewable energies are unable to replace current energy sources is widely accepted.

From the perspective of the organized government actors large hydropower, nuclear power, and (thermoelectric) gas are assumed to have the largest roles in the national mix, whereas wind is seen as a supplementary source. The role assigned to the remaining renewable energy technologies (i.e. solar, small hydropower, geothermal and biomass) seems to be completely marginal. Regarding the instability of renewable energy technologies, the nuclear engineer Baron argues this is a disadvantage presented by wind and solar energy sources.

It is possible to conclude through the conducted interviews and Energy Scenarios 2030 that leading roles assigned to hydropower and nuclear are a consequence of policy core beliefs existing since around 50 years. Entrenched policy core beliefs led to path dependency within the electricity system whereby beliefs and interests, formed in the past, have remained stable over time. In fact, one of the reasons why it is believed that hydropower should have a greater role in the electricity mix is its still large unexploited potential. The other reason, similar to nuclear energy, is that Argentina has a vast experience and, therefore, the expertise to generate hydropower. The first hydropower plant, called “Aprovechamiento Hidroeléctrico Escaba”, was installed in 1956 in the province of Tucuman.<sup>78</sup> The (immense) unexploited potential of hydropower could also be argued for wind energy. Indeed for wind energy almost all of its huge potential remains unexploited.

Apparently the country, especially the south (in the region of Patagonia), has one of the most rich wind resources in the world (Gerlach et al. 2011).<sup>79</sup> Thus, resource availability does not solely justify large hydropower plants having such a substantial role in the national electricity mix. The other prevailing argument is that although all three sources are CO<sup>2</sup> neutral; wind is inherently dispersed and unstable and a low quality energy source, hydropower is concentrated but also unstable contrary to nuclear, which is stable and its costs are proportionally low. This gives the advantage to nuclear energy (J. Baron, written interview, 11.06.2012). However, wind technology has improved a lot and currently is possible to have different types of wind turbines adapted for different wind speed levels, and through the distribution in diverse locations and the combination with other renewable sources, like solar, it is

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<sup>78</sup> Source: [http://energy.org.ar/index1\\_files/PROYARG/WWW/ELECTR~1/tucum2.htm](http://energy.org.ar/index1_files/PROYARG/WWW/ELECTR~1/tucum2.htm).

<sup>79</sup> Source: [http://www.rl-institut.de/sites/default/files/6cv.1.32\\_gerlach2011\\_pv-wind-complementarity\\_paper\\_pvsec\\_preprint.pdf](http://www.rl-institut.de/sites/default/files/6cv.1.32_gerlach2011_pv-wind-complementarity_paper_pvsec_preprint.pdf).

possible to optimize the resource, reducing its natural volatility, as shown by current studies in Germany and Europe (Gerlach et al. 2011).<sup>80</sup> The utilization of different wind turbines, adapted for different wind speeds, allows for the possibility of locating wind parks in diverse regions of the country and avoids their concentration in Patagonia. Regarding this point Spinadel points out “due to the grid’s problems, it is necessary to consider the Province of Buenos Aires rather than the south of Argentina. The south of Buenos Aires has a wind potential like that of the north of Germany. Patagonia, however, is too far from consumer centers” (E. Spinadel, oral interview, 15.11.2010).

The concerns about wind energy are brought up by groups of actors under the renewable advocacy coalition but it is not the priority of policymakers. Opposition of those living near the nuclear waste depository at Ezeiza and the three nuclear power plants remains a local phenomenon, an example of the so-called not in my backyard or *NIMBY* effect, further indicating that it isn’t a mainstream concern. According to Sabatier and Jenkins-Smith (1993, p. 5), coalitions are organized around common beliefs in core elements; which are hypothesized to be relatively stable over long periods of time (like the coalition’s members), because they are unlikely to change except when a significant external perturbation occurs (Sabatier 1993, p. 33–34). In Argentina dominant policy core beliefs of policymakers regarding fossil fuels within the electricity system have remained relatively in place, hampering the possibility of significant policy changes. However, policy attributes of large hydropower and nuclear energy could be included to different extents in the electricity system.

### **5.7.3 Research Findings**

This section will examine the two hypotheses. Among all the available options to generate electricity, policymakers support more strongly the development of large hydropower, nuclear energy and recently, non-conventional fossil fuels. Renewable energy should occupy a supplementary and secondary role in the national mix. Why have policymakers supported to different extents wind and nuclear energy goals, and why has there been little policy change? Referring to the first hypothesis (H1):

The policy core attributes of a governmental program in a specific jurisdiction will not be significantly revised as long as the system advocacy coalition that

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<sup>80</sup> Source: Ibid. 79.

instituted the program has a policy monopoly within that system. Conversely, the policy core attributes of a governmental program in a specific jurisdiction will be significantly revised if the system advocacy coalition that instituted the original program loses the policy monopoly within that system.

Policy core attributes of a governmental program have not been significantly revised because the fossil fuel advocacy coalition that established the electricity program based mostly on natural gas still dominates the electricity system. Electricity generated from fossil fuels has increased from 47% in 2003 to 64.1% in 2013 over large hydropower capacity, which has not increased and whose potential has varied considerably. However, there have been small changes in the options chosen in the last years. Renewable and nuclear energy goals have been introduced and they have received more support within the electricity system. The traditional policy monopoly began to weaken and policy core beliefs and institutional structures have started to experience a few revisions favoring nuclear and renewable energy. However, the government seems to be more attracted to nuclear and hydropower than to wind or to solar energy. As Recalde points out “renewable energy was never seen as a significant alternative to increase the security of energy supply of the country...” (M. Recalde, video call interview, 10.12.2013). Politicians and bureaucrats have been more enthusiastic about nuclear and hydropower than renewable energy because from their perspective they constitute a good option to diversify the electricity mix and achieve energy security. Additionally, nuclear technology is viewed as an option to diversify exports.

Nuclear energy is associated with the scientific, technological, and industrial infrastructure of developed countries. As such it will enable Argentina to export technology to other Latin American countries, being a regional leader, instead of just exporting traditional agricultural products. This is for example the main goal with project CAREM 25, portrayed as an adequate research nuclear reactor for transition countries. Detractors of CAREM, mostly coming from the civil society sector, think this a very expensive project and there are neither potential customers nor a market for such reactors and for them, policy beliefs that prioritize nuclear energy over renewable energy show a path dependency bias in the electricity system. Nuclear energy is a technology that has 40 years of experience, with CNEA founded in 1950 by president Peron, and wind about 20 years, founded by cooperatives. In the decision

to prioritize nuclear over renewable energy, the Ministry of Energy as long with MINPLAN and the Kirchners' administrations, bolstered an old belief of technological and industrial-growth through nuclear technology.

As Baumgartner and Jones (2009) explain a policy monopoly needs institutional structures to achieve its policy core attributes. For gas and oil there is ENARSA, and for nuclear energy there is CNEA. The first is a fossil fuel government institution but manages some administrative resources for the renewable energy sector, confirming that there is low institutional autonomy for renewable energy development. CNEA agglomerates and controls all nuclear activities and companies. As Casavelos said: "in the nuclear sector everything is centralized in only one stakeholder, the CNEA, which apart from being an official institution of the national government, constitutes just one spokesperson" (J. Casavelos, oral interview, 13.07.2012). CNEA exists to assure that nuclear policy core attributes are followed and it provides a formal "venue", the APCNEAN, for regular discussions among the actors and to defend collective interests of the nuclear sector. Also, the pertinent policy framework was set. As a consequence of the integral nuclear plan re-launched by the government, the *Nuclear Energy Act* was issued to legally guarantee the nuclear program. By the time of the economic recovery in 2006, the nuclear energy coalition, which was more established, could have greater access in the agenda definition than the renewable coalition.

In the case of renewable or wind energy neither a national agency with similar characteristics to CNEA, nor a formal venue exist. There is no a governmental body that has the exclusive aim of promoting renewable energy sources. The participation of the renewable energy advocacy coalition in national energy debates exists only in a discontinuous way; there is a lack of formal venues. They exist uniquely at the regional level. In fact, the only existing wind and renewable energy governmental actors are the CREE and the Provincial Agency of Renewable Energy, both in the Province of Chubut. There is thus more participation at the regional level in the Southern provinces, especially Chubut, and the city of Buenos Aires. In these provinces that are rich in wind resources and have a more favorable energy policy framework to promote wind energy, new investments of the local governments and international financial institutions are expected, as was mentioned before. In Chubut it was possible to create a sort of regional subsystem and establish formal actors to

promote their local projects. The renewable energy sector lacks a proper national legal and policy framework. This is an objective limitation that restricts the possibilities of finding sufficient financial support to fund wind and solar energy projects. The renewable energy policy framework has failed to provide favorable conditions to a renewable energy subsystem, except for the case of the province of Chubut. Not only most of the wind projects allocated by GENREN are situated in Chubut but also the environmental permits for the parks of Rawson and Puerto Madryn were granted quite fast and without difficulty.<sup>81</sup> In the rest of the country this is not the case.

This is the consequence of the power of the policy monopoly developed by the fossil fuel advocacy coalition and the scarce access it allows to the renewable coalition in agenda-setting processes. In the process of agenda-setting, “policy entrepreneurs fight doggedly either to push their issue toward the public agenda or to ensure that it not arrive there” (Baumgartner and Jones 2009, p. 20). The renewable energy coalition could not succeed in building an independent policy subsystem, having a low autonomy from the institutional setting established by the fossil fuel advocacy coalition, but they could have some small influence in the system. The nuclear energy coalition could succeed in creating an independent policy subsystem because they had a longer trajectory in the country. The APCNEAN, for example, was created in 1966 but it acquired legal capacity of a trade association in 2005, which assured them more access in the agenda. The reason why the nuclear and renewable coalitions were interested in having greater access is because as Baumgartner and Jones (1993, 2009) point out “in the process of agenda-setting, the degree of public indifference to given problems changes dramatically [...], it should not be surprising if periods of agenda access are followed by dramatic changes in policy” (p. 20).

That is why, in order to impede dramatic policy changes, the fossil fuel advocacy coalition has controlled the access of the hydropower, renewable, and nuclear coalitions by exerting a continued policy monopoly, but they could not avoid the penetration of some new policy core beliefs and collective interests. In the case of

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<sup>81</sup> Source: 1) <http://www.evwind.com/2010/05/17/eolica-en-argentina-aprueban-parques-eolicos-en-chubut/>. 2) [http://www.enre.gov.ar/web/bibliotd.nsf/\(\\$IDWeb\)/A53164411BA397280325799E00641DEF](http://www.enre.gov.ar/web/bibliotd.nsf/($IDWeb)/A53164411BA397280325799E00641DEF).

nuclear energy, policy core attributes regarding the significance of nuclear energy were re-established and original governmental bodies in the nuclear field became again salient. Regarding renewable energy, no specific governmental bodies have emerged but ENARSA was supposed to intervene in the renewable field, even though it has given scarce results in the sector so far. New legal regulations to foster nuclear and renewable energy were created, though weaker in the latter case than in the first. The re-establishment of policy core attributes and institutions to promote nuclear led to a small renaissance of nuclear power, and delayed a more significant deployment of renewable energy. This confirms that policy monopolies remain in place but as they are neither static, nor perfectly stable, renewable and nuclear energy goals have been able to get some attention in the public agenda leading to small policy changes in their favor. Thus, the first hypothesis is relatively strong, although there have been some minor policy changes in favor of wind and nuclear energy.

As was explained in the second hypothesis (H2), changes in policy core attributes of a governmental program (path change) in a particular system are also influenced by international policy learning. International policy learning regarding renewable energy has played a more moderate role in Argentina than in Uruguay, at least at the governmental level, as the government in the first country has dismissed the support offered by international actors such as the WB. Although the WB was at the beginning more focused on the development of renewable energy in Argentina, due to its greater international political importance, they failed to achieve this purpose. “Argentina was more willing to develop fossil fuels, and nuclear energy and they did not take the support (economic and non-economic) offered by international institutions like the WB and the AHK. After these institutions understood that Uruguay was more willing than Argentina to develop wind energy, being also a more secure country to invest in, and they decided to work more in Uruguay” (Winter, oral interview, 15.12.2012). In addition, Winter suggested that it was a good idea to support first wind energy deployment in Uruguay because this could serve as a leader example to be followed by other countries in the region, including Argentina (oral interview, 15.12.2012). By supporting wind energy in Uruguay the AHK might expect that this could boost wind energy development in Argentina, facilitating further German investments in the field.



The country's participation in different international renewable energy agreements and organizations was influential in promoting new regulations vis-à-vis the development of wind and solar energy. After the official administration decided to sign the renewable energy agreement at the Bonn Conference in 2004, Argentina adopted the obligation to formally establish a renewable energy share in the electricity mix and subsequently the country became member of the IRENA. There are also a few projects executed with the collaboration of international organizations. The GIZ for example contributes with INTI in the implementation of renewable energy projects, mainly biogas, the IDB is an active actor that has financed a 6.3 MW wind park (Diadema) in Chubut, and the FAO supports the biomass mitigation project PROBIOMASA. In the case of civil organizations, there is exchange of knowledge between Argentinean and German associations like for example the cases of The Greens with the Heinrich Böll Stiftung, AAEE with the ex-Inwent and German think tanks as well as the Argentinean-German environmental NGO Manos Verdes.

International developments influenced the initial development of nuclear energy in 1955. Following the examples of Germany, France, and Italy, Argentinean nuclear engineers learned that to accomplish relatively rapid nuclear development, it was a good idea to start importing nuclear reactors from abroad until the country developed sufficient technological capacity to produce the reactors locally. Nuclear engineers observed that although some European countries like Germany, France, and Italy began developing their own nuclear reactors, governments decided to suspend these and instead import American Low Water Reactors (LWR). When the discussion about nuclear local development versus technology import dominated the sector in the 1960s, engineers adopted a similar path as the European countries and imported reactors from Germany and Canada with the objective to follow technology transfer from these countries.<sup>82</sup> Since then, technology transfer agreements were signed with KWU-Siemens from Germany, AECL from Canada, and ANSALDO from Italy. Subsequently, Argentina gained a permanent seat in the Board of Governors of the International Atomic Energy Agency (IAEA) and became a member of the Nuclear

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<sup>82</sup> Technology transfer in nuclear energy includes equipment transfer, personnel transfer and training, and the flow of technical information. The first phase is the governmental agreement that provides the general framework within which it is possible to execute the rest of the operations and transactions (Petrunik 1985, p. 193-194).

Suppliers Group (NSG); Argentina and Brazil are the only countries in Latin America that have these permanent seats.

Apart from the first technology transfer agreements with Germany, Canada, and Italy, Argentina signed agreements with Canada, USA, France, South Korea, Russia, and China for the construction of a fourth nuclear power plant. For example, “in April 2010, a nuclear cooperation agreement was signed with Russia, and in September 2010, another was signed with South Korea. In May 2011 Rosatom and the Argentine planning and investments minister said they were discussing the possibility of joint development and construction of a 640 MWe reactor [...] In June 2012 the government signed a nuclear cooperation agreement with China, involving studies for a fourth nuclear power plant, financed by China, and a transfer of fuel fabrication and other technology” (World Nuclear Association 2014). Moreover, cooperation agreements for nuclear research were signed with India in 2010, and since the second half of the 2000s bilateral nuclear cooperation with Brazil has been intensified. The recent agreements with Brazil, Russia, China, India, and South Korea show that Argentina has increased its cooperative relations in the nuclear field with the major emerging economies. This can be explained by the stronger relationships that the Argentinean government has recently developed with the governments of these countries, especially with Brazil, China, and Russia, and by the influence of these emerging economies in Argentina.

Also, changes in policy core attributes of a governmental program (path change) are conditioned by external elements like impacts from the electricity system’s institutions; socioeconomic and technology conditions; and changes in the political balance of power. In Argentina, characteristics of the electricity generation area have negatively affected the building of a renewable energy subsystem. The steady implementation of indirect electricity subsidies has been a great barrier for renewable projects, but not for nuclear which is financed by the national treasury. Why after the recovery of the socioeconomic situation, has the government continued spending great economic resources to indirectly subsidize electricity consumption? The answer is related to the decision of the government to intervene more in the management of the electricity sector. As the government (together with private investors) began to act as one of the direct claimants of the electricity generation area, it became the direct responsibility of the domestic population and their demands

concerning the use of electricity revenues. Therefore to meet higher domestic demands and maintain political legitimacy, governments are likely to finance universal subsidies for electricity consumption (Jones Luong and Leivanthal 2010). The decision of the government in Argentina to have a greater intervention in the electricity sector has contributed to favor *quasi-fiscal* policies. The implementation of *quasi-fiscal* policies (i.e. frozen and distorted electricity prices, and indirect subsidies) has established a closed structure in the electricity system that has affected the viability and feasibility of policy options fostering renewable energy development. The electricity system became closed and quite path dependent, favoring more state financed activities like nuclear.

It is very important to consider the influence of the socioeconomic context. Socioeconomic changes can undermine the causal assumptions of present policies or alter the political support of various advocacy coalitions (Sabatier 1993, p. 22). In Argentina, the socioeconomic crisis triggered in 2001–02 contributed to the instability of the electricity system and affected negatively wind energy projects initiated by the cooperatives of the Southern Argentina. During the crisis in 2002, the devaluation of the Argentinean currency in relation to the US Dollar undermined the purpose of Law No. 25019, which set a feed-in premium tariff in Argentinean peso, and the wind energy cooperatives of the south lost their economic resources, being forced to halt their projects. Nuclear energy projects were affected because the state as a financial entity could not invest in the sector. Only after the economic recovery in 2005 was the state more able to re-launch the nuclear plan with public funds.

The rapid increase in electricity demand, caused by the strong economic growth, provoked a shortage of electricity supply in 2004. In response, a decision was made to set ambitious nuclear and also hydropower goals to increase significantly electricity supply capacity. Wind energy was considered insufficient as a primary source to meet high domestic demand. The prevailing view is that renewable energies can play little role in the electricity mix but they are not enough to cover large electricity demand. Both socioeconomic events have been a factor behind the introduction of only weak renewable energy goals.

Since the Kirchners entered into office for the first time in 2003, a nuclear plan has been pursued. CNEA and NASA's ambitions were accelerated and MINPLAN together with the Secretary of Energy supported these ambitions.

Kirchnerism, which is rooted in traditional Peronism, defends more nuclear than renewable energy. No political party in Argentina is clearly antinuclear. Peronism supports more nuclear energy than for example the Radical party. As Carasales (1999) points out “most of the Radical leaders were more lukewarm in their support of nuclear activities than the Peronists. Many of them felt that the priority accorded to the nuclear program was not justified; that Argentina did not need, at least not at that time, nuclear electricity plants...” (p. 57). Certainly the precarious economic circumstances of the day contributed to this attitude. But in any case, traditional peronists have shown themselves fervent admirers of nuclear energy due to their nationalist eagerness for more sovereignty and independence. Kirchner’s government has repeated in many occasions that nuclear energy will enable Argentina to develop highly qualified domestic human resources and strengthen technological development to join the list of developed countries that are leaders in nuclear energy. Significant political debates are missing, except for the case of NGOs and local movements, even after accidents like Fukushima. Although Fukushima was covered by the media, it can be observed that in general nuclear issues are not extensively discussed in the media maybe to avoid political debates. As Baumgartner and Jones (1993, 2009) point out regarding technical issues when “attention increases (whether positive or negative), public acceptance decline. For the nuclear industry [...] the adage ‘No news is good news’ could not ring more true” (p. 64).

Renewable energy was also favored by the Kirchner administration. A renewable energy law was issued and goals were introduced, privileging wind. As it was mentioned before, this position is related with peronism’s ideology that means a mix of tradition and innovation. It remains an open question about what is going to happen after the next presidential elections in 2015 and whether the same policy direction will be followed. The most likely scenario is that both nuclear and renewable energies will be fostered and it is possible that renewable energies will be more strongly promoted than they are now (as for 2014).

The next section will summarize the most important factors that led to the setting of weak renewable energy goals and stronger nuclear goals in the process of agenda-setting. The barriers to and requirements for successful development of renewable energy will be addressed.

#### 5.7.4 Preliminary Conclusions

In this chapter, the main conditions that affect the deployment of renewable and nuclear energy were identified as the increased intervention of the government in the electricity system, the implementation of subsidies for electricity consumption, economic growth, the energy crisis, the three-government periods of kirchnerism, and the international developments tied to renewable energy. These conditions have affected the renewable energy goals introduced in Argentina as well as the relaunch of the nuclear program, allowing a limited access of the renewable advocacy coalition and helping the nuclear advocacy coalition to have more access in the electricity system.

But not all the aforementioned conditions were equally significant in the policy changes that were seen. Facing the energy crisis, actors considered diverse possibilities to develop their own energy capacity and reduce their dependence on fossil fuels imports, so as to boost energy security while also increasing technological autonomy. One of the main concerns was the need to continue producing energy aimed to generate more economic activities and thus higher economic development. Public debates to discuss different energy alternatives were completely absent and even the national energy plan remains officially undisclosed. Politicians and bureaucrats exercised great discretion in their energy choices—nuclear and renewable—arguing that they were under great pressure. As Jasper points out “with a controversial issue like nuclear energy, the decisionmakers in each country were anxious to claim they had little choice of policy [...], although in the mid-1970s all three elites had exercised a great deal of discretion” (p. 264).

By the time of the electricity crisis, there were already indirect subsidies for electricity consumption that favored conventional energy sources and not renewable energies. Non-direct electricity subsidies were (for political reasons) discretionarily maintained over the years, even in a context of economic growth. This element restricted significantly the development of renewable energy but did not affect nuclear energy as it is financed by the state. The second element is the kirchnerist energy policy, which encouraged principally fossil fuels and then nuclear power and as a secondary source wind projects. Finally, the international context has certainly influenced taking initial steps towards nuclear and renewable energy, being a factor that accounts for some of the changes in the governmental program. Cooperation

agreements for technology transfer have been very important for nuclear energy development. For renewable energy, international learning was crystallized by the agreement signed during the Bonn Conference, resulting in the first renewable energy goals set in the public agenda. Although the influence of the international context was not as relevant as to significantly revise the governmental program, it had an impact on the addition of renewable and nuclear energy goals in the process of agenda-setting.

As a conclusion, the policy monopoly held by the fossil fuel advocacy coalition has been weakened due to two reasons. First, there is a motivation to avoid potential conflict with the renewable and nuclear energy coalitions and project an open and modern image. Renewable and nuclear power regulations promoted in the country were influenced by their respective coalitions, including actors from both the national and regional levels (i.e. CREE and Provincial Agency of Renewable Energy) in the case of renewable energy; policymakers cannot dismiss changes in the social structure due to the emergence of interest groups with political resources (Sabatier 1993, pp. 25–27). The other reason was the contribution that renewable and especially nuclear energy can have for technological development. The latter was the main policy belief that oriented policymakers to re-launch nuclear in the first place and introduce wind power in a secondary position. In the table below a summary of the elements explaining renewable energy development is presented.

**TABLE 5.5. ELEMENTS OF RENEWABLE ENERGY POLICY PROCESS**

<b>Elements</b>		<b>Characteristics</b>
<b>Advocacy Coalitions' Policy Monopolies</b>	Policy Core Beliefs	Satus-quo and dominant policy core belief in fossil fuels' sources (conventional and unconventional) & large hydropower with a supplement of renewable energy = Path Dependency with small policy changes.
	Energy Policy and Legal Framework	Energy policy & legal framework is shortsighted, and unstable. Policies & legal regulations to foster new energy sources fail. Economic risks for private investors.
<b>International Policy Learning Process</b>		The relationship with international actors contributes with international policy learning in renewable energy and nuclear. Potential international learning from the South American region.

**SOURCE: AUTHOR.**



## 6 Case Study: Uruguay

### 6.1 Introduction

The development of renewable energy in Uruguay started only a few years ago, and like many other developing countries, the principal reasons were in order to face the rapid increase in energy demand and to reduce dependency on fossil fuel imports. Unlike Argentina, connecting rural and peri-urban areas to the grid was not a relevant issue because the country has one of the highest electrification rates of Latin America (98.7%).

Additionally there was a depletion of large hydropower capacity due to a rapid increase in energy demand and a reduced availability of fossil fuels imports from Argentina. Therefore, in recent years the administration decided to diversify the national electricity mix, promoting non-traditional and domestic energy sources. Indeed, beginning in 2008 with the approval of a long-term national energy policy Uruguay started to set up a general and common framework supporting the deployment of renewable energy sources. In particular, one of the short-term goals is to achieve 15% non-traditional renewable energy source generation (i.e. wind, biomass and mini-grid hydropower) by 2015. It should be highlighted that although wind, biomass and mini-grid hydropower are promoted at the same time, the Energy Policy 2005–2030 gives a priority to wind energy. In fact, the established goals for 2015 fix the incorporation of wind power at 300 MW of the electricity generation, whereas biomass is set at 200 MW. In order to accomplish those goals the administration implemented a competitive auction scheme for wind energy through three calls for tender in 2009 and 2011, respectively (Decreets 403/009<sup>83</sup>, 159/011<sup>84</sup> and 424/011<sup>85</sup>). From a total of 987.8 MW of wind projects allocated (through the three bidding requests) between 2010 and 2012, about half of them have been constructed as of the beginning of 2015.<sup>86</sup> The decrees that regulate the auction scheme provide tenders with a fixed price for 20 years through purchase agreements. Due to the delay in the execution of the wind projects, in 2012 there were just five wind parks (four large and one small of 1.8 MW) connected to the national grid with a total capacity of about 52.5 MW, representing 2% of the electricity installed

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<sup>83</sup> Source: <http://www.energiaeolica.gub.uy/index.php?page=Convocatoria-2010>.

<sup>84</sup> Source: <http://www.energiaeolica.gub.uy/index.php?page=Convocatoria-2011>.

<sup>85</sup> Source: [www.energiaeolica.gub.uy/index.php?page=Convocatoria-2011-complementaria](http://www.energiaeolica.gub.uy/index.php?page=Convocatoria-2011-complementaria).

<sup>86</sup> Note that the information provided here is as of April 2015. There are some wind parks projected to be in operation during 2015 that are still “under construction”.



capacity, while for biomass the total installed capacity was about 232.7 MW, representing 9% of the electricity installed capacity.<sup>87</sup> Yet in 2014 the total installed capacity increased to 473.6 MW, as more than 400 MW were constructed during this year (DNE - MIEM 2014).

In relative terms renewable energy is more significant in the Uruguayan electricity mix than in Argentina's. Likewise, Uruguay has a long-term energy policy and an adequate regulatory framework that helps to promote foreign investment in the domestic renewable energy market.

However, Uruguay faces a lot of challenges in the development of renewable energy. Therefore, the aim of the first part of the chapter is to explain the policymaking process in relation to the decisions of the electricity system; identifying its actors and advocacy coalitions; their main fundamental positions; debates about roles of different electricity sources, especially renewable and nuclear energy since the mid 1990s; the legal framework fostering renewable energy as well as looking at the current national energy and electricity mix and at the current state of and goals of renewable and wind energy in the country. In the second part of the chapter I will explain the factors that have facilitated and constrained the development of renewable and nuclear energy and I will consider the hypotheses presented in chapter 2.

## **6.2 Political System**

Before further explaining the coalitions' most relevant milestones, the members who comprise the coalitions, how they interact with each other and other groups, the main public policies they support are analyzed here. It is essential to look at Uruguay's political and institutional framework in a historical context. In contrast to the dominant political parties of Argentina, the dominant political parties in Uruguay did not unilaterally take all public decisions concerning national energy policy. That's because of the institutionalized party structure and a tradition of strong representative democracy, which does not seek to exert absolute political power but rather an open public debate between different political parties at different intergovernmental levels.

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<sup>87</sup> Source: DNE - MIEM (2012)  
[http://www.dne.gub.uy/documents/15386/0/Folleto\\_BEN\\_2012\\_ingles.pdf](http://www.dne.gub.uy/documents/15386/0/Folleto_BEN_2012_ingles.pdf).

Uruguay, like other South American countries, is a young democracy, which between 1973 and 1985 was interrupted by a period of authoritarianism. But, in contrast to Argentina, dictatorship represented an exceptional deviation of the traditional Uruguayan democracy. Uruguay, together with Chile, is characterized by an institutionalized pluralism with control mechanisms that limit ambitions to change the system. Since the consolidation of democracy in 1985, all political parties (e.g. Red Party, National or White Party, and Broad Front) have won elections; alternating the exercise of power, reflecting the maturity of the democratic system (Roberts 2008). The current dominant left political party is, compared to *Peronism* in Argentina, an institutionalized coalition operating in one of the most consolidated democratic regimes of South America, similar to some parties operating in Europe where there are opponents on the more center-right side (Lanzaro 2001 and Roberts 2008). Since 1985 Uruguay has been one of the most politically stable countries in the region as well as a very good example of democratic policy learning (Costa Bonino 2000).

There is a historical reason behind the political stability achieved in Uruguay. Unlike almost all the rest of South American countries, the country experienced early modern political reforms driven by José Batlle y Ordóñez (1903–07 and 1911–15), during his two administrations but especially during the second term of office. As was mentioned in chapter 4, President Batlle y Ordóñez promoted labor reforms (i.e. the eight-hour workday and unemployment compensation), limited the profits of foreign-owned businesses, integrated migrants (mostly European) in the education system, nationalized public companies, strengthened the secularization of the state, reinforced middle classes and fostered women's social rights. This has set a political system with strong democratic institutions based on a solid bipartisan system represented by the Red Party and the White Party. However, democratic institutions were interrupted in 1973 under the Juan María Bordaberry administration (1972–1973), beginning a period of dictatorship. The military dictatorship was the consequence of a representational crisis that occurred “as a result of the threat to the traditional values of co-participation and the harshly repressive regime of President Pacheco and as a result of the discontent spawned by an economic recession that the traditional parties seemed unable to correct” (Costa Bonino 2000, p. 75). The discontent favored the founding of the Broad Front in 1971 that ended with the bipartisan system. The

emergence of a new political party signified weak parliamentary support for President Bordaberry who “treated Parliament as if it were also a subversive element. The deterioration of the political situation ended in the *coup d'état* of 27 June 1973” (Costa Bonino 2000, pp. 75-76). Along with the dictatorship of Argentina, there were many political prisoners and many went in exile abroad.

But it was after the return of democracy that the Broad Front was effectively settled as a significant political force, through an agreement (“*Pacto del Club Naval*” [1984]) and subsequent law (“*Ley de Caducidad*” [1986]). Therefore, the transition towards a democratic regime (1980–1985) and the first government of President Julio María Sanguinetti (leader of the Red Party) from 1985 to 1990, were based on a cooperative and competitive process between the three parties (Lanzaro 2001). The two-party system was replaced by a multiparty bipolar structure, due to the rapprochement of the two traditional parties and the divergent position of the Broad Front. During the three periods since the return of democracy (the two periods of Sanguinetti and the one of Luis Alberto Lacalle), presidents have taken special care to avoid conflicts among the different governmental branches, to negotiate parliamentary support, and to accept the end of the bipartisan system; the latter through a process of democratic learning (Costa Bonino 2000, p. 76). Thus, in 1990 the Broad Front started to govern Montevideo, which being the capital of Uruguay is the stronghold of the party. In 2005 they won, for the first time, the presidency of the country with the election of Tabaré Vázquez (2005–2010), followed by the election of the current president José Mujica (2010–2015).

Noteworthy is that the Broad Front, originated within traditional Latin American socialist ideology, has moderated its position after the democratic transition; abandoning its more extreme objectives and adopting liberal democracy as the institutional paradigm in order to preserve civil liberties by taking part in the political debate. Its leaders have tempered their views of neoliberal ideology and accepted the global integration of markets. Some authors have suggested that the Broad Front represents a *post-marxist* left position that has a lot in common with European social democratic ideology (Roberts 2008). The rapprochement of the two traditional parties and the ideological recalibration of the Broad Front have resulted in a political environment characterized by moderation and cooperation. During each administration the presidents have sought to create compromise and consensus among

the four political parties as well as to strengthen democratic institutions. They have attempted to include all social sectors in the relevant political debates.

This is reflected in the political identity and the policy style of Uruguay: the constant use of referenda as political instruments in the search for national consensus. Costa Bonino (2000, p. 81) explained this noting “three basic problems have been generated in Uruguay by the use of the referendum: 1) the polarization of society, 2) the blocking of government work, and 3) the devaluation of Parliament”. These difficulties, continues the author, “seem particularly alarming in a country such as Uruguay, in which the most vulnerable components of democratic legitimacy have traditionally been low political productivity and political gridlock” (Costa Bonino 2000, p. 82).

Among the most significant and controversial referenda held in the country are those ratifying the 1987 amnesty law<sup>88</sup> (in 1989 and 2009) and, specifically important for this study, the referendum of 1996 aimed to invalidate the energy and electricity liberalization and privatization laws. Due to the general wave of privatization in Latin America following the “Washington Consensus”, which was based on the suggestions from the World Bank (WB), the International Monetary Fund (IMF), and the U.S. Treasury Department, a partial liberalization and privatization of the public utility companies was considered during the presidencies of Lacalle and Sanguinetti. The plan was to end the monopoly of the state-owned National Administration of Power Plants and Electricity Transmission (UTE) as well as partially privatize the National Administration for Fuels, Alcohol and Portland Cement (ANCAP). Unlike in Argentina, there was a referendum in Uruguay in 1996 asking the population whether they agreed with the privatization of ANCAP and liberalization of the electricity market. The public voted down the measures for both companies. ANCAP remained state-owned. The ANCAP law that “opened the market for refined petroleum products, which eliminated ANCAP’s monopoly in the refining and distribution of these products, and which made it possible for private capital to come into the public enterprise, was overturned by a referendum that was initiated by ANCAP’s employees” (Bergara et al. 2005, p. 11).

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<sup>88</sup> The amnesty law dubbed the “Expiry Law” granted an amnesty to the military officials for their eventual crimes against humanity during the dictatorship of Uruguay until the 1st. March 1985. In 2011 a law that repealed some articles of the amnesty law and qualified the military crimes as crimes against humanity was issued.

In the case of UTE, despite the referendum, the electricity market was partially liberalized. In 1997, a new law concerning the regulatory framework for electricity (No. 16832) was passed under the second non-consecutive administration of Sanguinetti. Since then, the generation and sale of electricity has been partially liberalized and UTE technically no longer holds a monopoly over electricity generation. When interviewed, a private wind energy developer confirmed, “the law had a lot of adversaries that completely and utterly opposed it. Now some of those same people belong to the government and direct UTE as well as the DNE” (S. Vázquez from La Estrellada, oral interview, 18.12.2012). The fact that the law has had powerful opponents explains why in practice UTE has continued to be responsible for a large amount of generation, even though electricity production was partially liberalized.

From the examples of ANCAP and UTE, it is clear that the Uruguayan democratic tradition, except for the period between 1973 and 1985, is quite well established and some political practices, like the frequent use of the referendum, reinforces the democratic character even more. Whereas external forces heavily influenced other countries in South America during the privatization period, Uruguay applied its reforms with very distinct priorities, which the IFIs ultimately respected (Brooks 2004, p. 76).

It is possible to affirm that democratic institutions are relatively stable and transparent, which puts domestic policymakers in a better position to more openly discuss political decisions that affect policymaking processes, like that of the electricity system. However, there is also criticism concerning the frequent use of the referendum as a political mechanism whereby laws, approved by Parliament, are challenged by citizens. To Bonino (2000) the use of the referendum “threatens to depreciate the specific functions of Parliament by perpetuating the myth of direct democracy and the idea that it is better to legislate through the electorate than through representatives [...] It is also true, however, that the political space ceded by Parliament and the emergence of civil society have also been instrumental in generalizing this political tool that was conceived constitutionally as an exceptional course of action” (p. 82). Thus, it is not clear enough whether it is really about a devaluation of the functions of Parliament or if it is more about the strengthening of civil society and the transfer of political responsibility to it by Parliament, or both.

Yet the impact of the constant use of referenda on the polarization of Uruguayan society concerning sensitive issues (i.e. public utilities' privatization vs. nationalization, human rights, among others) is undeniable.

Referenda, plebiscites, and consensus-making conferences have been used quite often in the country. They have facilitated the achievement of consensus in some significant political areas relating to the return of democracy, the ownership structure of some public utilities, and the implementation of nuclear power, among others. On these issues this consensus has generally (except in the case of UTE) been respected. There is a general consensus in the country on the importance of keeping public services in state-owned companies and controlling as much as possible their partial liberalization. From the perspective of Bergara et al., “what is more consensual is the use of these monopolies (UTE and ANCAP) as strong contributors of resources to the treasury. This promoted some efficiency improvements in the state-owned companies but implies an obstacle in the process of liberalization of the utility markets” (2005, p. 11). In addition, Vázquez from La Estrellada said, “the Uruguayan state has a strong presence, which works together with the private sector and is never absent” (S. Vázquez, oral interview, 18.12.2012).

The examples of UTE and ANCAP highlight the relative stability and transparency of political and democratic practices in the last two decades, which may have had a positive influence on the building of the electricity system. Important for stability have been the stable energy policy framework and adequate fiscal activities related to the energy sector. These conditions have facilitated the strengthening of the electricity system with regard to the search for alternative solutions—new policies—that fostered renewable energy technologies. To explain how and why renewable energy was developed against nuclear power, it is essential to identify who the main actors were together with their policy core beliefs, and their relationship with foreign actors since 1997. The main focus of the electricity policymaking, however, is between 2003 and 2014 with updated data on renewable projects up to early 2015.

### **6.3 Analysis of the Uruguayan Electricity Policy System**

According to the Advocacy Coalition Framework of Sabatier (1987), systems or subsystems normally contain a large and diverse set of actors who come from

different organizations. These actors may aggregate into a number of advocacy coalitions, based on their shared normative and causal beliefs as well as long-term interests. Advocacy coalitions attempt to translate their causal beliefs and common long-term interests into governmental programs (Sabatier and Jenkins-Smith 1993). In Uruguay there are diverse advocacy coalitions; one of the most dominant is the large hydropower coalition, which since the two oil crises has dominated the electricity system. Hydropower is variable because it depends on climate conditions; thus it has always been supplemented with fossil fuels. Both sources complement each other, in the sense that when hydropower reduces its contribution, then the electricity produced from oil and its by-products increases. Fossil fuel and large hydropower coalitions have cooperated closely in the electricity system to maintain a stable electricity supply.

The weaker competing advocacy coalitions are the nuclear and the renewable energy coalitions. But, unlike Argentina where the nuclear energy coalition has a (small) participation in the electricity system, in Uruguay it is possible to identify an advocacy coalition that is strongly against nuclear power and in favor of renewable energy. This coalition has succeeded in sidelining the nuclear coalition. Already in 1997, under the Sanguinetti administration, Article 27 (within Law No. 16832) forbidding nuclear power use within the country and limiting its import was issued.<sup>89</sup> However, it was not until 2005, after the great electricity supply shortage in Uruguay, that government authorities explicitly proposed to develop renewable energy sources. Here, the pro-renewable energy and anti-nuclear coalition is referred to as the “Renewable Energy Coalition” because since the early 1990s it has opposed the installation of nuclear power plants and supported the introduction of renewable energy together with the reduction of fossil fuel demand. The renewable energy coalition began to build their policy subsystem in the electricity system in 2008. The opposition coalition referred to here as the “Nuclear Energy Coalition” corresponds to the minority view within the electricity system. Since 2005 its members have tried to nullify Article 27.

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<sup>89</sup> The Law No. 16832 is generally called the anti-monopoly law because the generation, commercialization and marketing of the electricity were liberalized, limiting the electricity monopoly of UTE.

### **6.3.1 Composition of the Advocacy Coalitions and Policy Beliefs**

There is a coalition that strongly supports renewable energy sources in order to diversify the national electricity energy mix with domestic sources; these are in order of importance: 1) wind power and biomass, 2) small-scale hydropower, 3) and finally solar power. The renewable energy coalition focuses mainly on wind energy and biomass which are the principal energy sources in the national electricity mix. There is also some attention to small-scale hydropower and solar power.

The nuclear energy coalition has tried to push for nuclear energy since 2005. Their members support firstly nuclear power and secondly renewable energy sources as a way to supplement the diversification of the energy mix. The use and production of electricity from nuclear energy was considered and debated under the Vázquez administration in 2005 but since 2010, during the Mujica administration, it entered in a period of stasis. At present, the nuclear energy coalition does not seem to have strong support, a fact that was reinforced by certain international events like Fukushima.

In order to have a clearer understanding of the central actors that make up the Uruguayan electricity system, the actors of the nuclear energy coalition and the renewable energy coalition as well as their principal policy core beliefs will be outlined below.

- **Renewable Energy Coalition**

The renewable energy coalition has acquired much governmental support and is composed of both governmental and non-governmental actors. The relevant governmental actors include parliamentarians and ex-parliamentarians in the Congress from the Broad Front like Ramón Legnani, Humberto González Perla, and Eleuterio Fernández Huidobro as well as some from the Red Party like Daniel García Pintos; the National Directorate of Energy (DNE), with its director Ramón Méndez, that is part of the Ministry of Industry, Energy and Mining (MIEM); the public electricity company National Administration of Power Plants and Electricity Transmissions (UTE), especially the current president Gonzalo Casaravilla, the vice-president César Briozzo and the generation manager Oscar Ferreño; the Uruguay Wind Energy Programme (UWEP) (from Spanish “Programa de Energía Eólica en



Uruguay”) and its coordinator Daniel Pérez; and, the project PROBIO for biomass. Interestingly, the Director of Energy, Ramón Méndez, has a doctoral degree in nuclear physics but afterwards became an advocate of renewable energy.

The relevant non-governmental actors include: Engineering Faculty with the Engineer José Cataldo (University of La República [UDELAR]); the academic group focusing on economic development and energy transition at the Faculty of Social Sciences with Professor Reto Bertoni (UDELAR); domestic and foreign partnerships of wind energy developers (i.e. SEG Ingeniería and La Estrellada); the “Deutsch-Uruguayische Industrie- und Handelskammer” or German-Uruguayan Chamber of Industry and Commerce (AHK Uruguay) with its managing director Tobias Winter; the Spanish Agency for International Cooperation and Development (AECID); the Uruguayan Wind Energy Association (AUdEE); the Uruguayan Network of Environmental NGOs that released a DVD named “Nuclear Energy for Uruguay?” executed by the energy accidents expert, engineer Enrique Muttoni; the NGOs CEUTA (founded in 1985) REDES-Amigos de la Tierra, and Eco-Tacuarembó.

The Coalition’s policy core beliefs stressed strategic decisions aimed at increasing energy sovereignty, providing universal access, and protecting the environment and human safety by (1) increasing energy security and sovereignty through reducing the dependency on imported electricity from Argentina, Brazil, and other possible foreign providers; (2) achieving more cost-efficient and affordable electricity prices; (3) protecting the environment as well as human health of present and future generations by hindering any possibility to develop nuclear energy and instead exploiting domestic non-traditional renewable energy such as wind energy, biomass, small-scale hydropower, and to a lesser degree photovoltaics; and by (4) promoting energy efficiency.

- **Nuclear Energy Coalition**

The more traditional and conservative actors within the “Nuclear Energy Coalition” have tried to repeal Article 27 of Law No. 16832, approved under the Sanguinetti administration, concerning the prohibition of nuclear power and, therefore, promote above all nuclear power as a primary energy source. This Coalition is comprised of a few allies in the Congress coming especially from the opposition National and Red parties. In the Red Party the segment called 15<sup>th</sup> list, which is composed by the ex-

president Jorge Batlle and the ex-Director of Energy under its administration Alvaro Bermúdez, manifested their strong political support for nuclear energy during the public debates of 2005–2010. From the National Party, the politicians that had an active role supporting nuclear energy were Senators Sergio Abreu and Walter Campanella.

In the Nuclear Energy Coalition there are also researchers belonging to the Department of Science and Engineering at the UDELAR and engineers like Ariel Joubanoba that work as advisors to opposition legislators. A well-known journalist, Carlos Maggi, who is also a lawyer and history professor, represents one of the greatest advocates of nuclear power. He has written a lot of articles in the national conservative newspaper *El País*, supporting nuclear power in Uruguay. In one article he wrote, “we are aware that Uruguay has exhausted its hydro resources and that it does not have coal, gas or oil. Thus the country has only one option in order to be a highly productive country, that is, abundant, cheap, and constant electricity (Abundante, Barata y Constante [ABC] in Spanish)” (“Reactores y reaccionarios”, in *El País* 22.07.2012).<sup>90</sup>

The Nuclear Energy Coalition's belief system stressed domestic energy security based on (1) promoting nuclear power by repealing Article 27 of the Law No. 16832 which forbids nuclear energy; (2) increasing the energy security by reducing electricity dependency on Argentina and Brazil; (3) increasing significantly energy supply capacity and achieving cost-efficient electricity by generating huge amounts of constant energy via nuclear power and (4) promoting renewable energies like biomass or wind as a supplement to nuclear.

### **6.3.2 The New Regulatory Framework (1997-2002)**

In 1997 the new regulatory framework for the electricity sector (No. 16832) was issued. It established that “the activity of generation is not a public service and it will be considered a free activity that ‘will be possible to be carried out by any agent including its total or partial commercialization to third parties’” (RNLD 1997, found in Bertoni 2010, p. 149). The law imposed the creation of the Regulatory Unit of Electric Power (UREE), later dubbed URSEA, and a non-state body called Electricity Market Management (ADME) (Bertoni 2010, pp. 149-150).

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<sup>90</sup> Source: [http://historico.elpais.com.uy/12/07/22/predit\\_653242.asp](http://historico.elpais.com.uy/12/07/22/predit_653242.asp).

One of the particularities of the regulatory framework for the electricity sector was the prohibition of nuclear activities (Article No. 27) that resulted from the demands of environmental NGOs as well as some legislators that opposed nuclear energy (i.e. Ramón Legnani, Humberto González Perla, and Daniel García Pintos). In fact, during the parliamentary discussions about the new electricity law the Uruguayan Network of Environmental NGOs worked actively with some legislators (one of the most relevant was Legnani from the Broad Front) for the legal ban of nuclear energy activities. The involvement of environmental NGOs in the nuclear issue started with the nation-wide mobilizations occasioned in 1992 due to a previous agreement between President Sanguinetti and the government of Canada promoting nuclear technology transfer and enabling the installation of a nuclear reactor in the municipality Paso de los Toros. The agreement was supposed to be ratified in 1992 when several protests “were held across the interior of the country and in Montevideo, drawing as many as 6000 people in the central city of Paso de los Toros, and resulting in enough pressure for the project to be shelved” (Renfrew 2007, p. 117). Also at that time, the legislators Legnani and González Perla introduced a bill in Parliament to declare the territory of Uruguay a nuclear-free zone, being a legal precedent for the later prohibition of nuclear activities in 1997 (No. 2379/1992).<sup>91</sup>

The Chernobyl nuclear accident in 1986 had probably influenced the great opposition to the nuclear project, which was originated by grass-roots movements with the support of several environmental NGOs (e.g. REDES-Amigos de la Tierra, Eco-Tacuarembó). The other reason for the protests might be the progressive “greening” of the country. Indeed, Daniel Renfrew (2007) points out that since the early 1990s Uruguayan society began a progressive “greening” with the emergence of diverse environmental movements related to the modernization of the country and the participation in the 1992 United Nations Conference on the Environment and Development (Rio Summit).

Two events converged in the late 1990s to spark the interest of UTE in renewable energy. First, the engineering faculty of UDELAR along with engineering

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<sup>91</sup> Source:  
<http://www.parlamento.gub.uy/repartidos/AccesoRepartidos.asp?Url=/repartidos/camara/d2000040084-00.htm>.

professor César Briozzo (currently the vice president of UTE)<sup>92</sup> were investigating wind energy technology with the purpose to develop a wind energy pilot project. In 1998 they could finally obtain funding from the Inter-American Development Bank Science and Technology Council (IDB-CONICYT) and UTE to install a wind turbine from the German company Nordex (Model N27) with about 150 KW. “This was the first industrial wind power generation directly connected to UTE’s network and also one of the most significant wind experiments of Latin America at that moment” (T. Winter, oral interview, 15.12.2012). The Nordex wind turbine was installed on the Sierra de los Caracoles in the Department of Maldonado, the same area where ten years later UTE set up the wind park Los Caracoles (Ingeniero Emanuele Cambilargiu). The Nordex wind project also appealed to private investors. As Vázquez noted, “after the Nordex experiment, private companies started to become interested in large-scale wind energy projects. Indeed, the first official call for tenders in 2006, in which some German wind energy companies took part, succeeded and the first allocation was finally given to an Argentinean entrepreneur. This was the first private wind farm for the 2006–2008 period” (S. Vázquez, oral interview, 18.12.2012).

Second, liberalization of the electricity market had an important effect on the emergent renewable energy market. After the law was issued the state-owned company UTE lost its monopoly in electricity generation and private companies were allowed to generate and sell electricity. “From this moment [after it was financed the pilot wind turbine] UTE came up with the idea to promote private investments to generate energy from renewable energy sources” (S. Vázquez, oral interview, 18.12.2012). As Reto Bertoni (2010) explains, it is important to highlight that despite the new regulation, the electricity market continued to be controlled by UTE until the late 2000s when new generation projects in the renewable energy field emerged, confirming the importance for this sector.

The engineering faculty from UDELAR and UTE were the first actors that made it possible to have a wind turbine in the country and were both fundamental actors in the initial deployment of renewable energy. Of course the circumstances of

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<sup>92</sup> César Briozzo holds a Master of Science in electrical engineering from the Chalmers University of Technology in Göteborg, Sweden (graduated 1981). Afterwards, he worked there for a couple of years evaluating systems for small-scale wind turbines. He has been the vice president of UTE since 2010 (since the administration of Mujica).

the day influenced the decision. Uruguay had at that moment the problem that electricity supply could not keep up with demand due to three fundamental reasons. First, Uruguay was experiencing substantial growth in electricity demand due to the relatively high economic growth that began in 2003. Second, Argentina, as it was explained in chapter 5, had a major natural gas shortage that affected seriously the electricity sector of Uruguay because of the agreements with Argentinean generators. Third, one of the main concerns for policymakers was that hydropower plants were all operating at maximum capacity. In respect to hydropower, Uruguay has a long history typified by four large hydropower plants: Gabriel Terra, Baygorria, Palmar and the binational project at Salto Grande together with Argentina. These plants have provided an important share of energy and their limited capacity to meet greater electricity demand exerted pressure on policymakers to supplement large hydropower plants with small-scale plants.

As the coordinator of the UWEP, Daniel Pérez, explained, “in the 1990s a liberal wave with the model of ‘the auto regulation of the market’, was introduced in the region and continued in Chile. Apparently, at that moment Argentina experienced overproduction and very good prices for natural gas. We have a very strong electric interconnection with Argentina and it was decided not to invest in electric generation in Uruguay, but rather to sign agreements with Argentinean generators. When these failed, we went into a critical situation because our demand was high and growing, and we had not invested in electrical generation for 14 years, between 1991—the year the thermoelectric power station at La Tablada with 220 MW opened—and 2005. So, after the urgent demand was met in 2005 through the thermoelectric station Punta del Tigre with 240 MW, a plan for a growth in electricity generation was proposed, mostly based on the development of domestic and non-traditional renewable energy sources” (D. Pérez, written interview, 07.06.2011).

The non-traditional renewable energy plan, dubbed *Energy Policy 2005–2030*, was possible due to the program Uruguay Technological Prospective 2015 and the subsequent Advisory Social Committee - Energy Roundtable. The program Uruguay Technological Prospective 2015 was developed through an agreement between the national administration and the United Nations Industrial Organization (UNIDO), and was coordinated by the Engineering Faculty of the UDELAR that was responsible of the final report. “The purpose was the realisation of a study to provide a diagnosis

and prospective for the energy sector. The strategy was the organization of several meetings and panels with the participation of experts from different areas of the energy sector. The final report emphasized the vulnerability of the Uruguayan energy sector, and the need for instruments aimed to achieve an efficient integration with neighbour countries, the supply security, the consumption efficiency, and the development of alternative energy sources. Also it was proposed the establishment of an interdisciplinary energy group” (Uruguay Presidency and UNIDO 2002, found in Bertoni 2010, p. 2). This proposal was crucial because it begets the Energy Roundtable in 2003.

### **6.3.3 Searching for Alternatives: The Years of Electricity Shortage (2003-2014)**

The Energy Roundtable was executed in the framework of the Advisory Social Committee of the UDELAR, which was created in 1999 to analyze and address different political, economic, and social problems. The participation in the Energy Roundtable initiative included a wide spectrum of actors coming from the UDELAR, UTE, ANCAP, Association of Industrial Energy Consumers, Association of Chemical Engineers, Association of Engineers, local governments, private companies, and the NGO CEUTA. One of the representatives of the UDELAR was the engineer Gonzalo Casaravilla, who in 2010 became the president of UTE. The report included the energy problems and challenges faced by Uruguay, the opportunities, barriers and potential of renewable energy sources to be developed in the coming years, and the possibility to consider nuclear energy in the future but only when new technologies to use this energy become available. Finally, it presents the possible future scenarios from 10 up to 30 years, starting from 2004 (Advisory Social Committee - UDELAR 2003). The final report of the Advisory Social Committee was completed in 2004 and it supplemented the report of the program Uruguay Technological Prospective 2015 created by the Engineering Faculty in 2002 (Bertoni 2010). This was the direct predecessor of the *Energy Policy 2005–2030*.

Between 2004 and 2010 when the electricity scarcity became very problematic and policymakers began to search for alternatives, legislators of the different political parties (especially Red and White parties) started to think about nuclear energy to diversify the national energy mix and bring about energy security. The debate was opened to multiple positions from different actors, including the four political parties

and the citizenry. At the beginning, the position of President Vázquez from the Broad Front was in favor to nuclear and he said in many occasions that he was considering the possibility to develop nuclear energy. But later on, Vázquez's position became more ambiguous. He did not openly reject nuclear energy, but neither did he support it; his attitude was to delay a radical decision and avoid any possible confrontation.

In 2006 when the electricity supply became a great problem, the 15th list of the Red Party launched an initiative to abrogate the anti-nuclear article. The beliefs of this segment of the Red Party, as well as of the White Party, was that since the country was experiencing a great growth in energy demand, it needed abundant, economic, and constant electricity. Another argument was that since Uruguay was importing electricity from Argentina and the latter was producing nuclear energy it was nonsense to limit nuclear energy imports as called for in the article. Finally they said that there were smaller and more economic nuclear reactors that could be imported. In 2007 former Senators Joubanoba and Campanella (White Party) confirmed their support to abrogate the anti-nuclear article and presented a proposal related to electricity demand until 2016. They argued nuclear energy is the most adequate alternative, favoring the building of a nuclear reactor CANDU 6 rather than a Light Water Reactor (LWR). The proposal put a priority on expanding electricity generation in order to obtain a steady energy basis to ensure continuity of supply and energy autonomy. They said that this would enable the country to gain independence from variable climate conditions, a typical problem with renewable energy sources. From their perspective investments should be addressed to achieve 'stable' and steady electricity mix and satisfy the conditions of economic efficiency, energy security, and environmental protection ("Diario de Sesiones de la Cámara de Senadores" 2007).<sup>93</sup>

In 2006 the DNE-MIEM published a report about the situation and perspectives of nuclear energy generation. The report explored superficially the conditions for a possible future development of nuclear energy in Uruguay but it did not provide any conclusion about the installation of nuclear plants and clarified that it was an issue that required a serious public debate before any decision would be

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<sup>93</sup> Source:

<http://www.parlamento.gub.uy/sesiones/AccesoSesiones.asp?Url=/sesiones/diarios/senado/html/20070815s0028.htm>.

adopted.<sup>94</sup> From this report it can be inferred there was little commitment to nuclear energy. This assumption can be confirmed in the reaction of some representatives of the MIEM that appeared in the media at that time: “even though we have technically considered it, nuclear power is not in our plans, at least not for the moment. Additionally, UTE does not like the idea” (*El País* 23.05.2006).<sup>95</sup> The reasons were that nuclear power plants were too costly, they would need several years until they could be in operation, and they would require importing a fuel (uranium) that was not available in the country. Yet, Vázquez continued to say they still might consider it. The reason may be that the president wanted to wait; it was not an easy decision to take and it would involve many political, legal, technical, and economic changes.

The main argument of the NGOs, expressed during the public debates, was related to nuclear safety. One of the most influential Uruguayan activists against nuclear power and pro renewable energy, Enrique Muttoni, explains: “We already have nuclear risks (in Uruguay) because Argentina and Brazil have nuclear power plants. But it is necessary to highlight that it is impossible to create any criteria about how to evaluate the risks; even when the possibility of an accident is very small the extent of the damage is so enormous. We’ve already had an accident that occurred within the 6<sup>th</sup> unit of the José Batlle y Ordóñez power plant on 25 February 1992. Indeed, accidents can always happen and they would cost a lot of money for a country the size of Uruguay. A radioactive leak, even small, could ruin the image of national production” (Muttoni 2010).<sup>96</sup>

In 2008 the former Senators Joubanoba and Campanella published a book, which was based on the proposal of 2007, called *Towards energy autonomy: diversification and nuclear generation*, analysing and explaining the advantages of nuclear energy for Uruguay. But this year a national *Energy Policy 2005–2030*, promoting renewable energy sources and considering nuclear energy as an option to evaluate from the year 2025, was proposed by the newly elected Director of Energy Ramón Méndez. The national policy was approved under the Vázquez administration.

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<sup>94</sup> See more details in “Aspecto para el análisis de la alternativa de incorporación de generación nuclear en Uruguay” (2006). Source: [http://www.espectador.com/perspectiva/energia\\_nuclear.pdf](http://www.espectador.com/perspectiva/energia_nuclear.pdf).

<sup>95</sup> Source: [http://historico.elpais.com.uy/06/05/23/pecono\\_217655.asp](http://historico.elpais.com.uy/06/05/23/pecono_217655.asp).

<sup>96</sup> Educational DVD for national distribution called “Nuclear Energy for Uruguay?” made by Enrique Muttoni and published by the Uruguayan Network of Environmental NGOs (2010). See the video in: <https://www.youtube.com/watch?v=Rixd-pvDw-M>.



These events generated public discussions about the role of nuclear energy and again the topic was in the media. The journalist Maggi from the conservative newspaper *El País* published an article promoting the work of Joubanoba and Campanella and defending the use of nuclear energy. Méndez appeared in the media explaining that in the short-term it was not reasonable to install nuclear plants, emphasizing that the decision whether or not nuclear energy should be pursued should not be decided by the DNE but by the country's citizenship. Opposition parties, their advisory engineers and some of the media continued insisting on the technical and political evaluation of nuclear energy.

As a consequence, the government and the UDELAR decided to hold a *Consensus-Making Conference*, also dubbed *Citizens' Forum*, in order to consult the population about the possibility of implementing nuclear power in Uruguay.<sup>97</sup> The initiative was part of the project called *Consensus-Making Conference about the Nuclear Energy in Uruguay* (in Spanish “Juicio Ciudadano sobre Energía Nuclear en Uruguay”), organized by a group of academics coming from the Development and Science Unit of the Faculty of Sciences at UDELAR. This popular initiative was financed by the Sectoral Committee of Scientific Research (CSIC) and the methodology used was based on that one used by the Danish Committee for Technology. The Committee was a pioneer in the implementation of public participation initiatives related to Science and Technology (S&T) and the Danish Parliament normally used the results of these citizens' consultations to inform S&T policy decision-making processes. The result of the final report generated by the *Consensus-Making Conference* was “to not accept nuclear power—at least for now—and to only open the possibility to accept it if technological advances in the future minimize the risk associated with construction or if future local studies bring forward information that is currently not available” (*Consensus-Making Conference* 2010).

It is worth mentioning, that the citizens consulted about different alternatives during the three-month project were not experts and were not directly affected by the issue. The objective was to prioritize qualitative aspects rather than quantitative ones,

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<sup>97</sup> Source: *Consensus-Making Conference* or *Citizens' Forum*, is a procedure of public participation in issues of Science and Technology (S & T) in which a group of 15 citizens come together to make a series of recommendations about a particular topic based on information and testimony presented by various experts.

and although it did not represent a definite decision, it constituted a valuable perspective in the decision-making process. It allowed for a new perspective not necessarily considered in the technical advice that traditionally characterizes decision-making processes related to science and technology issues. Although the *Consensus-Making Conference* was an effective mechanism to demonstrate that the country was skeptical about nuclear energy and preferred to foster renewable energy together with energy efficiency, it did anything but reinforce what the national bureaucracy had already decided.

The main barriers for the nuclear energy coalition in Uruguay were represented by UDELAR and the state-owned company UTE along with the DNE-MIEM. The intention to pursue renewable energy was manifested not only in the legal regulations promoting renewable energies (starting with the Decrees No. 267 in 2005 and No. 77 in 2006) but also in the efforts of UTE to install a wind park, owned by the public utility company. As Winter explained, “engineer Oscar Ferreño, the current electricity generation manager of UTE, played a crucial role in the installation of the wind farm Sierra de los Caracoles.<sup>98</sup> After he saw how wind energy in Spain worked, he knew he wanted to develop wind parks in Uruguay but was confronted with opposition in the beginning from other engineers at UTE who were senior to him and were trained in nuclear engineering. However he eventually achieved his goal and constructed the Caracoles wind park in 2008” (T. Winter, oral interview, 15.12.2012). After the first government of the Broad Front came to power new actors more committed to renewable energy entered UTE and later, the DNE.

Decree No.77/006 was the first call for a competitive process of non-conventional renewable energies through UTE. The call included biomass, small-scale hydropower, and wind. This decree and other calls for tenders had good results for biomass but they had only meager success with projects for the deployment of wind energy. After these first failed attempts to develop wind energy, DNE and UTE issued more policies to foster wind and other renewables. The UWEP program

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<sup>98</sup> Before Ferreño became the electricity generation manager of UTE, he was the hydroelectric generation manager of the company. This change was due to the reorganization of UTE in recent years that resulted in the hydro- and thermoelectric generation sections being merged into only one department. The latter is currently in charge of wind, hydro, and biomass electricity generation. The restructuring of UTE was a result of the new energy policy and its goals.

succeeded in 2007 and the *Energy Policy 2005–2030* was approved in the subsequent year. One of the latest projects was the PROBIO mitigation initiative to assist the development of biomass. Since 2005 great efforts were made regarding the legal framework for renewable energy, which will be explained in section 6.4.

The efforts to promote renewable energy were crystallized in the ratification of the *Energy Policy 2005–2030*. In late 2009 President Mujica setup a Multiparty Energy Commission that discussed the *Energy Policy 2005–2030* and ratified it. The purpose of the commission was to get a political consensus and prevent any future conflict. The Multiparty Energy Commission discussed the energy policy, approved under the Vázquez administration, and in 2010 came up with a long-term energy agreement. In the words of Méndez, the National Energy Director, the objective was “the diversification and development of domestic energy sources, with an increase in renewable energy but without any kind of subsidies as opposed to Europe, US and Japan. Moreover, renewable energy without subsidies implies a reduction of the energy costs as well as the stability of them. Since renewable energy does not need any fuel, there is only the initial cost of the capital investment. Then, tariffs remain stable for at least a couple of decades until technology becomes out-dated” (R. Méndez in “Foro de Innovación de las Américas”, November 2011). Additionally Pérez argued: “In Uruguay it is not necessary to apply strong subsidies to wind energy and biomass, because they are inherently competitive” (D. Pérez, written interview, 07.06.2011).

- **The Relationship with International Actors**

In the current globalized world, advocacy coalitions do not only agglomerate domestic actors; they may also include international actors. Apart from UTE, the DNE, and UDELAR other active players in the renewable energy advocacy coalition were foreign companies in the wind energy field, the ex-GTZ, current “Deutsche Gesellschaft für Internationale Zusammenarbeit” (GIZ), the Spanish AECID, and especially the AHK Uruguay. The implications of these international actors will be analyzed.

In an interview, AHK Uruguay director Winter explained how Germany had been involved in the development of wind energy since the beginning through two companies: Nordex and Vestas Germany. The director of the AHK also noted that the

engineering professor of UDELAR, José Cataldo, who directs a masters program in aerodynamic engineering and who was responsible for the Wind Atlas of Uruguay, worked for GIZ for many years and was always been closely tied to Germany.<sup>99</sup> “Inspired in many researches coming from Germany and having received technical advice from the GIZ, Cataldo has produced a large amount of researches, guidelines, and technical instruments for the wind sector in Uruguay” (T. Winter, oral interview, 15.12.2012). From the private sector, there are currently five German wind energy companies investing in Uruguay: SOWITEC has two projects; EAB New Energy together with SEG Ingeniería from Uruguay has a project of 100 MW; Juwi and Ferrostal have a project of 50 MW called La Estrellada; and finally ABO Wind and Innovent through Impsa Wind have a project of 50 MW. From the perspective of Sergio Vázquez from La Estrellada, “for a small country like Uruguay six projects coming from Germany represents quite a lot” (oral interview, 18.12.2012).

The main role among the German actors has been played by the AHK Uruguay, which has been directed by Tobias Winter since 2009. He is also responsible for the environmental and renewable energy areas for the German Chambers of Commerce for Argentina and Paraguay. These three AHKs, together with the AHKs for Brazil, are part of the platform MERCOSUR Alliance, which fosters economic and politic exchanges among the MERCOSUR countries, and between them and Germany. Everyone interviewed about the topic (i.e. the Uruguayan Embassy in Berlin, wind entrepreneurs and the DNE) agree that the Uruguayan AHK has had, and still has, an active role in wind energy development in Uruguay. This is especially true for its current director Winter. Vázquez notes: “since Tobias has been in charge of the Chamber, the AHK together with the German Embassy have worked hard towards the deployment of renewable energy in Uruguay. What is strange is that Winter is officially the head of the renewable energy center of the German Foreign Chamber of Commerce (AHK from “deutsche Auslandshandelskammer”) in Argentina, Paraguay, and Uruguay but has since 2009 spent nearly all of his time in the latter. He has organized several seminars and workshops with experts from Germany, Argentina and other countries and worked intensively to help and support German companies to achieve their goals, when they are not able to lobby on their own (because they have signed a compliance agreement

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<sup>99</sup> Source: [www.energiiaeolica.gub.uy/index.php?page=mapa-eolilco-en-el-google-earth-introduccion/](http://www.energiiaeolica.gub.uy/index.php?page=mapa-eolilco-en-el-google-earth-introduccion/).

with the government). Indeed no other chamber of commerce is as active as the German one” (S. Vázquez, oral interview, 18.12.2012).

The reason why the director of the AHK’s renewable energy center for the three countries spends more time in Uruguay than in the two other countries lies in the fact that since the beginning, he has seen Uruguay’s renewable energy development goals as an opportunity to demonstrate possible paths to other countries. In an interview conducted in 2012 he said that, “it is frustrating that Germany does not offer economic support to Uruguay for wind power development, although this is now changing, because they do not understand that Uruguay could be a pioneer country in the region and, therefore, spur a domino effect within the region” (T. Winter, oral interview, 15.12.2012). Winter works intensively in Uruguay (more than in Argentina and Paraguay) for the development of renewable energy, because he thinks that lessons learned in this country can be applied and diffused to the rest of the region. Winter claimed that although the financial support from the German government is still quite low, years ago the German Embassy invited a committee of the “Bundesministerium für Wirtschaft und Energie” (BMWi) to explain how renewable energy policies work in Germany and help Uruguay developing the renewable energy sector (T. Winter, oral interview, 15.12.2012). As all the German Chambers of Commerce, the work of the AHK Uruguay has been supported by the German Embassy.

The other important player has been the AECID, supported by the Spanish Embassy, to whom Uruguay is linked in many bilateral cooperation projects. One of the most critical sectors where the Spanish agency works is energy; particularly in two central axes: promotion of renewable energy and energy efficiency in the transport sub-sector. The objectives pursued are diversification of the energy mix and reduction of fossil fuel dependence. The AECID has been actively cooperating in the Energy Policy 2005-2030 of Uruguay, especially in the wind energy deployment. Since Spain has an extensive and accumulative experience in the development of wind energy, they can contribute to the good performance of the wind market during the present phase. The first project in which Uruguay received financial support from Spain was the UTE’s wind park Sierra de los Caracoles, mentioned above; it received ten million US dollars. This was part of the “External Debt Conversion Program” between the Uruguayan and Spanish governments laid out in law No. 17665 from 11

July 2003. The plan was to install wind turbines from Vestas Spain, replacing the previous Nordex installation.<sup>100</sup> However, as Winter explained, due to some internal problems with Vestas Spain, it was decided to purchase all the turbines from Vestas Germany (Ibid. oral interview, 15.12.2012).

It is possible to infer the existence of international learning, independent from any imposition or inducement, in terms of renewable energy policy thanks to the efforts of AECID, AHK Uruguay, the Spanish government and Embassy, the Uruguayan government, Uruguayan private companies and researchers from the UDELAR like the already mentioned engineer José Cataldo. This learning has interacted with domestic practice and national objectives but has never replaced them. There was a horizontal relationship between Uruguay and both Germany and Spain. The AHK Uruguay led by Winter and the Spanish AECID contributed to the independent observation of Uruguay. This can be confirmed by the decision of Uruguay to introduce the model of long-term fixed tariffs but adapted to the country's needs, which meant only applied to small-scale renewable energy projects (a net metering mechanism); decision that was strongly supported by international actors. In an interview that appeared in the magazine of the General Mosconi Argentine Institute of Energy (IAE) Winter said: “a model of long-term fixed tariffs adapted to Argentina, starting with low capacity generation, would be a successful instrument to ensure an efficient and controlled development of different renewable technologies. Some countries in Latin America like Uruguay are demonstrating this with success” (*Proyecto Energético* 2012, IAE). In relation to this policy, Winter also said “instead of the German model of FITs, Uruguay chose the long-term fixed tariffs for small-scale wind turbines in an intelligent decision to foster wind energy in the country” (oral interview, 15.12.2012).

The adaptation of the FIT policy to their national practices and socioeconomic context reveals that decision makers were motivated by their policy beliefs and collective interests rather than symbolic concerns for legitimacy and the desire to appear modern (Weyland 2004). They consciously evaluated the social cost-benefit to apply the German model of FITs but decided to introduce it just for biomass and set a net metering mechanism with fixed tariffs for small-scale renewable energy. FITs for

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<sup>100</sup> Source:

[www.ute.com.uy/pags/Institucional/documentos/EIA%20Parque%20Eolico%20Caracoles.pdf](http://www.ute.com.uy/pags/Institucional/documentos/EIA%20Parque%20Eolico%20Caracoles.pdf).

large-scale wind energy might be too costly to maintain for the Uruguayan state. The auction model for large-scale wind parks appeared to be more efficient to foster wind energy. Uruguay decided to use competitive auction schemes to achieve a cost-efficient benchmark price for large-scale wind energy. Subsequently, using the resulting price from the competitive auction they set a fixed tariff as the benchmark price for a new tender process. Johannes Jacob from the German company Juwi confirmed that “German FITs are not necessary, companies just need the legal guarantee that they will receive the agreed price for 20 years (oral interview, 16.11.2012).

Domestic actors in Uruguay chose to look at Germany and Spain because of their prestigious image as leaders and pioneers in wind energy. As it was referred in the theoretical framework actors can follow different international examples, according to the prestige of the innovators (Nelson 2004). When asked about this issue to Vázquez, he said, “one of the reasons was the need for specialized knowledge in terms of large-scale projects. For example, questions surrounding installation logistics for wind parks, considering that the port of Montevideo does not have enough capacity to receive many wind turbines at the same time as well as the need of routes with bridges that can support the weight of wind turbines” (oral interview, 18.12.2012). But then he also added that Germany was interested in Uruguay because of “the liberalization of the electricity market; where the rules are quite clear and easily accessible; Uruguay’s good credit rating as well as its location between Argentina and Brazil; two of South America’s largest economies; also contributed to Germany’s significant presence” (S. Vázquez, oral interview, 18.12.2012). This emphasizes the characteristic level of interaction in the relationship between the two countries.

To the question whether domestic actors have seek to anticipate concrete effects (Weyland 2004) from the introduction of wind energy, it is possible to see that actors have been facing several difficulties due to an inadequate technical knowledge at the beginning, explained in section 6.8.2, but they have set their own goals without seeking to imitate the European model. This relates to the idea that actors were able to assess the advantages and disadvantages of adopting this model and fully adapt it to their specific national needs and requirements (Weyland 2004). It can be concluded that the German and Spanish renewable energy models have provided an international

input for domestic actors to voluntarily observe and learn from but is has never replaced their domestic practices. The German AHK in Uruguay supported by the German embassy has decided to contribute with the development of wind energy in Uruguay based on their intention to “spur a domino effect within the region” (T. Winter, oral interview, 15.12.2012).

Comparably to Germany, Spain has also various ongoing projects, totaling four wind energy parks. Germany and Spain have certainly not been the unique countries investing in Uruguay. There were also projects from Argentinean, Brazilian, and French companies. One of the most important international projects, due to its political significance, is the future wind park to be installed by Eletrobras from Brazil and UTE. The project is set in the framework of the *Energy Policy 2005–2030* concerning bi- and tri-national agreements to be arranged with Argentina or/and Brazil to promote renewable energies in the region. To achieve this goal Uruguay has signed an agreement with Brazil in April 2013 to install the wind park through their electric utilities Eletrobras and UTE (Section 6.5.3). The political importance of this initiative resides on the possibility to start working towards electricity integration in the MERCOSUR area. In 2001 the four members of MERCOSUR (Argentina, Brazil, Paraguay and Uruguay) signed an agreement called “Acuerdo Marco sobre Medio Ambiente” to work together in different environment policy sectors, including renewable energy sources as part of the Life Quality and Environmental Planning section. However, little has been done so far and the project agreed by UTE and Eletrobras would be the first regional wind park in the South American area.

The President of Eletrobras, José Da Costa Carvalho Netto said, “it is a very important agreement for everyone, for Eletrobras and for UTE, but also for Uruguay and Brazil, because it is the beginning of an understanding between our companies, towards the future integration of the electrical systems of our countries [...] this could serve as an example for new business ventures in Uruguay as well as Brazil, or even in other Latin American countries. That is why it is very important beyond the project itself. It's a symbolic event for our future understandings” (*El Pais*, 2013).<sup>101</sup>

Some critiques from the side of the AHK Uruguay have been heard. Winter said, “although governments have the economic resources to do it, the question is

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<sup>101</sup> Source: <http://www.elpais.com.uy/economia/noticias/ute-y-eletrobras-firman-acuerdo-de-parque-eolico.html>.



whether this has the same quality as it would be executed from the private sector (...) in any case this project is an opportunity for Uruguay to become better integrated in the MERCOSUR as well as a way to promote greater political exchange with Brazil” (oral interview, 15.12.2012). The possibility of a deeper political integration between the two countries with this project was not examined here, since the project is still under the agreement’s phase and it is still too soon to make any assertion. But it is possible to note the intention of the current Uruguayan administration to get closer to Brazil. The reason might be the recent strict international commercial and trade barriers implemented by Argentina, affecting seriously the commercial relationship with Uruguay. Commercial barriers have been harshly criticized by politicians and bureaucrats and have motivated Uruguay to look for other possible countries to initiate commercial relationships.

- **The role of the United Nations Development Program**

The United Nations Development Program (UNDP) together with the national administration launched the Uruguay Wind Energy Programme (UWEP) with funds from The Global Environment Facility (GEF), which were supported by the World Bank (WB) and the Inter-American Development Bank (IDB).<sup>102</sup> The purpose was to finance the marketing and promotion of wind energy as well as to support the public servants of UTE and the DNE in their work promoting wind energy. As a result, on June 30, 2007 three civil servants of UTE developed the UWEP within the DNE for a period of five years (until the 30<sup>th</sup> June 2012).<sup>103</sup>

The program created a web page in which all legal steps and investments related to the wind sub-sector as well as the actors involved in wind energy were published. The web page is still active as of 2014, being continuously updated. The principal coordinator of the program was the engineer Pérez, who, working at UTE took responsibility as the coordinator of the UWEP. Pérez represents one of the key actors involved since the beginning of the development of wind energy in Uruguay. With regard to his role as the coordinator for the UWEP, Winter said, “Pérez is a person who is completely engaged with his work as well as with the advance of wind energy in Uruguay. The program had what it needed to take off: funding from the WB for the establishment of wind energy and capable personnel who were well suited for

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<sup>102</sup> See details about the UNDP - GEF in: <http://web.undp.org/gef/donorpartners.shtml>.

<sup>103</sup> Source: [www.energiaveolica.gub.uy](http://www.energiaveolica.gub.uy).

the work; this ensemble of factors could achieve a great advance for the sector” (T. Winter, oral interview, 15.12.2012). After the UWEP was finished, Pérez began in 2013 to work on the joint wind energy project that will be developed by UTE and Eletrobras.

Similar to the UWEP, the UNDP together with the national administration launched the Uruguay Biomass Power Production (PROBIO) with the financial support from the GEF in 2010. The PROBIO mitigation project, which was executed by DINAMA, the DNE, and the Uruguay’s General Directorate of Forestry (DGF), aims at the development of decentralized and on-grid electricity generation based on domestic forest industry biomass residues.<sup>104</sup>

The UNDP-LAC has also supported national discussions as well as strategic actions concerning climate change mitigation in the energy and electricity sectors. Both, discussions and actions for climate change mitigation are promoted in the framework of the climate policy project launched for Latin America in 2008 (*Climate Policy Project 2012: Preparing Climate Strategies*).<sup>105</sup> Unlike Argentina and other Latin American countries, where the project has been supporting climate strategies in the agriculture, forestry and biofuel sectors, in Uruguay the focus has been on the renewable energy sector (as well as agriculture).

The UWEP and PROBIO programs, wind energy and biomass goals as well as the wind energy project with Brazil confirms that among all renewable energy technologies, Uruguay has given priority to the development of wind and biomass. The goal to allocate 300 MW of wind power was exceeded in the public tender offers and the new objective was set at 1040.3 MW, to be constructed by the year 2015-16. Wind energy and biomass are expected to represent about 24% and 18% of the national electricity mix, respectively.<sup>106</sup> The new regulation of the electricity market has stimulated the initial legal regulations fostering the development of renewable energy like the first decrees promoting electricity production via renewable energy

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<sup>104</sup> Source: <http://undp-ccmap.org/projects/uruguay-biomass-power-production-probio>.

<sup>105</sup> Source: <http://www.eeg-regionalcentrelac-undp.org/images/stories/pdf/politicas%20climticas%202012%20preparando%20estrategias%20climticas.pdf>.

<sup>106</sup> National electricity mix goal: 93% of RES, whereby 24% wind power, 51% hydropower, and 18% biomass. See: <http://www.miem.gub.uy:8080/gxpfiles/miem/content/video/source0000000062/VID0000050000002121.pdf>.

sources (2005–2009). These were followed by further renewable energy policies like the Energy Efficiency Act (No. 18597) and *Energy Policy 2005–2030* as well as the wind, and biomass programs. The next section will explain in depth the legal framework promoting renewables, and especially wind energy in Uruguay.

## 6.4 Policy Framework for Renewable Energy

### 6.4.1 National Energy Policy 2005–2030

The *Energy Policy 2005–2030* was proposed by Méndez and approved by the MIEM–DNE, being confirmed after by the Multiparty Energy Commission under the Mujica administration. It covered four areas (i.e. institutional, social, energy demand, and supply) and set goals for the short-, medium- and long-term. In the short-term (2015), renewable energy sources such as wind, biomass and mini-hydropower were expected to represent 15% of total electricity generation. This percentage was calculated based on the expectation at that moment (2009). Of this 15% it was expected that 300 MW would come from wind energy and 200 MW from biomass. Following this macro goal the UTE decided to implement different tender processes for wind energy in three phases beginning 2009. Allocations within the three calls for tender surpassed the 300 MW objective. There were 150 MW of wind power in 2010 (Decree No. 403/009 and No. 41/10)<sup>107</sup>; 192 MW in 2011 (Decree No. 159/011)<sup>108</sup>; and finally 537.8 MW in 2012 (Decree No. 424/011)<sup>109</sup>, resulting in a total of 987.8 MW, on top of the 52.5 MW that had already been installed.

Due to the success of renewable energy public tenders, the expected share of renewable energy sources for 2015-16 was increased to 42%, including wind energy and biomass. Of this 42%, wind energy would represent 24% and biomass 18%. Hydropower is expected to provide 51% of total electric power generation. The rest of electricity generation (7%) would be covered principally by liquefied natural gas (LNG), processed in one combined cycle gas turbine (CCGT) plant.<sup>110</sup> A re-gasification plant based on LNG coming by ship from different countries outside the

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<sup>107</sup> Source: <http://www.energiaeolica.gub.uy/index.php?page=Convocatoria-2010>.

<sup>108</sup> Source: <http://www.energiaeolica.gub.uy/index.php?page=Convocatoria-2011>.

<sup>109</sup> Source: [www.energiaeolica.gub.uy/index.php?page=Convocatoria-2011-complementaria](http://www.energiaeolica.gub.uy/index.php?page=Convocatoria-2011-complementaria).

<sup>110</sup> Source:

<http://www.miem.gub.uy:8080/gxpfiles/miem/content/video/source0000000062/VID0000050000002121.pdf>.

South American region will be installed for this purpose. From Méndez' perspective this energy policy will enable the country to gain independence from the South American region (R. Méndez, oral int., 17.12.2012). Méndez added during the interview “LNG is the best supplement for renewable energy because it enables the rapid expansion of electricity generation systems, supplying power to both industry and households (indeed it covers 26% of the used energy in the world) and emitting less greenhouse gases (half of the CO<sup>2</sup> emitted by oil and a fourth of that emitted by coal)” (R. Méndez, oral interview, 17.12.2012).

According to the energy policy, coal will continue to be absent within the national energy mix and oil imports will be reduced (R. Méndez in “Foro de Innovación de las Américas”, November 2011). Méndez explains that oil imports represented 56% of the primary energy mix in 2006 and in 2010–11 they represented 49%, showing a decreasing dependency that is expected to amount to 37–38% by 2015 (R. Méndez in “Foro de Innovación de las Américas”, November 2011).

Although energy policy has fixed goals for the medium- (2020) and long-term (2030), it does not lay out the expected share of renewable energy sources in the national energy mix. In particular, the text dictates that for the medium-term, “the optimal level of renewable energy (i.e. wind, biomass, thermal solar and bio-fuels) will be achieved” (“Política Energética 2005–2030”).<sup>111</sup> However, it does not define the optimal level. Also, there is a reference to the share of each electricity source in the goals described as follows, “... define a timeline for the incorporation of different electricity sources, including their aims at the short-, medium-, and long-term” (“Política Energética 2005–2030”). The goals of a national energy policy should be more clearly defined including a precise quota for each source in the medium- and long-terms, in addition to the later definition of a detailed timeline.

#### **6.4.2 Legal Regulations**

At the very beginning the DNE-MIEM introduced a fixed tariff of 52 USD/MW to be paid to UTE for a period of 10 years (Decree 267/005). Although the decree was formally addressed to any electricity generator, the real intention was to set a compensation tariff for renewable sources. The mechanism did not produce the

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<sup>111</sup> Source:

<http://www.miem.gub.uy/documents/49872/0/Pol%C3%ADtica%20Energ%C3%A9tica%202030?version=1.0&t=1352835007562>.

expected results and Uruguay, like Argentina and other South American countries, opted for a bidding process as the preferred policy instrument for deploying wind energy on a large scale. Public tenders were regulated by several different decrees that started in 2006. Before the Energy Policy 2005–2030 was launched, UTE called several open and competitive auctions to allocate a total of 60 MW of renewable energy sources, through Decree 77/2006 followed by Decrees 397/2007, 296/2008 and 299/2008. These calls for tenders worked well for biomass but not for wind power. As Pérez, the coordinator of the UWEP, said, “the first public tenders partially succeeded: with biomass they worked well but with wind power they did not—at least in the beginning, so another call (a sort of a FIT mechanism that has lasted a couple of years) for wind projects was issued in order to equalize the price of the offer made by the only allocated project. After that, the intention of the national energy policy (2008-10) was explicit and, therefore, measures like wind power tenders and the fixed tariff for biomass were taken” (D. Pérez, written int., 07.06.2011). Through Decree 377, issued in 2009, a second request was made to wind companies in order to equalize the price offered by the only winning project of 15 MW (wind park Nuevo Manantial). From this procedure two more wind parks were allocated: Kentilux (17.2 MW) and Engraw (1.8 MW). The Kentilux project comes from a European company named Gunvor International B.V. Amsterdam Geneva Branch, which operates in Geneva and works in the fossil fuels sectors. This wind park was installed in the framework of the Clean Development Mechanism’s (CDM) scheme, due to the need for free CO<sup>2</sup> emissions credits.

It should be pointed out that, after a careful evaluation, it was determined not to implement FITs for large-scale wind energy projects but instead to call a request for bids to generate PPA for 20 years with a price that is derived from a competitive process. Regarding the request for bids, Méndez explained, “due to the variability of wind energy, a maximum MW cap is set based on domestic demand. Therefore, private companies participate in the request for bids, competing between each other and thus, reducing the price. The difference between auctions and FITs is that the price is not fixed beforehand by the government, but rather determined by the market. This has enabled us to reduce costs and today we have a tariff 50% lower than the FITs in Europe” (R. Méndez, oral int., 17.12.2012). Indeed, the coordinator of the UWEP briefly explained the national debate about feed-in tariffs: “we received a lot

of very strong suggestions at national and international levels to apply this mechanism, but finally we decided to not implement it. International investors want FITs, because they are used to the German and the Spanish models. This system brings security for these investors. The Uruguayan political and social systems are more accustomed to competitive processes however. This is due to its national idiosyncrasies; a complex political system and the size of its market” (D. Pérez, written int., 27.05.2011).

With regard to the size of the market, it is clear that a country with a population such as Uruguay’s has a small electricity market and low energy demand. In relation to that Méndez said “we have in Uruguay much more wind energy investment interest than we do energy demand, in other words there are more investment offers than the energy demand of the country. The wind potential is many thousand MWs while the energy demand of Uruguay is a little bit more than 1700 MW. So we have mechanisms more convenient than FITs that have enabled us to reduce costs. The goal is to achieve around 1000 MW for the year 2015, whereas the peak demand is 1700 MW. From the work we have done in collaboration with Spain, Germany and Denmark we know that it is possible to harness 1200 MW of wind as part of our electricity energy mix” (R. Méndez, oral interview, 17.12.2012).

For the generation of small-scale renewable energy projects, the Uruguayan administration has implemented a different policy mechanism—net metering—, through Decree 173/010 in June 2010.<sup>112</sup> This policy instrument introduces bidirectional metering whereby each household can install a bidirectional electrical meter in conjunction with a wind turbine, photovoltaic panel, micro-hydropower plant or biomass furnace and then take advantage of a one-to-one energy system with UTE (i.e. to buy from and sell electricity to UTE at the same price) for a period of 10 years. Thus, each citizen becomes consumer and producer at the same time. The maximum electricity potential is between 100 and 150 KW, depending on the transmission lines in a customer’s area. In regard to this policy mechanism Méndez said “there is a desire to generate and strengthen civil awareness of the costs of energy production and the practice of producing it; in the end society becomes more democratic” (R. Méndez, oral int., 17.12.2012).

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<sup>112</sup> Source: [http://archivo.presidencia.gub.uy/sci/decretos/2010/06/miem\\_56.pdf](http://archivo.presidencia.gub.uy/sci/decretos/2010/06/miem_56.pdf).

Decreets No. 158/012 and 433/012 of 2012 allow large energy consumers to install small wind parks for their own consumption, selling the rest onto the national grid. It is not one-to-one or net metering, because they have to buy electricity from UTE for a higher price than they can sell it. Thus, as Méndez explained, “in addition to the generation cost, the cost of distribution (use of grids and distribution) is also included” (R. Méndez, oral int., 17.12.2012). One of the most important characteristics of this decree is that it enables intensive electricity consumers to band together in order to scale their production and, therefore, be more profitable.

Decreets such as 460/009 and 258/009 regularize particular aspects concerning the generation of wind energy and Decree No. 567/009 establishes the conditions for the creation of a wind atlas. Finally Decree No. 354/009 addresses all activities of electricity generation coming from renewable and non-traditional sources as well as national manufacturers of machines and equipment related to these activities. In particular, it established tax benefits such as an exemption from incomes taxes for all activities related to renewable energy generation and for national manufacturers related to those activities.

In the case of biomass, Decree No. 367/010 established a FIT mechanism for a period of 20 years for all biomass power plants being agreed during the year 2011; the decree expired the 31 December 2011.<sup>113</sup> The purpose was to achieve a maximum of 200 MW of installed capacity whereby each project could not exceed 20 MW of capacity; the result was the allocation of about 259 MW. Other projects in the energy sector include the Solar Thermal Energy Act (No. 18585)<sup>114</sup> issued in 2009 for thermal solar energy, and the Energy Efficiency Act (No. 18597). Having a few years, the legal and policy framework promoting renewable and wind energy has constantly evolved.

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<sup>113</sup> Source: [http://www.ute.com.uy/Compras/asp\\_compras/K42158/11-07-01%20%20Parte%20I%20-%20Pliego%20Particular%20Biomasa.doc](http://www.ute.com.uy/Compras/asp_compras/K42158/11-07-01%20%20Parte%20I%20-%20Pliego%20Particular%20Biomasa.doc).

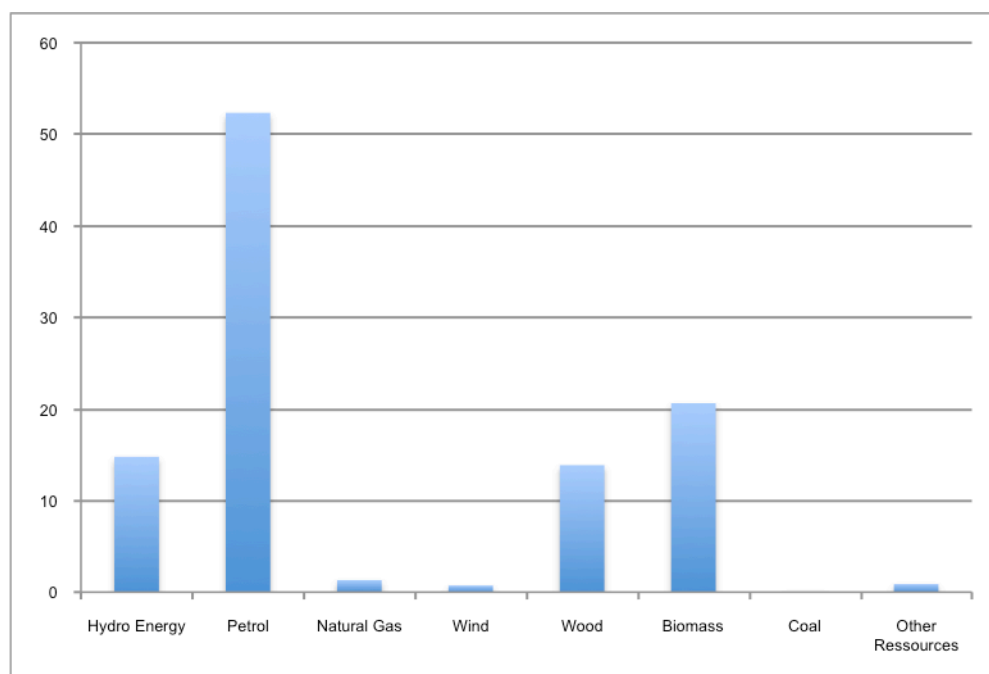
<sup>114</sup> Source: <http://www.eficienciaenergetica.gub.uy/novedades.asp?id=157>.

## 6.5 Energy Supply and Electricity Mix

### 6.5.1 Internal Primary Energy Supply 2012

In the internal (primary) energy mix of 2012, non-traditional renewable energy had a higher proportion in Uruguay than Argentina. This represented 21.4% of the internal energy supply, which in this case includes biomass and wind energy (20.6% and 0.7% respectively) and did not include biofuels or solar power (Figure 6.1). In the next figure 6.1 the internal primary energy supply is shown in percentages for 2012 from a total of 3960.5 toe. From this total of 3960.5 toe in the internal energy supply, 2015.2 toe came from domestic production and 2126.8 toe were imported.

**FIGURE 6.1. INTERNAL ENERGY SUPPLY (2012)**



**SOURCE: AUTHOR FROM DATA OF “MATRICES CONSOLIDADAS 2010–2012”, “DIRECCIÓN NACIONAL DE ENERGÍA - MINISTERIO DE INDUSTRIA, ENERGÍA Y MINERÍA” (DNEA - MIEM).**

Unlike Argentina, in Uruguay there is a lack of gas, oil and coal resources, a reason why the country imported energy and electricity from Argentina until 2004. In Uruguay around 53% of the primary energy supply comes from the import of fossil fuels (oil and gas) followed by domestic production of renewable energy sources (around 49%), including large hydro energy, biomass, wind energy and wood (Figure 6.1). In other words, Uruguay has traditionally been an oil and natural gas importing country. During recent years, however, the percentage of energy imports has come

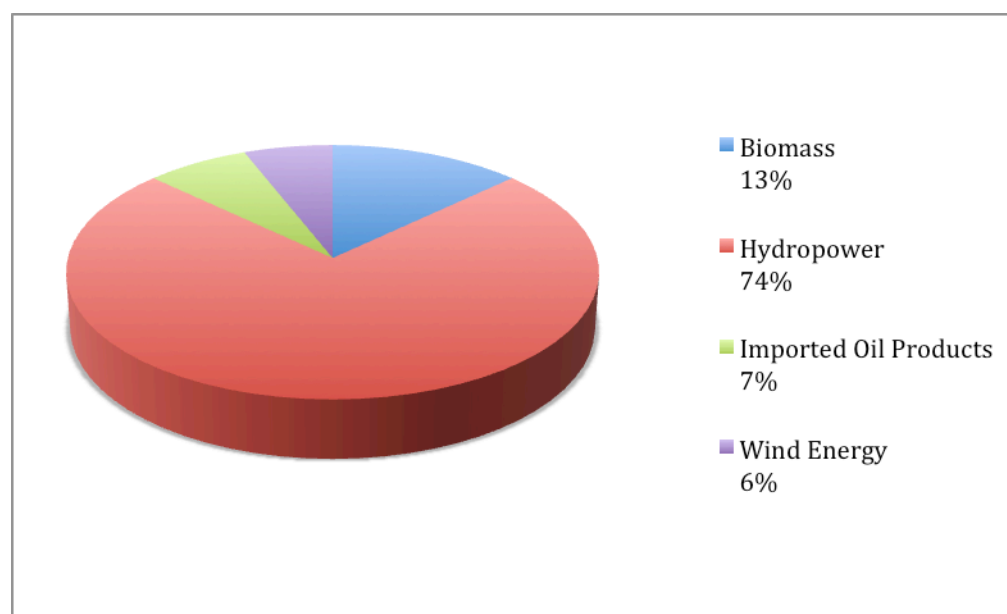


closer to the imported energy amount of Argentina, due to the decline of domestic reserves of fossil fuels in the latter. Wind power has increased from around 0.3% in 2009 to 0.7% in 2012. The increase of wind energy will be noticed in the primary energy mix of 2013 and 2014. Furthermore, the production of large hydro energy (around 14% in 2012) has been traditionally extremely important, through four hydropower plants: Baygorria (1960), Palmar (1982), Bonete (1945), and the Salto Grande Dam (1979). However, since 2011 hydropower has been surpassed by the production of biomass.

### 6.5.2 National Electricity Mix 2014

In the next figure 6.2 is shown the national mix of the electricity generated by source in percentages for 2014 from a total of 11702 GW.

**FIGURE 6.2. NATIONAL ELECTRICITY GENERATION MIX (2014)**



**SOURCE: DNE-MIEM<sup>115</sup>**

As can be seen in figure 6.2, large hydropower is the traditional renewable source in Uruguay, occupying the most significant role in the country. Nonetheless its contribution varies a lot depending on weather conditions, from an average of 82% in 2001–2005, it has decreased to over 50% in 2012 (DNE – MIEM 2012), being increased to 74% in 2014. The production of biomass started earlier than wind energy

<sup>115</sup> Source: DNE - MIEM 2014  
<http://www.dne.gub.uy/documents/15386/6508173/BALANCE%20PRELIMINAR%202014.pdf>.

due to the success of the first calls for renewable energy tenders that worked quite well for biomass. Especially important were the pulp mills of the Finnish company UPM, which is settled in Fray Bentos and is one of the leading producers in the sector. For biomass the total installed capacity is about 400 MW; this represents 13% in the mix of the electricity generated by source for 2014 (Figure 6.2).<sup>116</sup> Since 2010 wind energy has been particularly promoted through different calls for tenders. Still, due to the delay in the execution of the wind projects, the installed capacity of wind energy was until 2013 only 55.6 MW, representing about 2% of total installed capacity and 1% in the national mix of the electricity generated by source (DNE – MIEM 2013). In 2014, however, the total installed capacity increased to 473.6 MW, representing 6% in the national mix of the electricity generated by source (Figure 6.2).

### **6.5.3 State of Wind Energy**

Uruguay is starting a new trend that favors renewable energy goals, and especially wind power. Actually, there are several companies from other countries developing and investing in wind projects, as described below. The following two tables show the operating wind parks as of April 2015 and 13 allocated installations that are projected for 2015 and 2016 (see Table 6.1 for existing wind parks and Table 6.2 for the projected installations).

- **Existing Wind Parks**

In April 2015, 16 wind parks have a total of 523.6 MW of the installed capacity and are all connected to the national network. Apart from the existing wind parks listed in Table 6.1, there is one small wind farm owned by Agroland S.A.—the first wind park in Uruguay—installed near Garzon in Rocha at the beginning of 2007 and with a total capacity of only 0.45 MW. This project was set up to supply Agroland with its own energy and to sell the surplus to UTE. It is not included in the list below because it is a small-scale project and it does not correspond with the wind farms included in the table; all are large-scale projects.

After this project Agroland S.A. developed another wind park, called Nuevo Manantial, also in Rocha but this time a large-scale project of 13 MW (Table 6.1).

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<sup>116</sup> Source: Ibid. 115.

Agroland is a Uruguayan agroindustrial company, situated in Garzon in the Department of Maldonado, whose owner is an Argentinean business owner, Alejandro Pedro Bulgheroni.<sup>117</sup> Regarding the start of the Nuevo Manantial project the Mayor of the Department of Rocha, Barrions claimed: “it doesn’t matter whether investments are foreign or domestic; but simply whether they are good or bad” (*El Pais* 2008).<sup>118</sup> The Mayor wanted to highlight that the project was good because it had created 450 new jobs in Departments of Maldonado and Rocha and that the traditional discussion about domestic versus foreign (investments) was not so relevant as in the past. In other words, policy priorities have changed.

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<sup>117</sup> Before these projects, Alejandro Pedro Bulgheroni had some experience in the area of conventional energies (natural gas and oil) in Argentina.

<sup>118</sup> Source: <http://historico.elpais.com.uy/081023/pciuda-377199/ciudades/rocha-inauguran-primer-parque-de-molinos-eolicos/>.

**TABLE 6.1. EXISTING WIND PARKS (APRIL 2015)**

<b>Wind Park</b>	<b>Locality and Department</b>	<b>Installed Capacity in MW</b>	<b>Year of operation</b>
Nuevo Manantial	Rocha	13	2008
Ing. Emanuele Cambilargiu (I, II) (UTE)	Sierra de los Caracoles in Maldonado	20	2008-2010
Kentilux	San José	17.2	2011
Engraw	Florida	3.6	2013
Blengio	San José	1.8	2013
R del Sur	Maldonado	50	2014
Palmatir	Tacuarembó	50	2014
Togely SA	San José	7.7	2014
Luz de Rio	Florida - Flores	50	2014
Luz de mar	Florida	18	2014
Gemsa	Lavalleja	42	2014
Luz de Loma	Florida	18	2014
Polesine	Florida	50	2014
Astilleros (UTE-Elektrobras)	Flores	65.1	2014
Juan Pablo Terra (UTE)	Artigas	67.2	2014
Cadonal	Flores	50	2015
<b>Total of installed capacity</b>		<b>523.6</b>	

**SOURCE: URUGUAY WIND ENERGY PROGRAMME, DNE - MIEM.**

- **Wind Parks in Construction**

The allocated wind projects reach a total 987.8 MW of the installed capacity. Ten wind parks are now under construction.<sup>119</sup> Further details about the parks are described in table 6.2.

**TABLE 6.2. WIND PARKS IN CONSTRUCTION (APRIL 2015)**

<b>Wind Parks in Construction</b>	<b>Locality and Department</b>	<b>Installed Capacity in MW</b>	<b>Projected Year</b>
Fingano	Maldonado	50	2015
Colonia Arias (UTE)	Florida - Flores	70	2016
Andresito (UTE)	Flores	50	2016
Molino de Rosas	Maldonado	50	2015
Vengano	Maldonado	40	2015 (Corporación América)
Valentines (UTE)	Treinta y Tres	70	2016
Libertador I	Maldonado - Lavalleja	50	No data
Aguas Leguas S.A.	Tacuarembó	100	2015 (SEG Ingeniería, EAB New Energy & EPI Energía)
Astidey	Flores	50	2015 (CSI Ingeniería)
Vientos de Pastoreale	Flores	49.2	2015 (Sowitec)
Estrellada	Cerro Largo	50	2015 (Juwi and Ferrostal)
Ladaner	Cerro Largo	50	2015 (SEG Ingeniería, EAB New Energy & EPI Energía)
Pampa (UTE)	Tacuarembó	140	2016
Grupo Cobra Uruguay	San José	48.6	2016
<b>Total</b>		867.8	

**SOURCE: AUTHOR BASED ON DATA FROM THE URUGUAY WIND ENERGY PROGRAMME, DNE - MIEM.**

<sup>119</sup> Source:  
<http://www.energiaveolica.gub.uy/uploads/Log%C3%ADstica/Reporte%20semanal%20arribo%20a%20puerto.pdf>.

Since Uruguay does not have a national industry to produce wind turbines and just a few of its own wind developers, there are many companies from abroad investing in wind energy. The two principal countries investing in wind energy are Germany and Spain. There are six wind developers from Germany: Sowitec with a project of 49.2 MW; EAB New Energy through SEG Ingenieria from Uruguay with 100 MW; Juwi-Ferrostal through La Estrellada with 50 MW; Abo Wind (project sold to third party in the end) and Innovent through Impsa Wind with 50 MW (project currently suspended). Moreover the UTE's wind park Pampa will be financed by the German development bank KfW and compatriot lenders Bayern LB and Euler-Hermes. There are currently four Spanish companies: Grupo Cobra, Abengoa (dubbed Teyma in Uruguay), Grupo Fortuny (Energías Renovables) and the Spanish investor Honorato Lopez Isla from the company R del Sur.

Other countries in addition to Germany and Spain are investing in wind energy as well, including Brazil, France and Argentina. Of those, Brazil has been gaining great momentum in recent years. It has an allocated wind project called Molino de Rosas (50 MW) in the Department of Maldonado. The developer, Brazilian company PTZ Bio- Energy, has registered the project within the UN *Clean Development Mechanism* (CDM). The CDM application states the project will use 25 turbines, each at 2.5 MW and mentions the N100-2.5 turbine from Germany's Nordex as the reference technology.

Additionally, the government of Brazil together with the government of Uruguay has constructed a wind park of 65.1 MW through their public companies, Eletrobras and UTE, which has been operative since 2014. The wind park, placed in the Department of Flores, has a total of 31 wind turbines. For this purpose, UTE and Eletrobras have created a third firm in which each company hold 50%. This company makes a contract with UTE to set the conditions under which it sells the generated electricity to the Uruguayan public utility.<sup>120</sup>

Interestingly, this project is situated in a colony (named Rosendo Mendoza), which belongs to the Settlement National Institute (INC)<sup>121</sup>, having direct

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<sup>120</sup> Source: see more details about the project in: [http://www.ute.com.uy/php/detalle\\_novedades.php?id=15482](http://www.ute.com.uy/php/detalle_novedades.php?id=15482).

<sup>121</sup> Source: The "Instituto Nacional de Colonización" (INC) is the responsible organism at the national level to implement and deploy the settlement policy. See more information in: <http://www.colonizacion.com.uy>.

consequences for the local residents. Indeed, due to the installation of the wind park, the tenant farmers are supposed to receive some economic benefits (i.e. annual remuneration for each wind turbine, free payment of rent for several years, electricity free of charge and also during the construction, 900 US dollars per month for each turbine). The farmers have already agreed that the annual payment they receive is used for the construction of an irrigation system for the area.<sup>122</sup>

Furthermore, France has invested through Akuoenergy, which has two projects (Gemsa and Polesine) with 42 and 50 MW respectively. Finally, there are two Argentinean wind energy companies investing in the country, IMPSA Wind and Corporación América with the latter having two the projects of Fingano and Vengano. IMPSA Wind has been created through the subsidiaries Venti Energía, the German company Innovent and Central de Generación Eólica Libertador I (formerly known as Jistok). Libertador I will have a total installed capacity of 50 MW and will be situated in the Departments of Lavalleja and Maldonado. This wind park was planned to start commercial operations in 2014 but its construction was delayed and it is currently suspended. Wind farms Libertador II and Libertador III will have a total installed capacity of 7.35 MW each and each has an agreement guaranteeing 20 year energy purchases from the start of commercial operations.<sup>123</sup>

The wind park Kentilux in San José belongs to a company of Russian origin, named Gunvor International B.V. Amsterdam Geneva Branch, which operates in Switzerland and works in the oil and gas sectors. This project was born out of the desire to acquire free CO<sup>2</sup> emissions bonuses through the UN CDM. They won a request for bids together with the medical department of Siemens Uruguay.<sup>124</sup>

## **6.6 Renewable Energy Goals: Towards a New Policy Subsystem**

Here changes in the regulatory and energy policy framework that are facilitating the emergence of a renewable energy policy subsystem are examined. As was shown

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<sup>122</sup> Source: [www.primerahora.com.uy/7368-productores-de-colonia-recibiran-importantes-beneficios-por-instalacion-de-parque-eolico.html](http://www.primerahora.com.uy/7368-productores-de-colonia-recibiran-importantes-beneficios-por-instalacion-de-parque-eolico.html).

<sup>123</sup> Source: 1) <http://www.impsa.com/en/ipo/Full%20year%202011%20Fin%20Stat/IMPESA%20-%20Financiamiento%20Statements%20FY2011.pdf>. 2) <http://www.elobservador.com.uy/noticia/236429/los-molinos-uruguayos-se-aprontan-para-multiplicarse/>.

<sup>124</sup> Source: UNFCCC <http://cdm.unfccc.int/Projects/DB/AENOR1354125130.37/view>.

above, several renewable energy decrees were issued between 2006 and 2008 without causing the expected impact, at least on the development of wind energy. The renewable energy coalition responded by launching the *Energy Policy 2005–2030*. Unlike Argentina, which lacks long-term goals for renewable energies in its regulatory framework, Uruguay has set an energy policy structured in short-, medium- and long-term goals based mainly on renewable energy sources. Their renewable energy goals are developed as follows:

#### Goals for 2015

Renewable energy sources must be 50% of the total primary energy supply. From that percentage, renewable energy sources such as wind power, biomass waste and micro hydropower must achieve 15% of electric energy generation. At least 30% of the agroindustrial and urban waste of the country must be used to generate different forms of energy, transforming an environmental passive attitude into an energetically active one.

#### Goals for 2020

The use of renewable energy, especially wind power, biomass, thermal solar and biofuels must reach an optimum level. The balance must also be achieved in relation to the use of waste-generated energy. The consumption of energy has decreased 20% in relation to the tendency scenario thanks to several actions that promote energy efficiency. It is important to highlight that neither the optimum level to be reached by renewable energy nor the balance to be achieved by the use of waste-generated energy have been specified by the *Energy Policy 2005–2030*.

#### Goals for 2030

The country is to have saved great amounts of money (at least several thousand million USD) compared to 2010 thanks to the replacement of energy sources and to the encouragement of energy efficiency, being a leader in energy efficiency processes. Regional energy integration is to be achieved through bi- and tri-national projects.

Renewable energy goals are only clearly stated (in percentages) for the short term (for 2015). For the medium-and long terms there are some general references about the ideal and the economic benefits of the use of renewable energy but no concrete goals, measured in percentages. Also, it is worth mentioning that in



comparison to Argentina, the strategic energy policy in Uruguay with its strong focus on renewable energies as a state policy is agreed to by all political parties. As it is textually stated, “strategic fundamental positions as well as the goals (especially those of medium and long term) should go beyond one governmental period and it is also desirable they are broadly agreed to by all political parties. At the same time the strategic actions are more dynamic and should be reviewed often through regular situation analyses” (DNE- MIEM 2008).

Since the *Energy Policy 2005–2030* was approved in 2008, giving a clear priority to renewable energy sources, the following decrees gave UTE the responsibility to facilitate tenders totaling 300 MW of wind energy. In 2010, a Multiparty Energy Commission representing all political parties was formed to ratify the *Energy Policy 2005–2030*. “This political consensus is very important because it has convinced international investors, embassies as well as governmental entities like Commercial Chambers that this is a serious political decision and it is foreseen that its direction will not change although political authorities and government change” (T. Winter, oral interview, 15.12.2012). After the national energy policy was ratified, new policies were issued to promote other uses of renewable energy. One was the possibility to connect the low-voltage public network of micro-generators (i.e. wind, solar, biomass, and hydro). The other was the possibility for large industries to produce their electricity from their own wind turbines, selling the excess to UTE. Apart from the legal framework, three civil servants of UTE developed the UWEP in the framework of the DNE and the PROBIO project was developed by the DNE, DINAMA, and DGF. As was already mentioned, the wind energy and biomass programs were financed by the UNDP–GEF, which offered funds from the WB to the DNE, DINAMA, and DGF.

In an interview J. Jacob of Juwi was asked why the company invested in Uruguay and his answer was, “we decided to invest in Uruguay because of the prospects of the country. We plan to install 150 MW of wind energy by 2015 and even later. Also, it is a stable country, which has a legal system that works well and UTE has a good credit rating, which has the financial trust of international banks” (J. Jacob, oral interview, 16.11.2012). Before the decision of Juwi to invest in Uruguay, the company planned to invest in Argentina. However, during the first meetings in Buenos Aires between Juwi’s Head of Project Development Latin America,

representatives from Ferrostal Germany, Argentina and Uruguay, the members of Ferrostal Argentina did not show any interest in the project and left the meeting. In contrast, Ferrostal Uruguay showed interest in starting a wind park together with Juwi, and a few years later their project La Estrellada arose. They won the last tender process of 2011 by matching the lowest tariff of the last allocated offer (63.5 USD/MW).

Regarding the use of wind energy auctions, Hugo Lucas from IRENA explained: “the emerging countries are those that are now designing better policies to support renewable energy. Now the Danish, German, and Spanish case are not interesting, the really interesting, innovative and trend-setting are those of Peru, Uruguay, Brazil, South Africa, Malaysia because they are those who are using these auction schemes in a more sophisticated way, whereby different renewable energy sources or different providers of the same renewable energy are set to compete. This is now possible because a critical mass of project developers exists. While now competition is possible, formerly there were not so many suppliers (and) they were not so international or not globally developed [...] But these conditions changed, there is no longer this kind of barrier [...] Since all fast-growing emerging countries know they have to diversify their energy matrix, they benefit from the current context of renewable energy. So, their policy makers are designing these auction systems more efficiently, adapting tenders call after call to attain more competition and cheaper prices. Uruguay has achieved the lowest price of wind power in the world so far, and Brazil has managed wind power prices cheaper than those of gas, competing in the same auction” (H. Lucas in radio *Espectador*, 12.06.2013).<sup>125</sup>

It can be affirmed that since the time of the electricity supply shortage policy monopolies of the fossil fuel and hydropower coalitions began to crumble. Political debates were initiated by the renewable energy and nuclear power coalitions and they have competed to gain access to the electricity system and build policy subsystems with their own policy core beliefs and institutional structures. The renewable energy coalition emerged because of their dissatisfaction with the dominant policy core beliefs in the electricity system to deal with the inadequate electricity supply, having a favourable political context after the legal prohibition of nuclear power.

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<sup>125</sup> Source: [www.espectador.com/noticias/266939/hugo-lucas-irena-convencimiento-politico-y-ambicioso-plan-eolico-haran-de-uruguay-un-pais-lider-en-energias-renovables\\_pagina-5](http://www.espectador.com/noticias/266939/hugo-lucas-irena-convencimiento-politico-y-ambicioso-plan-eolico-haran-de-uruguay-un-pais-lider-en-energias-renovables_pagina-5).

As renewable energy became a widespread state policy since late 2008 after the launch of the *Energy Policy 2005–2030*, a second phase for the renewable energy advocacy coalition in the country began. The latter could re-conduct the policymaking process in comparison with the initial somewhat failed attempts of 2005-06. This explains why in 2009 the AHK sent an engineer specialized in the renewable energy field, Winter, to Uruguay and why German renewable energy companies started to be interested in investing in the country. The introduction of the *Energy Policy 2005–2030* and the inclusion of the particular conditions of the wind energy dispatch into the regulation of the electricity wholesale market (Decree No. 460/009) shows the intentions to improve the legal and energy policy framework. But it was not until the *Energy Policy 2005–2030* was ratified by all the political parties that the renewable energy advocacy coalition could succeed in sidelining the nuclear energy coalition. This decision has reinforced the policy framework to stimulate renewable energy development. Further wind energy auctions as well as new regulations addressed to small-scale, and industrial wind energy installations were promoted. The existence of a more adequate and long-term energy policy framework able to create favourable conditions to foster investments in wind energy was the consequence of an enfeeblement of the dominant policy *duopoly*.

**TABLE 6.3. FIRST PHASE**

<b>Phases</b>	<b>Period of Time</b>	<b>Relevant Events &amp; Policies</b>	<b>Main Actors</b>
1997 - 2008	1997	New regulatory framework of the Electricity Sector (Law 16832): Abolition of the UTE monopoly & prohibition of nuclear energy.	National Administration
	1998 - 2000	The engineering faculty installed the first industrial wind turbine of 150 KW (Nordex N27) directly connected to UTEs' network.	UDELAR & IDB - CONICYT
	2002	Regulation of Law 16832.	National Administration
	2004	Increase of electricity demand caused by economic growth = Look at alternative solutions like renewable energy.	
	2006 - 2008	First calls for tenders and allocation of the wind park Nuevo Manantial (15 MW).	UTE, DNE & Agroland
	2007	Competitiveness of renewable energy in comparison with other sources. Uruguay Wind Energy Programme (supported by the GEF & UNDP).	National Administration and DNE
	2008	UTE set up its own wind park Ingeniero Emanuele Cambilargiu (10 MW). Convention between UDELAR and UWEP to develop a Wind Atlas.	UTE, UDELAR & Uruguay Wind Energy Programme (UWEP)

**SOURCE: AUTHOR.**

**TABLE 6.4. SECOND PHASE**

<b>Phases</b>	<b>Period of Time</b>	<b>Relevant Events &amp; Policies</b>	<b>Main Actors</b>
2008 - 2014	2008	The Executive approved the <i>Energy Policy 2005 – 2030</i>	National Administration
	2009 - 2010	Decreces 403/009 and 41/010 entrusted UTE with the realization of wind tenders for 300 MW, having allocated the first 150 MW.	UTE, DNE & private sector
	2009	Decree 567 established a methodology for the dispatch of wind plants.	DNE
	2010	Consensus of the <i>Energy Policy 2005 – 2030</i> by all political parties through the Multiparty Energy Commission.	National Administration
	2010	Implementation of a net metering for mini-grid systems; introduction of a one year FIT for biomass and the PROBIO project for biomass (supported by the GEF and the UNDP).	DNE, DINAMA, & DGF
	2011	192 MW were allocated for wind energy.	UTE, DNE & private sector
	2011 - 2012	537.8 MW of wind energy were additionally allocated.	UTE, DNE & private sector
	2012	Decreces 158 and 433 enabled large industries to produce their own electricity from wind energy.	DNE & UTE
	2013-2014	Decree 133 promoted tenders in photovoltaics with an installed capacity from 500 KW until 50 MW. 2014 was a key year for wind power development, reaching a great scale.	DNE, UTE & private sector

**SOURCE: AUTHOR.**

## **6.7 Policy Change in the Electricity System**

To explain the policy process in the electricity system of Uruguay, the same approach is followed as for that of Argentina in the previous chapter. The following questions are addressed: Why were certain policy beliefs or ideas (but not others) adopted in the Uruguayan's electricity system? Why, facing a problem of inadequate electricity supply and growing energy demand, was it decided to prioritize renewable energy instead of nuclear power? The answer to these questions will guide this second part of the present chapter 6. The whole section 6.7 will explore how renewable energy supporters achieved such success.

First, how impacts from the broader electricity system have affected changes in the policy core attributes of the governmental program, and how the roles of nuclear and hydropower have constrained or facilitated the interaction of the renewable energy advocacy coalition to influence the agenda will be introduced. Subsequently, in section 6.7.4 the hypotheses presented in chapter 2 will be examined.

### **6.7.1 Impacts from the Electricity System: Electricity Reform and Subsidies**

One of the most important changes that facilitated the deployment of renewable energy was the end of UTE's electricity generation monopoly. The new regulatory framework for electricity opened the possibility to private actors to generate electricity. Although this new regulatory framework was approved in 1997, it was not until five years later that the law was implemented through several decrees (i.e. No. 276, 277, 278 and 360), each one corresponding to the general regulatory framework of the national electricity system, the distribution regulation, the transmission regulation, and the regulation of the electricity wholesale market respectively. The reason for the delay might have been the controversy that emerged after the government went against the results of the referendum—aimed to overturn the law No. 16832—, deciding to approve the electricity law.

Traditionally electricity production was only from large hydropower and imported fossil fuels but the liberalization of electricity generation provided Uruguay an alternative path to generate electricity, and this was mostly from biomass and wind energy. From the perspective of Vázquez from La Estrellada, the new electricity regulation “allowed private companies to start thinking in terms of generating

electricity and selling it to UTE, opening the door to invest in renewable energy” (S. Vázquez from La Estrellada, oral interview, 18.12.2012). The liberalization of the electricity generation enabled private companies to invest in renewable energy explaining why the first private investments in the country (from the mid 2000s) were in biomass and wind energy projects. Since Uruguay has no fossil fuels, the liberalization of the electricity generation conducted private companies to start seeking other alternative sources to invest in the country. Here arose the question about which kind of alternative energy sources it was possible to invest in. Nuclear energy was legally forbidden but the possibility to derogate the law was at the moment strongly considered by the government. In 2010, after years of debates, the idea of developing nuclear energy was discarded, at least until 2030, conducting private companies to have only the possibility to develop renewable energy.

Understanding the ownership structure of electricity generation is important because this can partially explain why the state succeeded to provide an energy policy able to foster investments in new energy sources like wind. The partial liberalization of the electricity generation facilitated the opening of the electricity system, enabling different coalitions to enter and discuss their fundamental positions. The structure of the ownership became more open in an electricity system that didn't have indirect energy subsidies, making it easier for new energy sources to compete in the electricity market. When states restrict their participation in the electricity market, the domestic population tends to have lower political demands towards their governing elites since they do not receive the rents generated by the production of electricity. As a consequence governing elites tend to build more transparent and stronger fiscal regimes because there is less pressure for governing elites to build indirect and universal electricity subsidies that undermine budgetary stability and transparency (Jones, Luong, and Weinthal 2010, p. 12).

Unlike Argentina, there is a lack of “quasi-fiscal activities” (Jones Luong and Weinthal 2010) like indirect and implicit subsidies to consumers in public services such as in electricity. The absence of electricity subsidies has facilitated the development of new energy sources like biomass and wind. Without electricity subsidies improvements in energy efficiency are also more likely to happen. The end of the UTE's monopoly in the electricity generation led to a more open structure in the electricity system. This process in a country with a more transparent fiscal regime

could contribute to policy innovation in the electricity sector. In the case of Uruguay, political changes in the broader (electricity) system had a favorable impact on the introduction of gradual policy changes in the governmental program.

### **6.7.2 Technical and Administrative Difficulties**

Unlike in chapter 5, here the technical, management, and administrative barriers related to the capacity for wind energy development will also be examined. When the development of wind energy began in 2006, there were a lot of problems due to lack of experience within the sector. In fact, the Nuevo Manantial wind farm from the Argentinean company Agroland S.A., the first wind farm installed in the country, had several logistical and technical problems.

As Vázquez described, “UTE purchased a smaller portion of the generated electricity than the portion of electricity that the utility company had agreed before. The reasons were the inexperience of the investor (wind energy was not his business) and the lack of local advice (i.e. advice from UTE). Thus, the company bought second hand wind turbines from Europe and the project was unsuccessful. But it was the beginning of a learning process for large-scale wind that influenced the Energy Policy 2005–2030, which interpreted and expanded upon the electricity law of 1997<sup>126</sup> and gave strong priority to renewable energies. After its publication came the first requests for bids for 150 MW facilities in 2010” (S. Vázquez, oral interview, 18.12.2012). Nevertheless, certain technical problems remained and others have become more evident since the allocation of an unexpectedly large number of wind projects, particularly with regard to logistic and infrastructural issues. Those problems can be summed up as:

- The need for additional capacity at the Port of Montevideo in order to receive wind turbines.
- The need for more roads and bridges that can support the weight of wind turbines.
- The need for electrical grids with added capacity and the need of network integration. Although Uruguay is largely electrified, when different projects are allocated in the same area using the same grid, it does not have enough

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<sup>126</sup> Law No. 16832: “Updating of the National Electricity System and creation of the regulatory unity of the electrical energy (UREE)”.



capacity to integrate the electricity generated by the wind turbines. Thus, the installation must change locations at great costs.

- The allocated projects that are under the average wind speed of Uruguay (8 m/s)<sup>127</sup> may have problems because the tariff set at 63.5 USD/MW of wind may be too low for a wind speed that is under the referred average and, thus, they do not generate enough profits for the investor.
- The need for clear pre-established and fixed criteria to regulate the environmental approval procedure. There is a lack of rules concerning environmental and territorial planning. Indeed the National Directorate for Environment (DINAMA) frequently changes the rules because they do not have regulations established in advance to make a proper environmental audit.
- Since none of the investors own the land, they must rent the land in order to exploit the wind energy and, therefore, is difficult for foreign investors who do not have local contacts.

Regarding the first point, the administration of the Port of Montevideo has arranged a special space for the coming wind turbines but under the condition that they do not stay too long in port. For this reason, the government has accelerated the custom processes to enable wind turbines to leave port rapidly (Perruccio from the AUdEE, 19.07.2013).<sup>128</sup> The national administration is also strengthening the capacity of other commercial ports.

In the opinion of one of the members of the Uruguayan Association of Wind Energy (AUdEE), Mullin, “since Uruguay is a small country logistics are one of the challenges, especially if all the projects are executed at the same time. Indeed, if all 500 wind turbines are mobilized at the same time it will result in some significant difficulties for the country” (S. Mullin, video call interview, 27.07.2013). Regarding

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<sup>127</sup> From the perspective of Vázquez, the average wind speed in Uruguay is estimated in 8–8.5 m/s second.

<sup>128</sup> Source:

[http://www.argentinaeolica.org.ar/portal/index.php?option=com\\_content&task=view&id=4461&Itemid=2](http://www.argentinaeolica.org.ar/portal/index.php?option=com_content&task=view&id=4461&Itemid=2).

this problem, Perruccio said: “to compensate for the lack of sufficient roads, wind turbines are being transported at night” (Perruccio from the AUdEE, 19.07.2013).<sup>129</sup>

Concerning the capacity of the electrical networks, there are some projects underway. One of the most important projects is the 500 kV transmission line extending 350 km from San Carlos in the south to Melo in the north. This line will interconnect Uruguay with Brazil, which is a goal expressed in Uruguay’s energy policy. A converter will also be constructed in Melo in order to buy and sell energy from Brazil. In the opinion of Mullin, “the integration of networks is currently in the development process whereby investments in the infrastructure are being made in order to facilitate network growth in time to integrate the allocated 1300 MW. If the network of 150 kV is not integrated as projected, there will be problems. UTE has planned this but it will be a challenge to do it within the expected time” (S. Mullin, video call interview, 27.07.2013). Besides efforts to invest in the infrastructure, the need for fixed criteria to regulate the environmental approval procedure, and the issue of renting the land to install the wind parks remain problematic. These problems are a challenge for current energy policy.

The role of the DINAMA and its regulations regarding infrastructure investments is currently a controversial issue. In recent years there have been complaints from private investors, entrepreneurs as well as representatives from public companies, like UTE and ANCAP, regarding issues like the need to foster the DINAMA, the lack of qualified personnel working there and the sluggishness of the bureaucratic proceedings that hinder investments. In fact, Jacob mentioned those problems during the interview: “bureaucratic proceedings work very slowly and it takes a lot of time to get the necessary approvals in order to advance the installation of wind parks. So they need to work faster, more efficiently, but in general we see a chance to improve the cooperation between the authorities and companies” (J. Jacob, oral interview, 16.11.2012).

Since the Ministry of Housing, Territorial Planning, and the Environment (MVOTMA) and its directorate DINAMA are relatively new,<sup>130</sup> know how and

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<sup>129</sup> Source: Ibid. 128.

<sup>130</sup> In June 1990, under the Lacalle administration, the Ministry of Housing, Territorial Planning and the Environment (MVOTMA) was created, through law No. 16112. Before that time, the only

experience in the environmental sector are still inadequate. DINAMA faces new challenges every time a large project from a new subsector, like a wind park, is launched.

Gudynas made an interesting point about the functioning of the DINAMA: “The coordination of different national environmental policies is essential to give a solid structure to the whole environmental policy. This will require the government to setup more mechanisms for monitoring and coordination between DINAMA and other ministries, public companies and local administrations. The President’s administration has been continually saying that this institution is overwhelmed and must be split up and that it complicates investments. A reasonable solution would be to agree to a national environmental policy and to strengthen the MVOTMA (not in budget but rather in political weight) in order to promote adequate environmental management, both between private companies (or citizens) and the state” (*Semanario Voces*, 11.04.2013).<sup>131</sup>

Nevertheless, in the interview held with Mullin from the AUdEE, it was highlighted that the problems with the DINAMA have been mostly overcome because the Environmental Directorate has accelerated permits for wind parks between 2012 and the beginning of 2013. In particular he mentioned that, “in the beginning, the DINAMA did not have any regulation and it was not prepared to receive these types of projects; generating some conflict with private developers. But now, except for some isolated cases, the majority of the allocated projects have already the required environmental authorization from the DINAMA to start the construction of respective wind parks” (S. Mullin, video call interview, 27.07.2013). This conclusion is confirmed on the official site of the DINAMA, where almost all the allocated wind parks as well as those projected by UTE are listed as authorized projects (almost all between 2012 until March 2013).<sup>132</sup>

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predecessor was the Ministry of Housing and Social Promotion that was created in 1974 under the military dictatorship. It was dissolved in 1977.

<sup>131</sup> For details see: [www.voces.com.uy/articulos-1/lacrisispoliticaenlapoliticaambientaleduardogudynas](http://www.voces.com.uy/articulos-1/lacrisispoliticaenlapoliticaambientaleduardogudynas).

<sup>132</sup> Source: MVOTMA. More information: <http://www.mvotma.gub.uy/ambiente-territorio-y-agua/participacion-ciudadana/manifiestos>.

Closely related is the last point described above about the renting of land for the production of wind energy. This is a problem of land use, which is typical and frequent in the South American region. The dispute for land appears when different interests concerning its productive use are superimposed within a territorial area. In Uruguay, interest conflicts have appeared in a territorial colony (Campbell P. Mc. Meekan), which belongs to the INC.<sup>133</sup> Due to the allocation of a wind installation planned by UTE in the Mc. Meekan colony, the local tenant farmers started to complain and to oppose the development in the area they occupy. They claimed the wind park would hinder their productive activities (farming and ranching). Thus after a few discussions between the national administration, the INC, and local tenant farmers; the government decided to attempt to move the project to another location with less social resistance and similar wind conditions.<sup>134</sup>

There is scarce information about this conflict besides a few articles in local journals like *Primera Hora* and *Diario Colonia*. The conflict was only mentioned by the person who is responsible for social policies within the DNE when she was asked about social resistance to wind parks in Uruguay. Rossanna González referred to that issue more as an economic conflict that local tenant farmers have with UTE. She explained “it is more a problem of economic accord, interests and governance than a resistance to wind energy. They do not agree with UTE about how much they will receive for the use of their land” (R. González, oral interview, 17.12.2012). There is a lack of regulatory framework that clearly defines zones where it is and isn’t possible to install wind turbines and under what conditions as well as potential compensation mechanisms when these cases are presented. For example in Germany since 2009 the Annual Tax Act 2009 has defined the distribution of business taxes (*Gewerbesteuer*) coming from the operation of wind turbines. In the regulation, local communities, where wind turbines are settled, receive 70% of the business tax and the municipality only 30%. The revenues from the use of wind energy that go to the local community have a concrete financial benefit (Chapter 7).<sup>135</sup>

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<sup>133</sup> Source: The INC is the organization at the national level responsible for implementing and deploying settlement policy. See more: <http://www.colonizacion.com.uy>.

<sup>134</sup> Source: <http://www.primerahora.com.uy/6968-proyecto-de-parque-eolico-en-mc-meekan-podria-mudarse-hacia-el-penal-de-libertad.html>. <http://diariocolonia.com/nacionales/relocalizarian-parque-eolico-en-san-jose/>.

<sup>135</sup> Source: [www.homberger-hingucker.de/?p=2137](http://www.homberger-hingucker.de/?p=2137).

### 6.7.3 Role of Nuclear Energy and Hydropower in Uruguay

- **Nuclear Power**

Nuclear energy was legally forbidden in 1997. The events that preceded the antinuclear regulation have indirectly influenced public opinion to consider renewable energy as an option to diversify the energy mix, instead of nuclear power. In some occasions of electricity crisis, politicians have tried to retract the antinuclear article in the law, but have failed. In an interview a private entrepreneur said, “in Uruguay it has always been claimed that the antinuclear (regulation) will be removed” (S. Vázquez, oral interview, 18.12.2012) but this has not happened so far.

In the context of electricity shortages since 2005 a public debate around the derogation of the article was engendered and two coalitions with opposing ideas and policy core beliefs emerged. The government of Vázquez and the DNE, before Méndez, had an ambiguous position concerning nuclear energy, while they were also supporting the deployment of renewable energy with legal regulations. In fact, at a seminar of the Montevideo Circle (29.10.2007), Vice President Rodolfo Nin Novoa and the Minister of Industry, Energy and Mining, Jorge Lepra, openly discussed this prospect. Nin Novoa highlighted that after the derogation of the article, which was a possible plan, it would take another 10 to 15 years for the installation of a nuclear power plant.<sup>136</sup> Nevertheless this has not happened and, after Méndez was elected Energy Director, a national energy policy promoting renewable energy and sidelining nuclear power was approved and then ratified by the government together with all the political parties. Even UTE has succeeded installing its own wind park. This confirms that in spite of the ambiguous political discourses and the posterior *Consensus-Making Conference* to consult the public about the possible implementation of nuclear power, the government had already taken the decision to develop renewable energy instead of nuclear.<sup>137</sup> After that the nuclear accident at Fukushima occurred, confirming and reinforcing even more this decision.

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<sup>136</sup> Source: <http://uruguayescribe.com/2007/10/29/el-gobierno-uruguayo-esta-dispuesto-a-derogar-prohibicion-de-energia-nuclear/>.

<sup>137</sup> Source: “Consensus-making Conference” or “Citizens' Forum”, is a procedure of public participation in issues of Science and Technology (S & T) in which a group of 15 citizens come together to make a series of recommendations about a particular topic based on information and testimony presented by various experts.

From Vázquez' perspective, a lot of Uruguayans are potential opponents of nuclear energy because of a general mistrust. He explained, "the safety of nuclear reactors would be the responsibility of the state and people don't believe that the state could guarantee that safety. The state via UTE would be responsible for the nuclear reactors and there is a general assumption that the state does not have the ability to execute adequate safety controls. Therefore, because renewable energy needs a stable and reliable source of energy to support demand when there is a lack of renewable energy sources, it was decided to install a closed-cycle gas turbine (CCGT) plant instead of the nuclear option" (S. Vázquez, oral interview, 18.12.2012). From his perspective the main reason for the public rejection is the nuclear risk or the lack of safety associated with nuclear technology and indeed the main argument of the mobilizations to forbid nuclear activities in the 1990s was civil safety.

However, not all Uruguayans against nuclear energy see the risk of an accident associated with nuclear reactors as a problem, especially not politicians and bureaucrats. When the National Director of Energy was asked about why they decided not to develop nuclear energy in the country, he answered, "nuclear energy contradicts current energy policy because first, it is not produced locally and requires importation and, second, we do not have the capacity for nuclear reprocessing. Therefore, since initial investments of nuclear energy are higher than those of renewable energy, the economic rate of return of the first is lower and, thus, its cost is vastly higher than the costs of renewable energy. Moreover the costs of nuclear waste management during thousand of years are, for such a small country, extremely high. However nuclear energy is still considered as a potential option for post-2030, but only if certain conditions are met. Until the year 2030, we see renewable energy as cheaper and more respectful for the environment" (R. Méndez, oral interview, the 17.12.2012). The 'certain conditions' referred by Méndez are the solutions for nuclear waste problems. Thus, only if after 2030 there are solutions to manage nuclear wastes at a reasonable cost will it be possible to think about the nuclear alternative.

For the Energy Director, the main arguments to reject nuclear energy and, instead to support renewable energy are the economic costs of both technologies, and the idea that promoting an energy technology that can be produced domestically is

more attractive than the need to import technologies as well as deal with the question of nuclear waste management. Winter confirmed this saying that “although Ramon Méndez studied nuclear engineering, he agreed that if the World Bank wanted to economically support the promotion of renewable energy why not try to implement it. Additionally, in the last five or six years renewable energy has become very competitive and wind energy is cheaper than any other source with the exception of hydropower. Now the price of wind energy is 62.5 USD/MWh and nuclear is between US 80 and US 100 dollars per MWh. For this reason, and because electricity is not subsidized in Uruguay, the Director of Energy thought it the most economic alternative for the country” (T. Winter, oral interview, 15.12.2012).

Why was the renewable energy option imposed over the nuclear option? In the context of the legal ban and negative public image, several engineers of the Udelar supported by a sector of UTE played a crucial role in the encouragement of renewable energy, through the presentation of official reports. Subsequently, as I mentioned before, the change of political balance for the first time, in favour of the Broad Front party, facilitated the access of the Udelar’s engineers who are more committed to renewable energy, and less to nuclear, to UTE and to the DNE. Since then UTE unified its voice along with the DNE in favor of renewable energy, postponing the potential nuclear option for 2030 or later, if at all. But, which are the main visions behind the support of renewable energy, instead of nuclear? From the side of UTE and the DNE a cost-benefit vision, associated with the competitive costs of renewable technology, converged with an ethical belief about the problem of nuclear wastes. From the side of the antinuclear NGOs and part of the public opinion the main concern was civil safety, which is an ethical concern. The latter had an indirect impact on the ultimate decision taken by UTE and the DNE. Thus, policy core beliefs linked with cost-benefit and ethical positions of the renewable energy coalition succeeded over the nuclear coalition. In the debates President José Mujica intervened acting as a “policy broker” (Sabatier 1993) when he setup the Multiparty Energy Commission to reach an agreement with all the political parties and ratify the *Energy Policy 2005–2030*, giving priority to renewable sources over nuclear energy.

In the case of Argentina, path dependency with regard to nuclear and large-scale hydropower presented barriers for the development of wind energy (Chapter 5). Since

Uruguay, like Argentina, has traditionally developed large-scale hydropower, how this factor relates to the development of renewable energy will be analyzed below.

- **The Role of Hydropower**

As already explained, the production of hydropower has been important since 1945, through four hydropower dams at Baygorria, Palmar, Bonete, and Salto Grande. The problem is that hydropower capacity, in contrast to Argentina, has already been exhausted, at least in relation to the installation of large-scale hydropower plants. In fact, as the President of UTE expressed, “little water remains to provide electricity. We have used 97% of hydro resources and little remains left to explore” (G. Casaravilla in *El Pais*, 10.12.2012). The present situation is that the current hydropower production is insufficient to meet the electricity demand but there are no more hydraulic resources to make use of. One of the main reasons is that demand has been growing continuously, especially since the 2000s, while production has remained the same.

Although the Uruguayan electricity mix was traditionally based on large hydropower, the depletion of this resource has forced the country to think about introducing renewable energy sources, mainly wind, biomass and a few small-scale hydropower plants. In addition, these sources will be supplemented with some LNG, since nuclear power has been sidelined as an alternative energy source. The depletion of the hydropower capacity has helped the renewable energy advocacy coalition gain access to the policy agenda. They have limited the dominance of the hydropower advocacy coalition. Thus, UTE will continue operating the installed four large hydropower dams but no expansion in the hydro capacity is projected.

#### **6.7.4 Research Findings**

Renewable energy has achieved the general support of policymakers in the electricity system and has become one of Uruguay’s main energy sources, after large hydropower, in the national electricity mix. Why were ambitious renewable energy goals established leading to appreciable policy change? Referring to the first hypothesis (H1):



The policy core attributes of a governmental program in a specific jurisdiction will not be significantly revised as long as the system advocacy coalition that instituted the program has a policy monopoly within that system. Conversely, the policy core attributes of a governmental program in a specific jurisdiction will be significantly revised if the system advocacy coalition that instituted the original program loses the policy monopoly within that system.

According to this hypothesis (Chapter 2), the successful support for wind energy together with biomass, some photovoltaics and some small-scale hydropower—instead of nuclear—can be seen as the result of changes in the policy monopoly within the electricity system whereby the fossil fuel and hydropower coalitions that instituted the original program lost their monopolies within that system to be replaced by the renewable energy coalition. This argument goes rather too far. The fossil fuel and large hydropower interests remain very strong in the electricity system, but their policy duopoly has been weakened. Thus, new policy attributes have been introduced in the governmental program, leading to a disturbing of the partial equilibrium in the electricity system. Baumgartner and Jones point out “policy monopolies are highly favorable policy-making structures for those who participate in them, and they produce seeming equilibria that may be far from what another group of participants might prefer. Agenda-setting is a process that has the potential of disturbing these partial equilibria in politics” (2009, p. 20). The system advocacy coalitions are now in a more unstable situation with the opposing renewable energy coalition gaining strength. Recently, there have been important policy changes. As a consequence, new policy core attributes and new institutional structures favouring renewable energy and confronting the collective long-term interests of the nuclear energy coalition have emerged in the electricity system of Uruguay. In the decision to support renewable energy and energy efficiency, actors from UTE and from the DNE prioritized a cost-benefit belief. Indeed in a country where the electricity is not subsidized and considered to be expensive, one of the main goals was to reduce the electricity price. New energy sources and more energy efficiency and conservation had the purpose of achieving this goal.

As Baumgartner and Jones (2009) explain new institutional structures serve to reinforce the achievement of the policy core attributes pursued by the actors. An adequate and long-term legal and energy policy framework was set in the electricity

system, being more favourable to the implementation of subsequent decrees and public policies. This decision was crucial to facilitate the take-off of the renewable energy path. The lack of an adequate and stable legal and energy policy framework was a limitation identified in the case of Argentina that hindered the possibility of finding sufficient financial support for the renewable energy projects as well as the electricity infrastructure. Unlike Argentina, the *Energy Policy 2005–2030* in Uruguay has driven a shared dialogue between all political parties in order to achieve a consensus within the energy and electricity system. In particular for the cases of wind energy and biomass the national programs, UWEP and PROBIO, had the objective to encourage policy expertise in the field. Capable staffs were to be responsible for coordinating and divulging all activities, actors and regulations related to both sectors. The UNDP-LAC has contributed to strengthening the renewable energy subsystem through national discussions about key issues and strategic actions for climate change mitigation in the energy and electricity sector, as part of national activities promoted in the framework of *Climate Policy Project 2012: Preparing Climate Strategies*.<sup>138</sup>

Additionally, the Uruguayan government has set up a professional staff in the DNE and UTE to make sure that new electricity projects were implemented following and respecting the electricity normative and national energy policy outlined in 2008. Professionals educated in Europe specializing in wind energy are currently part of the professional staff at UTE. Accordingly, the Vice President of UTE Briozzo as well as its electricity generation manager Oscar Ferreño, both studied electrical engineering and wind energy in Europe and worked there with small and large scale wind turbines, bringing their knowledge back to the country. The actors of the renewable energy coalition have been working together from around 2003 in an attempt to achieve agreed policies in the sector, with AUdEE being a good example for the wind subsector. The creation of the AUdEE<sup>139</sup> in 2009 has indirectly driven a dialogue between public and private actors. In an interview with the National Director of

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<sup>138</sup> Source: “Proyecto Políticas Climáticas 2012: Preparando Estrategias Climáticas” <http://www.eeg-regionalcentre/undp.org/images/stories/pdf/politicas%20climticas%202012%20preparando%20estrategias%20climticas.pdf>.

<sup>139</sup> Since the creation of the AUdEE, the association has achieved to set good relations with different official institutions, private companies, and diverse personalities of the sector. See more details in: <http://www.audee.org/>.

Energy he said, “private and public actors are linked through the AUdEE. The wind association is separated from the government but binds public and private actors” (R. Méndez, oral interview, 17.12.2012). Santiago Mullin from the AUdEE said, “the AUdEE is composed by individual members, that is to say, persons who can represent companies or not. Its board of directors is composed of people that work in private companies and also in UTE and are interested in the wind energy process” (S. Mullin, video call interview, 27.07.2013). Although the association is independent from the public and private sectors, it enables an exchange of information and, indirectly, builds relations among actors representing different sectors. Beyond the private actors, some of the members of the AUdEE board are actually members from UTE.

Although the renewable energy legal and policy framework has been continuously improved since 2005, there are still technical challenges regarding the deployment of wind energy. These are typical bottlenecks of a new technology. Eight years do not represent sufficient time in the development of the necessary technical expertise to deploy a nascent technology. Wind power, as an innovative energy source, requires new specific knowledge related to the functioning of the electricity sector. Accordingly, Winter explained “there is not enough expertise in the sector and there will be a lot of obstacles and delays, like how to manage the electricity grid with wind energy and how to dispatch it, among others. This is not the responsibility of private investors but of UTE” (T. Winter, oral interview, 15.12.2012). This technical knowledge and expertise, addressed by Winter and Vázquez, seems to be difficult to acquire rapidly, despite it was issued a stable legal and energy policy framework that could enable finding sufficient financial support for wind energy projects and for electricity infrastructures.

The assumption for the availability of adequate technical knowledge would be that it represents an objective limit, beyond which delays (instead of failure) set, even if there are skilled and highly motivated actors (Jänicke 2002). In fact, delays are expected due to a lack of adequate technical knowledge but the latter is expected to be improved over time thanks to a favourable energy policy framework that has been strengthened in the last years. Thus, without omitting the observed delays and obstacles, it can be highlighted that the long-term energy policy framework is what has enabled renewable energy regulations to succeed in financially supporting wind energy projects and the required electricity infrastructure.

As it was explained in the second hypothesis (H2) changes in policy core attributes of a governmental program (path change) in a particular system are influenced by international policy learning. International policy learning has contributed to policy changes in the governmental program of Uruguay. In fact, renewable energy developments from abroad have greatly influenced the renewable energy advocacy coalition in the country.

The relationship with the AHK Uruguay, the Spanish AECID, European universities where various engineers have studied as well as private foreign renewable energy developers was important as they created a horizontal dialogue in which domestic actors have observed, consulted, and learned from international practices. The AHK Uruguay and the Spanish AECID have assisted and advised in formal and technical issues concerning the implementation of wind energy. Joint venture projects like Peralta GCEE (formed by the German company EAB New Energy, its Brazilian subsidiary EPI Energía, and the Uruguayan company SEG Ingeniería) and foreign companies like the Finnish UPM (a leader in the new forest industry) have helped domestic developers to gain specific technical knowledge and capacity, providing another example of international policy learning. Moreover, the economic and technical support provided by international organizations, such as the WB, the GEF, and the UNDP was important at the governmental level to initiate the development of wind and biomass. Like Argentina, Uruguay has signed the Statute of the IRENA in 2009, promoting further the open dialogue with the international community.

In other words, relationships established with renewable energy pioneering or advanced countries and international organizations have been manifested in varied horizontal forms and different channels such as studies made abroad, economic support, technical consulting, and business partnerships. This complex articulation, here named international policy learning, has inspired and influenced the path towards renewable energy.

Also, as explained in chapter 2, changes in policy core attributes of a governmental program (path change) are conditioned by certain external elements such as impacts from the electricity system's institutions; socioeconomic and technology conditions; and changes in the political balance of power. Changes in the electricity generation area (the broader system), had an impact on the implementation of renewable energy policies. A partially liberalized electricity generation in a

transition country has opened the structure of the electricity system. A more open electricity system has facilitated the access of new actors, the penetration of new ideas, and the feasibility of policy options that fostered their development.

This constitutes an example of transition electricity systems that, after the partial liberalization of electricity generation, became more open and likely to enable the creation of a new advocacy coalition willing to conduct policy change. The end of the electricity generation monopoly that owned the fully state-owned company, UTE, had as an indirect consequence of triggering thinking about alternative and new energy policy models.

It is also quite important to consider the influence of the socioeconomic context for its implications in Uruguay. Socioeconomic changes can undermine the causal assumptions of present policies or alter the political support of various advocacy coalitions, as Sabatier argued (1993, p. 22). In the case of Uruguay, the worldwide competitiveness of wind energy since the late 2000s in comparison with other energy technologies but especially with nuclear helped to alter political support of policymakers more in favor of the renewable energy coalition. Additionally, in relation to “the character or structure of the problem” (Jänicke 2002), it is important to examine the urgent problem associated with an inadequate energy supply. Socioeconomic development of the country provoked a rapid growth in the electricity demand that combined with insufficient domestic electricity capacity contributed to give a boost to the deployment of renewable energy. Therefore, both worldwide competitiveness of renewable energy and rapid growth of electricity demand, due to high levels of socioeconomic growth, have facilitated the success of renewable energy development and a path change.

The access of the Broad Front to the political power for the first time contributed to accelerate the ambitions of the renewable energy coalition, especially a segment in UTE but also Udelar’s academics. But the party had not a clearly antinuclear position, nor a clearly pro-nuclear attitude. It was rather ambiguous. When president Vázquez went into office it was the peak moment of the energy crisis and the inflection point for energy debates. In that moment the Vázquez administration had supported nuclear and renewable energy, or better explained it has not discarded any of these sources. However, among the technical advisors collaborating with the politicians there were some professors of the Udelar who wanted to develop

renewable energy, not nuclear. In fact, the Broad Front a relatively young party, at least in relation to the other two traditional parties, gathered a few actors, especially technical advisors, who were more willing to seek and implement innovative alternatives. What is important is that these technical advisors, mostly engineers or related sciences of the Udelar have worked together with some members of UTE and had considerable influence over political decisions, at least in the electricity system; afterwards several of these Udelar engineers became bureaucrats in DNE and UTE.

Section 6.8.5 will summarize the factors that led to a successful deployment of renewable energy policy and will describe the barriers that still remain in place. Examples of countries in the world that have overcome similar obstacles, through different policy instruments will also be provided.

### **6.7.5 Preliminary Conclusions**

The main conditions that favored the start of the renewable energy deployment were liberalization of the electricity generation, the energy crisis triggered in 2005, the competitiveness of wind energy, the access of the Broad Front, and international renewable energy developments. These conditions have contributed to helping the renewable energy advocacy coalition build a policy subsystem.

But not all the aforementioned conditions had the same significance in their contribution to policy change. Facing an energy crisis, actors have considered diverse cost-effective possibilities to develop their own energy capacity and reduce the dependency on fossil fuels imports. The objective was to boost the energy independency and security but also reduce costs. They first analyzed and then debated with society the introduction of nuclear power and different renewable energy sources, opting for the latter and discarding (at least until the year 2030) the nuclear option. Some changes in ownership structures and more solid fiscal regimes in the sense of an absence of indirect subsidies have helped policymakers to discuss broadly and reflect on the feasible and most cost-efficient possibilities in order to overcome the electricity crisis. Similar energy debates have occurred in the past in Western developed countries. For example, Jasper (1990, p. 267) suggests that the oil crisis and the rising antinuclear movement put energy policy on the agenda of politicians and the media, having as an indirect consequence the development of energy models favoring the cost-benefit belief in US and Sweden.

Which conditions had more significance in the decision to develop renewable energy, instead of nuclear in Uruguay? Similar to the suggestion of Jasper, the energy crisis triggered in 2005, cost competitiveness of wind energy, and the international renewable energy developments put the energy policy on the agenda of politicians, having as an indirect consequence the development an energy model based on renewable energy, mainly wind and biomass, that favored mostly the cost-benefit and ethical beliefs. In the context of electricity scarcity, worldwide cost competitiveness of wind power, and the international renewable energy developments mattered more in the decision to develop a renewable energy path than the access of the Broad Front and the partial liberalization of the electricity generation.

The cost competitiveness of wind energy was directly related to the cost-benefit belief. In Uruguay, cost reduction of the electricity generation was an urgent issue as policymakers were quite concerned about obtaining a cost-benefit. But not only the cost-benefit belief mattered; ethical considerations about nuclear waste issues were also considered. Indeed, director of the DNE said “I think the main problem is nuclear wastes; this is a philosophical and ethical issue. Are we ready, even under the best work conditions, to leave to future generations something potentially dangerous beneath the earth for thousand years?” (Méndez, interview for Uruguay Science Magazine 2008). While the problem of nuclear accidents was more important for environmental NGOs and the public opinion, it was less significant for bureaucrats and politicians. However, as environmental NGOs participated in civil initiatives like the Consensus Making Conference, the risk of nuclear accidents was also considered in the debate and NGOs had certainly an indirect influence bolstering the decision to discard the nuclear option. It is possible to conclude that a convergence between a cost-benefit position and an ethical belief succeeded in the decision to develop renewable energy. The objective of a local technological development came after cost-benefit and ethical concerns.

Renewable energy developments abroad was the other variable that contributed to set ambitious wind and biomass energy goals in the agenda-setting process. It should be highlighted that the influence of international developments was adapted to the domestic political context. For example, contrary to the initial suggestions of Germany and Spain to implement a FIT mechanism for wind energy, Uruguay decided to launch an auction process because, according to their cost-benefit

belief, this was more cost-effective. They allowed FITs only for biomass and net metering for micro-energy production of renewable sources. In relation to the categories referred to by Weyland (2004), international policy learning for renewable energy was a result of independent observation by domestic actors and not of the pressures or even inducements exerted by foreign actors (Chapter 2). Uruguay did not adopt any renewable energy policy model from Europe but rather they preferred to observe and adapt international models to domestic practices and objectives. The *observation* of international ideas and experiences provided a source of inspiration. In regard to international policy learning in Latin America Nelson explains, “the retained autonomy of Latin American countries is quite high. Although external models provide crucial inputs to gain an adequate consensus for change, internal experiences and politics determine how those models, ideas or programs are used” (2004, p. 51). In the renewable energy subsystem, the decision to reject FITs and instead implement an auction scheme confirmed that external models were observed but policymakers retained great autonomy in their decisions.

After the renewable energy advocacy coalition succeed in winning some political support, the legal and energy policy framework in the electricity system began a process of improvement. Still, there are several challenges to address in the technical areas related to renewable energy, especially wind power. For example, the National Director of Energy said that they are dealing with all the bottlenecks in logistics in order to introduce as many wind turbines as possible in a short period of time (R. Méndez, oral interview, 17.12.2012). As was explained before, there are some new technical and policy challenges that need to be attended and overcome until for example wind energy can achieve the projected goals in the electricity mix as well as establish itself as a more mature industrial sector. Due to the novelty of the renewable sector, this aspect was only briefly mentioned here but it is a potential research area for the future, as will be suggested in chapter 8. In the table 6.5 a summary of the elements explaining renewable energy development is presented.



**TABLE 6.5. ELEMENTS OF RENEWABLE ENERGY POLICY PROCESS**

<b>Elements</b>		<b>Characteristics</b>
<b>Advocacy Coalitions' Policy Monopolies</b>	Policy Core Beliefs	Policy core belief in favor of large hydropower & renewable energy with a supplement of gas, and against nuclear power = Small Policy Change.
	Energy Policy and Legal Framework	Long-term and more stable energy policy & legal framework facilitated policies & regulations to support renewable energy projects.
<b>International Policy Learning Process</b>		Policy learning from international ideas in renewable energy & full national adaptation. Several kinds of horizontal relationships with international actors.

**SOURCE: AUTHOR.**

## **7 Examples from Abroad: Germany and France**

### **7.1 France and Germany as Pioneering Countries**

What can be learned from the previous experiences of France and Germany? Answering this question will enable us to see whether there are similarities in the cases of France for nuclear energy and Germany for wind energy, which can be applied to expand our understandings of the Argentinean and Uruguayan energy developments. Some aspects of the technological paths followed by Germany and France that are crucial for Argentina and Uruguay will be shown. Germany, Denmark, Spain, and California, are pioneering countries in the development of renewable and wind energy policies. Looking at Germany as an example of an *'early energy transition'* country can be useful for countries that have recently decided to encourage energy transition with renewable energy like Uruguay. In contrast, France, Japan, Canada, and Sweden are considered to be references in nuclear energy. French nuclear policy may constitute a good example to observe when analysing countries that are currently fostering nuclear energy like the case of Argentina.

To see which factors and actors have conditioned the development of new energy sources—especially wind energy—in Germany and in the French case, nuclear policy a comparative overview will be presented. This comparative description will include similar references that are especially important to the two selected case studies—Argentina and Uruguay.

### **7.2 Early Nuclear Development in France and Late Nuclear Adoption in Germany**

During the transition from the Third Republic (1870-1940) to the Fourth Republic (1947-1959) economic and industrial activities faced various problems. There was a general political consensus that France should redefine the role of the state, creating new or reforming old public institutions. The answer came along with President Charles de Gaulle<sup>140</sup> who, among other institutions, founded in 1945 an atomic energy commission, the “Commissariat à l’Energie Atomique” (CEA), aimed to develop nuclear research and technology. The following year, the state-owned utility

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<sup>140</sup> Charles de Gaulle was President in the Provisional Government of the French Republic from 1944 until 1946.

“Electricité de France” (EDF) emerged as a consequence of the nationalization of the electricity generation, transmission, and distribution. These two institutions were crucial in the formation and development of nuclear energy and the constitution of the modern French identity. France emerged as a new technological country in which state experts, so-called “technologists”, played the key role defining national identity (Hecht 2009).

In the new paradigm technologists had a better position, due to their specific knowledge, than politicians to take sound strategic decisions that could lead to gain geopolitical power and independence. Notions like long-term, future, growth, technological progress, political power, and independency constituted the main goals of technologists who were afraid that France would lose its status of a great nation through the process of decolonization (Hecht 2009). Technologists would become the representatives and the spokesmen of the nation. Their commitment to technological autonomy was essential in shaping the initial development of nuclear energy. This explains why in the late 1950s technologists and top politicians supported more French gas-graphite technology than American LWR. As Jasper (1990) points out “in France light water commercialization was delayed [...] partly because the political elite clung to a view of the national interest as autonomous technological development rather than as the ability to compete in international markets” (p. 100). This nationalist technological belief was mainly driven by the CEA with the full support of de Gaulle during his presidency (1959–1969). For de Gaulle and the CEA gas-graphite technology symbolized French cultural superiority, national independence, and glory.

In 1969 when president George Pompidou (1969-1974) took office, he revised de Gaulle’s nuclear policy, “approving a policy in which EDF would build more LWRs without necessarily engaging more gas-graphite reactors” (Jasper 1990, p. 79). EDF was closer to Pompidou’s idea than to the position of president Charles de Gaulle and for them ‘national independence’ did not mean “technological autonomy” but rather “economic competitiveness” (Jasper 1990). As the utility company had managers with an economic expertise they did not advocate the same “technopolitics” of the CEA’s engineers and de Gaulle (Hecht 2009). For example, to EDF the American reactor model was more cost-effective than the French gas-graphite technology. Thus, when Pompidou won the election they could impose their view

over the CEA. By balancing cost-benefit and technological enthusiasm, EDF and the CEA finally agreed in favor of the LWR. Since then, top policymakers were more convinced of the importance of competing on international markets and less of the idea of technological autonomy. By 1973 when the oil crisis was triggered this position was reinforced. In fact, when Giscard d'Estaing came into power he continued supporting nuclear policy as a form of industrial policy. For Giscard, as well as Pompidou, nuclear energy was seen as a "mean of developing French heavy industry, making it competitive on world markets and giving it access to foreign technology" (Jasper 1990).

In contrast Germany, as a latecomer in nuclear energy, favoured sooner than France the import of the Westinghouse LWR from USA and supported a national long-term development of high- temperature and fast-breeder reactors. Jasper (1990) explains for the case of Sweden that technology autonomy mattered less in this country than in France because they were more concerned with the export potential and the ability to respond quickly to international markets. The need to answer quickly to the international market development may be also a reason why Germany opted immediately for the LWR.

Before 1973 Germany, as well as France, had still a relatively modest nuclear sector. Yet in 1973 by the time of the oil crisis both countries planned widespread nuclear development programs. The increasing price of oil and the question of the energy independence pushed the governments to expand substantially their nuclear programs. The result was the Messmer Plan in France and the fourth Atom Program in Germany. Policy decisions were taken by politicians, bureaucrats and scientists but did not include political discussions. From 1974 a large number of different groups emerged questioning diverse aspects of nuclear energy and the anti-nuclear movement gained great attention. In the words of Nelkin and Pollak, "in both France and Germany, the nuclear opposition evolved from local actions in the early 1970s to massive demonstrations and violent confrontations with the police. The courts were significantly involved [...] The issue also generated hundreds of new citizen groups; environmental organizations and ad hoc committees proliferated to oppose particular siting decisions, and national organizations formed to coordinate these grass-roots efforts and to lobby on the governmental level [...] Even the traditionally apolitical environmental organizations were politicized by the nuclear issue" (1980, pp. 129-

130). Protests organized by citizen initiatives (in German called “*Bürgerinitiativen*”) emerged not only to question the technical problems concerning the construction of nuclear power plants, but also to challenge what nuclear energy represented: a central and closed governmental decision making process as well as the concentration of economic activities in the hands of a few actors (Nelkin and Pollak 1980; Schreurs 2003).

In France, in spite of the antinuclear movements the government did not change its nuclear plans and the movements could not stop any reactor; “nuclear policy became a closed system precluding any public participation” (Jasper 1990). Yet, antinuclear movements had an indirect influence: certain technical defects were brought to light, regulators tended to tighten standards, politicians began to examine more in detail nuclear energy rather than just accept it, and each sitting decision was brought before the administrative courts. The scarce access antinuclear movements had to the policy making process after 1973 as well as its scarce success in the subsequent years were associated with two elements. First, dominant political parties together with dominant political figures were critical in shaping nuclear policies. Being an unequivocal advocate of nuclear energy and favoring a centralized state, when Giscard was in office and the RPR (Gaullist) party was in control of the assembly, they could easily marginalize antinuclear movements. Socialists were divided around the nuclear issue and during the preelectoral period it seemed that François Mitterrand would favour more of an antinuclear position when he announced a two-year moratorium on nuclear development and included a few antinuclear actors in the campaign. But when the Socialists came to power, the top leaders became hostile with the antinuclear fraction of the party and the nuclear position was embraced.

Second, there was an undeniable political influence of EDF, which could achieve its ambitious nuclear program with the strong support of the government. The technical nature of the nuclear issue contributed to create a political monopoly of EDF bureaucrats. As a result EDF gained excellent managerial skills in the nuclear sector. In the words of Jasper “the strong French commitment has allowed economies of scale, standardization of reactors, lower costs of fuel processing and reprocessing, and priority in construction resources” (1990, p. 259).

Although in Germany administrative courts could stop the construction of major nuclear projects in Wyhl, Brokdorf, Grohnde, and Kalkar, the experts' judgements of governmental nuclear research centers were not questioned, ignoring the concerns raised by nuclear critics (Nelkin and Pollak 1980, p. 130). At the beginning political parties did not want to take public positions on nuclear issues. The CDU, together with its filial CSU, was in general more in favour of nuclear energy but the SPD, as well as the Socialists in France, were divided. Whilst local and regional organizations opposed some nuclear sittings and the party youth fraction opposed nuclear energy (because of the monopoly of the industry), major trade unions and several ministers favoured nuclear power (Nelkin and Pollak 1980). It may be the case that the precedent established by the administration of Willy Brandt regarding the first environmental policies has also contributed to the internal cleavages of the SPD. "Modern environmental protection in Germany was introduced by policy makers, not scientists or citizenship initiatives; it was a top-down process" (Jänicke, conference held the 18.10.2012).<sup>141</sup> This quote refers to the environmental policies introduced in Germany between 1969 and 1974.

In 1977 the SPD adopted the position favouring nuclear energy, as they did not want to show internal ideological differences that could constitute a signal of weakness. This was important because as policy makers moved away from nuclear policy issues, anti-nuclear, other diverse environmental movements and scientists advanced further in this area contributing to the foundation of the German Green Party in 1980 (student movement generation of 1968 was also part of the party). The special characteristic of the Green Party is that "it is the only political party that could succeed to persist since decades, among all the new founded parties" (Jacob and Jörgens 2011, p. 22).

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<sup>141</sup> The conference entitled 'Oral History: The Origins of Environmental Policy Advice - Part I' was held at Ecologic Institute in Berlin.

### 7.3 Early Wind Energy Development in Germany

The origination of the green party, after the oil crises, created a favourable context for the deployment of renewable and wind energy policies in Germany, which especially benefited from developments abroad. This period of time is referred to as the wind energy's *pioneering phase* (Ohlhorst 2008) and extended from the early 1970s until 1986. The boost given to the wind industry by the frontrunners came mainly from Denmark and California in the USA. In the particular case of wind energy, Denmark played a significant role and, being a pioneer, influenced Germany to a great extent. In the words of Bechberger et al. (2006), "in Denmark the use of wind power to produce electricity has a long tradition. [...] The principal causes behind the early age of the windmills in Denmark were related to a social question. Due to a major economic importance of steam electric power, the university of Askov tried to avoid a socioeconomic collapse in the countryside and took some actions to convince their graduates to remain in the countryside [...] The experimental windmill was an example of how power plants could be set up and operated in the countryside. The experimental windmill has produced direct current for the Askov University and later also for the locality. In 1900 rural electrification began in Denmark partly through wind turbines" (p. 8).<sup>142</sup>

Subsequently, due to the low price of oil, the wind turbines were not competitive and, thus, some of them were shutdown in 1967 (Bechberger et al. 2006, p. 9). After this time, and as in many other countries, the energy crisis of the 1970s prompted a search for alternative sources, including wind and/or nuclear sources. National energy plans were developed between 1976 and 1981 through wide discussions about energy security, self-sufficiency, and efficiency as principal objectives, as well as greenhouse gas reductions (Mendonça et al. 2009, p. 385). In fact the introduction of nuclear power was an essential element of these official plans,

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<sup>142</sup> "Die Nutzung von Windkraft zur Stromerzeugung hat in Dänemark eine lange Tradition [...] Die wichtigsten Beweggründe für die frühen Windmühlenversuche Ende des 19. Jahrhunderts in Dänemark waren sozialer Art. Dampfmaschine und Elektrizität führten zur Landflucht und die Hochschule Askov wollte ihre Absolventen dazu bewegen, auf dem Land zu bleiben [...] Die Versuchsmühle war ein Beispiel dafür, wie Kraftwerke auf dem Land eingerichtet und betrieben werden konnten. Die Versuchsmühle produzierte Gleichstrom für die Hochschule Askov und später auch für den Ort. Um 1900 begann in Dänemark die ländliche Elektrifizierung teils durch Windkraftanlagen" (Bechberger et al. 2006, p. 8).

generating significant public opposition. Alternative energy plans without nuclear power as well as with higher levels of renewable sources and energy efficiency were published by energy experts from Danish universities (Bechberger et al. 2006, p. 10; Mendonça et al. 2009, p. 385). In Denmark, the discussion about nuclear power ended in 1985, when a majority in the Danish Parliament decided that nuclear power plants would not be part of the national electricity system. This political decision was a decisive factor, which influenced the German energy policy and the deployment of wind and renewable energies.

The U.S. case was very important because it was the first country to introduce a Renewable Energy Act, which served as a model for the later establishment of feed-in tariff (FITs) laws in European countries, including Germany. In 1978, the *Public Utility Regulatory Policies Act* (PURPA) was adopted in response to the rising cost of fossil fuels over the 1970s. PURPA required utilities to purchase renewable electricity from qualified independent generators over long-term contracts. Unlike today's feed-in tariffs, which guarantee a premium for the renewable electricity delivered to the grid, PURPA payments were based upon the avoided cost of generating electricity from conventional sources. It worked well since its implementation in 1981 but the substantial drop in the price of oil and natural gas in the 1990s made these payments based on avoided cost too low for renewable energy projects to compete (Mendonça et al. 2009, p. 380). From 1983 Denmark began to export wind turbines to California, which at that time had built a strong wind power industry, due to favorable tax rules implemented before. But since the oil prices dropped significantly, these tax rules were abolished in 1986 and the U.S. market collapsed the next year (Mendonça et al. 2009, p. 385).

Important in this pioneer phase is that wind energy, although not yet a really significant energy supply in Germany, was already present competing with nuclear energy. One constellation of actors had the aim to achieve an environmental friendly and decentralized energy supply system, and the other, which resulted from the combination of energy economy, big industry, and technology policy, had as principal objective the achievement of energy security (Ohlhorst 2008, p. 74).

Unlike Germany, after the Socialists came to power in 1981 the French antinuclear movement lost dramatically its significance, becoming a marginal



movement. French policymakers were purely committed on nuclear energy and, thus, less attracted by renewable energy sources. Jasper explains that “in France less attention was paid to alternatives, in part because of policymakers’ enthusiasm for nuclear energy and in part because EDF could expand its market only through nuclear energy [...] The French commitment to nuclear energy makes (renewable sources) development unnecessary and unlikely since excess electric capacity already exists in France” (1990, pp. 260-261). As the country was extremely focused on the expansion of its electricity supply capacity with nuclear energy, it incurred a problem of excess capacity.

On April 26, 1986 there was a nuclear catastrophe in Chernobyl. The difficult consequences of the nuclear accident, which sent radiation over certain regions in Germany, showed Germans the risks of nuclear power plants. “Skepticism towards the nuclear technology was spread in the country and Germans could not trust in this technology anymore” (R. Mono, oral interview, 11.06.2013). This was an inflexion point from which German environmental and energy policies completely changed. As a result, in this year the SPD decided to advocate the exit of nuclear energy within ten years. But the same accident of Chernobyl provoked a quite different reaction in France. After the accident only a small increase in the number of anti-nuclear protest events took place and even this increase did not imply more participants in the protests (Koopmans and Duyvendak 1995, p. 238). In France the accident caused far less impact on public opinion and political parties remained firmly supportive of nuclear energy. While in Germany Chernobyl provided a favourable opportunity for energy policy change, in France Chernobyl did not change anything. “In France only government spokespersons appear to reassure the public” (Jasper 1990, p. 262).

In 1988 the *Intergovernmental Panel on Climate Change* (IPCC) and the *United Nations Environmental Program* (UNEP) whose reports provided the basis for the setting of the first goals for climate protection and reduction of CO<sub>2</sub> emissions was established. This was to have a big impact on national political decisions towards renewable energy (Ohlhorst 2008, pp. 75-76). Until 1990 there was not a strong wind energy market in Germany. Yet, there were already individual technical developers, especially from the alternative milieu, which developed a wide technological spectrum of wind turbines in small self- initiatives. Farmers and operators’ consortiums played a significant role as well (Ohlhorst 2008, pp. 86-87).

On January 1, 1991 the first renewable energy FIT act, called “*Stromeinspeisungsgesetz*” (StrEG) was issued, initiating a *break down phase* (Ohlhorst 2009). The FIT legislation, issued under the administration of Helmut Kohl from the CDU, caused a critical juncture for the generation of electricity from renewable energy sources. Since that moment, the development of wind energy in Germany has been vigorous. Due to the implementation of fixed compensation mechanisms for green electricity and grid access for renewable energies, both the average of the nominal capacity of wind energy turbines as well as the installed capacity increased quite rapidly. This thrust of innovation provided one of the most important bases for the growth of the wind energy sector in Germany. The StrEG enabled the opening of the electricity market for different private producers of regenerative electricity, who were before limited by the capacity and supply monopoly of the energy market (Ohlhorst 2008, pp. 89-90). As René Mono points out “the birth of the StrEG opened the possibility to build renewable energy installations in many small entities, and these small entities were opposed to big monopolies in the energy market” (oral interview, 11.06.2013). The significance of the StrEG was that the state promoted the development of the niche constellation not just through financial support—like before—but also through normative regulations, which provided more security for actors and more stability for the sector (Ohlhorst 2008, p. 109). The development of renewable energy was a double-sided process: “the movements from the bottom were allowed to invest in renewable energy installations thanks to the first renewable energy laws” (R. Mono, oral interview, 11.06.2013).

After the StrEG, the first decrees regarding territorial planning of wind energy at the regional level were enacted. The main reason was that without land-use planning the danger of uncontrolled land development and an unjustifiable disturbance of nature and the landscape as well as an endangered continuity of wind energy acceptance existed (Ohlhorst 2008, p. 104). Since 1998, instability dominated the wind energy sector due to the following critical factors: insecurity in the wind energy market as a result of the fee’s debate; slow approval and declining acceptance of wind installations, which translated into an increased rejection of applications for construction permits; the first load limits of the existent electricity grid capacity; the first technical problems of wind turbines and unsatisfactory levels of energy production coming from wind parks (Ohlhorst 2008).

In 1997 the EU signed the Kyoto Protocol, which was then ratified in 2001. The protocol was and is still the milestone in the international climate policy because for the first time, under international law, emissions reduction objectives for industrialized countries to occur within a concrete time frame were determined. The obligations committed were different for each EU country. For example, while Germany committed to reduce by 21% their greenhouse gases emissions until 2008-2012 compared to 1990, France committed to neither increase nor reduce its greenhouse gases emissions for the same period (BMU 2013).<sup>143</sup> It is important to highlight that Germany has exceeded its Kyoto target of 21%, “by the end of 2010 national greenhouse gas emissions had already been reduced almost 25% compared with 1990” (Ibid. 143).

In 1998 there was a transition to a new Federal Government, formed by a coalition of Social Democrats and the Green Party. The new regime introduced extensive changes regarding renewable energy and energy efficiency. A significant increase in the existing FIT for renewable energy led to an unexpected acceleration in the speed of diffusion of renewable energy sources. Under this administration, there was an innovative approach to German climate policy, given its further emphasis on "ecological modernization" in the coalition agreements of the red/ green Federal Government in 1998 and 2002. One of the most important results of the state's ecological modernization approach was that the Kyoto target of reducing greenhouse gases to 21% by 2012 was exceeded before 2007, and this surprise effect also made its mark in renewable energy development (Jänicke 2011, p. 4).

The great increase in the existing FITs was possible through the enforcement of the “*Erneuerbare Energie Gesetz*” (EEG), Renewable Energy Act, in January 2000. The replacement of a compensation fee that was dependent on the average of electricity prices by a fixed and price independent compensation tariff per KW/h was one of the main differences between the StrEG and the EEG. In addition, the

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<sup>143</sup> Auf der 3. Vertragsstaatenkonferenz der Klimarahmenkonvention in Kyoto 1997 hatten die Vertragsstaaten das sogenannte "Kyoto-Protokoll" verabschiedet. In dem Protokoll verpflichten sich die Industriestaaten verbindlich dazu, ihre Emissionen der sechs wichtigsten Treibhausgase - u.a. Kohlendioxid (CO<sub>2</sub>), Methan (CH<sub>4</sub>), Fluorchlorkohlenwasserstoffe (FCKW) - im Zeitraum 2008 bis 2012 um mindestens 5 % unter das Niveau von 1990 zu senken. Dabei haben die einzelnen Länder unterschiedliche Verpflichtungen zur Emissionsminderung akzeptiert (z. B. Japan 6 %, Russland +/-0 %). Die EU mit ihren damals 15 Mitgliedstaaten (EU-15) hat ihre gemeinschaftliche Kyoto-Verpflichtung von 8 % innerhalb der EU umverteilt, so dass z.B. Deutschland 21 %, Großbritannien 12,5 % und Frankreich +/-0 % erbringen müssen. Source: <http://www.bmub.bund.de/themen/klima-energie/klimaschutz/internationale-klimapolitik/kyoto-protokoll/>.

extension of the compensation for a period of 20 years (before compensation was limited to the period of validity as established by the law) and the differentiation by energy sources and sizes, were significant legal changes at that time (Ohlhorst 2008, pp. 130-131). The deployment of the wind energy market played a crucial role for structurally and economically weak—mostly rural—areas. Around 55% of the national wind energy capacity was installed in Schleswig- Holstein and Niedersachsen in 1998. This development had a positive impact on the employment, creating jobs for 25,000 persons between 1998 and 2002 (UBA 2004, found in Ohlhorst 2008, pp. 136-137). The main reason for the new approach represented in the EEG was the particular dynamism of the innovation process, which started after 1998 (Jänicke 2011, p. 5).

Finally, the conflict between climate and emissions protection—defenders of wind energy—and, on the other hand, the nature and landscape protection—opponents to wind energy was culminated. Thus, strict species protection provisions excluded the construction of wind turbines in protected areas with certain species of birds (Ohlhorst 2008, pp. 140-141). Tax reforms have also played a role in the increase of wind energy’s social acceptance. Nikolaus Karsten, a Parliament member from the SPD, highlighted “the red/ green government have executed a tax reform called ‘*Gewerbesteuer*,’ saying that it doesn’t matter where the firm sits but rather where the production settles, and the production settles where the wind mills are turning and spinning. And so up to around 70% of the tax ‘*Gewerbesteuer*’ will stay in the communities. Therefore in some communities where they have built very big wind parks, this earning has become the largest source of income. Some communities that were very poor have become very rich and they like it of course. So, they started to think about other renewable energy sources, storage ways, and more wind parks. And then they could build infrastructures, like kindergarten or schools, homes, etc. So the acceptance has risen because of the tax earnings” (oral int., 04.12.2011). In an interview held with David Jacob (oral int., 16.07.2012), he also mentioned the modification of the ‘*Gewerbesteuer*’ for wind projects in 2009 as an initiative for public acceptance, which has achieved positive outcomes in local communities and areas. This represents an example that could be applied in local areas of some South American countries like Uruguay.

## 7.4 European Union and International Agreements

The European Commission (EC) directives of 2001 set national indicative targets for the contribution of electricity produced from renewable energies to gross electricity consumption in European electricity markets for the year 2010.<sup>144</sup> The targets were 12.5% for Germany and 21% for France. These targets contributed further to the development of renewable energy in Germany and France, especially wind energy in the first and hydropower in the latter. In 2009 a new EC directive revised the national indicative targets of 2001 and set new indicative targets for the contribution of electricity produced from renewable energies to gross electricity consumption in European electricity markets for the year 2020. For Germany the target was revised to 18% and for France to 23%, in relation to 2005 renewable energy contributions.<sup>145</sup>

In France the indicative target of 2001 has especially boosted the development of hydropower and it has contributed to start developing wind and, to a lesser extent, solar energy. Another important element that might probably contribute to the development of renewable energy sources was the opening process of the electricity market. Due again to directives of the EC, the monopoly of EDF for electricity distribution ended in 1999. Subsequently the state-owned utility company became a limited-liability corporation during the first half of the 2000s. Yet, the state still owned almost 85% of the shares as of December 2013.<sup>146</sup> After the EC directive of 2001 and the reforms in the electricity market, the French administration issued in 2001 the first FIT regulations to foster wind energy and hydropower, which were afterwards revised. In France, the extension of the compensation for wind energy parks was set for a period of 15 years. FIT regulations for photovoltaic were issued later in 2006, and thereafter revised a few times.<sup>147</sup>

In Germany the increase of employment figures in the wind sector and the possibility to achieve a regional added value showed positive economic impacts of the progressive diffusion (Ohlhorst 2008, pp. 153-156). Wind energy development increased greatly and caused the revision of the EEG in 2004, 2009, and 2012. In

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<sup>144</sup> Source: <http://faolex.fao.org/docs/pdf/eur40867.pdf>.

<sup>145</sup> Source: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF>.

<sup>146</sup> Source: <http://finance.edf.com/action-edf/structure-de-l-actionnariat-40669.html>.

<sup>147</sup> Source: <http://www.developpement-durable.gouv.fr/Les-tarifs-d-achat-de-l,12195.html>.

2004 the change was the digression of the FIT rate rising from 1.5 percent to 2 percent from 2005 and 2008 for onshore and offshore, respectively. In the amendments of January 2009 and 2012 other incentives for system services and for direct marketing of regenerative electricity were introduced. In regard to wind energy, the most significant changes occurred in the version of 2009. This was mainly due to the necessity of better framework conditions for the improvement of the repowering process and the acceleration of the installation of offshore wind energy (BMU).<sup>148</sup> In particular, the start compensation fee to replace the old turbines was established at 0.5 ct/kWh and the conditions were: old turbines with a minimum of 10 years and new turbines with a minimum of double capacity. Concerning the on-shore compensation tariff, this was fixed at 9.2 ct/kWh with a digression of 1% (BMU).<sup>149</sup> In the version of the EEG 2012 there were slight modifications in the compensation tariff and the percentage of the digression was set at 1.5% (BMU).<sup>150</sup>

The 2009 the White Paper “Adapting to Climate Change: Towards a European Framework for Action”<sup>151</sup> related the issue of climate change to the energy sector, and its effects both on the supply and demand side. This document called for a more strategic and long- term approach to spatial planning, both on land and in marine areas, including in transport, regional development, industry, tourism, and energy policies (COM (2009) 147 final, 01.04.2009). The European framework also affirmed that the EU was working with other partner countries in the *United Nations Framework Convention on Climate Change* (UNFCCC) towards a post-2012 (Kyoto) climate agreement policy (COM (2009) 147 final, 01.04.2009). The EU proposals were set out in the Communication<sup>152</sup> discussed in the 15<sup>th</sup> *United Nations Copenhagen Climate Change Conference* (COP15) that took place in December 2009.

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<sup>148</sup> Source: [http://www.erneuerbare-energien.de/erneuerbare\\_energien/gesetze/eeg/eeg\\_2009/doc/40508.php](http://www.erneuerbare-energien.de/erneuerbare_energien/gesetze/eeg/eeg_2009/doc/40508.php).

<sup>149</sup> Source: 1) [http://www.erneuerbare-energien.de/fileadmin/ee-import/files/pdfs/allgemein/application/pdf/eeg\\_2009\\_verguetungsdegression\\_bf.pdf](http://www.erneuerbare-energien.de/fileadmin/ee-import/files/pdfs/allgemein/application/pdf/eeg_2009_verguetungsdegression_bf.pdf).

2) [http://www.erneuerbare-energien.de/fileadmin/ee-import/files/pdfs/allgemein/application/pdf/eeg\\_2009\\_begr.pdf](http://www.erneuerbare-energien.de/fileadmin/ee-import/files/pdfs/allgemein/application/pdf/eeg_2009_begr.pdf).

<sup>150</sup> Source: [http://www.erneuerbare-energien.de/fileadmin/Daten\\_EE/Dokumente\\_\\_PDFs\\_/verguetungssaetze\\_eeg\\_2012\\_bf.pdf](http://www.erneuerbare-energien.de/fileadmin/Daten_EE/Dokumente__PDFs_/verguetungssaetze_eeg_2012_bf.pdf).

<sup>151</sup> Addressed by the European Commission in April 2009.

<sup>152</sup> “Towards a comprehensive climate change agreement in Copenhagen”, COM (2009) 39, 28.1.2009.

The COP15 raised climate change policy to the highest political level. In fact, around 115 world leaders attended the high-level segment, making it one of the largest gatherings of world leaders ever outside United Nations (UN) headquarters. More than 40,000 people, representing governments, nongovernmental organizations, intergovernmental organizations, faith-based organizations, media and UN agencies applied for accreditation. The meeting produced the *Copenhagen Accord*, which expressed clearly a political intent to constrain carbon and respond to climate change, in both the short and long term. The *Copenhagen Accord* contained several key elements in which there was strong convergence of the views of governments. This included the long-term goal of limiting the increase of the maximum global average temperature to no more than 2 degrees Celsius above pre-industrial levels, subject to a review in 2015. There was, however, no agreement on how to do this in practical terms. It also included a reference to consider limiting the temperature increase to below 1.5 degrees—a key demand made by vulnerable developing countries. Finally, it should extend the Kyoto-Protocol from the year 2012 (see UNFCCC).<sup>153</sup>

Relevant for the German and French energy policy objectives was the adoption by the EC of the “Energy Roadmap”, on 15 December 2011. Here the EU declared its commitment to reducing greenhouse gas emissions to 80-95% below 1990 levels by 2050 in the context of necessary reductions by developed countries as a group. In the Energy Roadmap 2050 the Commission explores the challenges posed by delivering the EU's decarbonisation objective while at the same time ensuring security of energy supply and competitiveness (COM (2011) 0885 final, 15.12.2011).<sup>154</sup> The Energy Roadmap 2050 is the basis for developing a long-term European framework and, therefore, French and German energy policies should also develop according to this reference framework.

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<sup>153</sup> Source: UNFCCC

[http://unfccc.int/meetings/copenhagen\\_dec\\_2009/meeting/6295.php](http://unfccc.int/meetings/copenhagen_dec_2009/meeting/6295.php).

<sup>154</sup> Source: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0885:FIN:EN:PDF>.

## 7.5 Fukushima Impacts

One of the most important international events directly related to wind energy was the nuclear accident, which occurred in Fukushima (Japan) on 11 March 2011.<sup>155</sup> After the Fukushima accident, a change in Germany's energy policy was imposed. The decision of the Christian Democratic Union – Free Democratic Party (black – yellow) coalition to continue with nuclear energy, taken in 2010, was objected to by many sectors of the population in the country. In fact, in 2011 the black - yellow coalition lost elections in two federal states, in Baden-Württemberg, against The Green party, and in Nordrhein-Westfalen, which was won by the SPD. The Christian Democratic Union – Free Democratic Party coalition, represented by chancellor Angela Merkel, decided consequently to phase out nuclear energy by 2022 and to foster the development of renewable energies through a package of measures addressed to reach new ambitious energy targets in June–July 2011.

The renewable energy and electricity goals were:<sup>156</sup>

- Renewable energy is expected to achieve a share of 18% in gross final energy consumption by 2020, and 60% by 2050.
- By 2020 renewable energy is expected to have a share of at least 35% in gross electricity consumption, and 80% by 2050.
- The primary energy consumption is expected to be reduced by 20% by 2020 and 50% by 2050, compared to 2008 levels.

The new German path, which received the name of the *Energiewende*<sup>157</sup> (in English energy transition), was considered a change of a paradigm in the energy policy. It implied the transition to an energy system based on more renewable energy and less conventional energy sources, principally nuclear power. In order to start the energy transition the German Federal Government called the formation of two commissions,

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<sup>155</sup> Fukushima is the name of the nuclear accident localized in the city of Fukushima in Japan that began on March 11<sup>th</sup> of 2011 with the tsunami and unfolded over the course of the next several days.

<sup>156</sup> Source: Deutsche Energie Agentur 2013 (DENA)

[http://www.dena.de/fileadmin/user\\_upload/Veranstaltungen/Vortraege\\_GF/sk/130309\\_SK\\_Umweltko\\_nferenz\\_Naturfreunde\\_OEsterreich\\_Salzburg\\_Energiewende\\_in\\_Deutschland\\_-\\_Roadmap\\_bis\\_2020-2050.pdf](http://www.dena.de/fileadmin/user_upload/Veranstaltungen/Vortraege_GF/sk/130309_SK_Umweltko_nferenz_Naturfreunde_OEsterreich_Salzburg_Energiewende_in_Deutschland_-_Roadmap_bis_2020-2050.pdf).

<sup>157</sup> The term *Energiewende* comes from the title of a scientific prognosis referring to the transition from a conventional energy system into a renewable system made by the Öko – Institut in 1980. (*“Energiewende – Wachstum und Wohlstand ohne Erdöl und Uran”*, Krause et al. 1980).



one technical and the other ethical. After a few sessions, the ethical and technical commissions wrote a report finally concluding about the importance of the German *Energiewende*. Yet, the German energy transition, as a transition process of a fuel based energy system to a renewable based energy system, started around 30 years ago since the constitution of the Green Party and the anti- nuclear movements, and especially after Chernobyl, which entailed a critical juncture. “After Fukushima, this process started to adopt the name *Energiewende* but actually we are currently in the middle of this transition. In this energy system, based on renewable energy, decentralisation is a part of the *Energiewende*. It is also possible to do it with less decentralisation but not without it” (D. Jacob, oral interview, 16.07.2012).

Decentralized versus centralized is related to onshore versus offshore, and both issues are situated at the centre of the current political agenda in relation to the energy transition. In fact as it is expressed, “the debate between on–shore versus offshore plays a crucial role in the problematic of centralized versus decentralized. Offshore wind energy favours large-scale utilities. Large-scale utilities are investing more in large scale than in small scale (wind energy installations)” (D. Jacob, oral int., 16.07.2012). Large-scale wind energy installations tend to favor more centralized energy systems and small-scale wind turbines favour more decentralized systems. From the discourses of the German government it is possible to infer that investments in offshore wind power technologies as well as onshore repowering are being supported. In fact, through an amendment to the Offshore Installations Ordinance (“*Seeanlagenverordnung*”), the German government expects to simplify and accelerate the approval procedure for installations in the German exclusive economic zones (EEZ).<sup>158</sup> Beyond such offshore considerations, there are also legislative incentives regarding onshore wind power meant to improve the economic conditions for repowering projects (the ‘repowering bonus’).<sup>159</sup>

The federal government promotes wind energy at a large scale to a great extent due to its big potential in the reduction of the costs and the rapid expansion of electricity generation from renewable energy. In the interview held with one member of the SPD Parliament, Nikolaus Karsten, he said that “at the local level there is no

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<sup>158</sup> Source: <http://www.offshore-windenergie.net/en/politics/authorization>.

<sup>159</sup> Source: [http://www.erneuerbare-energien.de/fileadmin/Daten\\_EE/Dokumente\\_\\_PDFs\\_/verguetungssaetze\\_eeg\\_2012\\_bf.pdf](http://www.erneuerbare-energien.de/fileadmin/Daten_EE/Dokumente__PDFs_/verguetungssaetze_eeg_2012_bf.pdf).

difference between the positions of the diverse political parties but at the national level there is a tendency that the more you are on the right, the larger the projects are supported. Indeed Greens and SPD are more in favour of small on shore wind parks while the CDU supports larger off shore and larger on shore. But sometimes the Green party also supports large off shore and on shore, of course” (oral int., 04.12.2011). The different positions can be seen in the protocols of the discussions in the Bundestag about the *Energiewende* and the wind energy. In general, the “Linke”, Greens, and SPD are more in favour for a decentralised generation and supply of the wind energy with small on-shore installations. The difference between the three political parties is that the “Linke” always supports small wind projects, and the Greens are divided, being sometimes in favour of large offshore wind energy and sometimes not. To the SPD large offshore wind turbines are not seen as immediately necessary but they could be an option in the future (Plenary Protocols of the Deutsche Bundestag).<sup>160</sup> Another important problem that remains present is the technical integration of the wind turbines in the grid electricity system, when a great expansion of wind energy installations is projected.

The German discussion about onshore or offshore wind is, in fact, a debate about the degree of decentralization of the energy systems. This is one of the keystones of the current political debate. Several renewable energy associations, foundations and initiatives (“*Bürgerinitiativen*”) promote a transition to a more decentralized energy system that is closer to local communities, arguing that these systems deepen the democratic character of political decisions. Thus, they assume decentralized energy systems facilitate the involvement of the actors since the beginning—especially those living nearby the wind installations—through public participation mechanisms and bottom-up decision processes. In the literature there are some authors relating the decentralization of (renewable) energy systems with the reinforcement of democracy and of citizen’s public involvement (Mendonça et al. 2009/ Burton and Hubacek 2007). The importance assigned to public participation and local involvement of citizens is related to the restructuring of the advanced industrial welfare states during the last two decades (Rathgeb Smith 2002). Yet, this is an unresolved issue and there are different ideological and conceptual positions. It

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<sup>160</sup> Source: *Plenarprotokoll* 17/96 (96. Sitzung), 17. March 2011; *Plenarprotokoll* 17/108 (108. Sitzung), 12. May 2011.

is therefore under discussion how to fulfil the objectives for the *Energiewende*. Still the macro goals are fixed.

After the announcement of the *Energiewende*, its impacts could be seen in France. When the Socialists won the national elections in 2012 they launched a public debate around the energy transition issue. In September of the same year the Environmental Conference about Sustainable Development was organised to discuss two main issues: the energy transition, and the biodiversity protection and restoration. A road map for the so-called *ecologic transition* was introduced and, subsequently, the council responsible for the ecologic transition, “Conseil National de la Transition Écologique” (CNTE) was established. Currently the national strategy for the ecologic transition towards a sustainable development 2014-2020 (*Stratégie Nationale de Transition Écologique vers un Développement Durable 2014-2020*) is being elaborated; one of the major topics is the energy transition. Yet, Socialists’ position about the nuclear phase-out question is still not clear. President François Hollande seems to support the idea of reducing nuclear energy from near 75% in 2014 to 50% in 2025 and after holding public discussions, the government has decided to close Fessenheim, the oldest nuclear power plant in France, in 2016; no detailed plans for the rest of the fleet have been announced yet. Also, the first new generation reactor model, the European Pressurized Reactor (EPR), designed by French company Areva, is being constructed in Flamanville (Normandy) and is planned to be operative in 2016.

Here emerged the question about the options of France for the evolution of the existing nuclear feet. One option would be to dismantle all original nuclear reactors that may be potentially dangerous to renovate, replacing them with EPR reactors. The purpose of replacing original reactors with EPR might be to minimize social pressure, and enjoy already existent high-tension electricity lines since third plus and fourth generation reactors are presented as inherently safe (Le Monde, 14.02.2014).<sup>161</sup> As Hecht points out “in EDF’s promotional material for the EPR, vestiges remain of the monumental technological spectacles that (were) described for the first generation, and the economies of scale and scope touted for the second generation. But its main themes concern safety and environment, in a response to activist objections and an

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<sup>161</sup> Source: [http://www.lemonde.fr/planete/video/2014/02/14/delphine-batho-le-pdg-d-edf-est-le-ministre-fantome-de-l-energie\\_4366462\\_3244.html](http://www.lemonde.fr/planete/video/2014/02/14/delphine-batho-le-pdg-d-edf-est-le-ministre-fantome-de-l-energie_4366462_3244.html).

attempt to capitalize on global climate change as a new source of legitimacy for new, large-scale nuclear projects.” (2009, p. 343). The other option would be prolonging the life of the oldest nuclear to 50 or maybe 60 years, instead of replacing them. As David Buchan (2014) suggests, “replacement, if and when it comes, will be difficult. Because so many reactors were built in one decade (1978–88), their replacement would need to be almost as rapid. The EPRs may be bigger, but they also take longer to build [...] The cost of EPRs is [...] beginning to appear prohibitive” (n. pag.).

Several actors question these possible plans, arguing that this contradicts original engagements agreed during the national debate in 2012 of reducing the global energy consumption and the absolute participation of nuclear energy in the electricity mix. As the ex-minister of ecology, sustainable development, and energy, Delphine Batho, says, “this is not the energy transition” (Le Monde, 14.02.2014). However, as France has to increase the renewable share of its total energy consumption to 23% by 2020, in theory this should implicate a decline of the nuclear share (Buchan 2014). A new energy law to boost renewable energy in the national energy mix and limit nuclear energy production will be presented to Parliament in June 2014.

## **7.6 Renewable Energy Capacity in Germany and France**

Since 1991 renewable energy sources have been strongly promoted in Germany making use of the FIT. Germany is the third-largest market for wind energy in the world with 34250 MW (10.8% of the total of the worldwide cumulative capacity) in 2013, having the highest share of wind energy capacity in Europe (GWEC 2013).<sup>162</sup> It should be pointed out that from a total of 21.9% of renewable energy, including large hydropower, generated in the national electricity mix of Germany in 2012 (Figure 7.1), wind energy represented the highest share with 7.3% followed by biomass 5.8%, photovoltaics 4.6%, and hydropower 3.3%.<sup>163</sup> Wind energy installed capacity has increased from around 5000 MW in 2000 to around 34000 MW in 2013 (Bunderverband Windenergie 2013). In the national electricity mix of France from a total of 16.4% of renewable energy, including large hydropower, hydropower

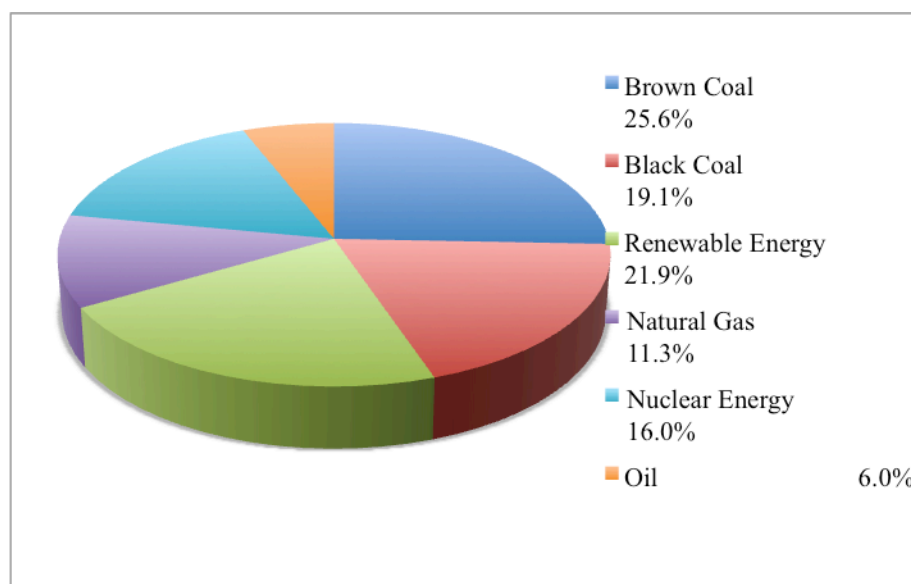
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<sup>162</sup> Source: [http://www.gwec.net/wp-content/uploads/2012/06/05\\_top10-cum-cap-dec13.jpg](http://www.gwec.net/wp-content/uploads/2012/06/05_top10-cum-cap-dec13.jpg).

<sup>163</sup> Source: BDEW 2013. See: [http://www.bdew.de/internet.nsf/id/17DF3FA36BF264EBC1257B0A003EE8B8/\\$file/Foliensatz\\_Energie-Info-EE-und-das-EEG2013\\_31.01.2013.pdf](http://www.bdew.de/internet.nsf/id/17DF3FA36BF264EBC1257B0A003EE8B8/$file/Foliensatz_Energie-Info-EE-und-das-EEG2013_31.01.2013.pdf).

represented the highest share with 11.8% followed by wind energy 2.8%, photovoltaics 0.7%, and other renewable energies 1.1% (Figure 7.2).<sup>164</sup> Wind energy fleets represented 8140 MW of installed capacity in 2013 (Réseau de Transport d'Électricité 2013).<sup>165</sup> This shows that although France is a nuclear energy nation (Figure 7.2), the country has developed renewable energy and it constitutes the eighth largest market for wind power in the world with around 8200 MW (2.6% of the total of the worldwide cumulative capacity), having the fifth highest share of wind energy capacity in Europe in 2013 (Ibid. 162).

**FIGURE 7.1. NATIONAL ELECTRICITY MIX IN GERMANY (2012)**



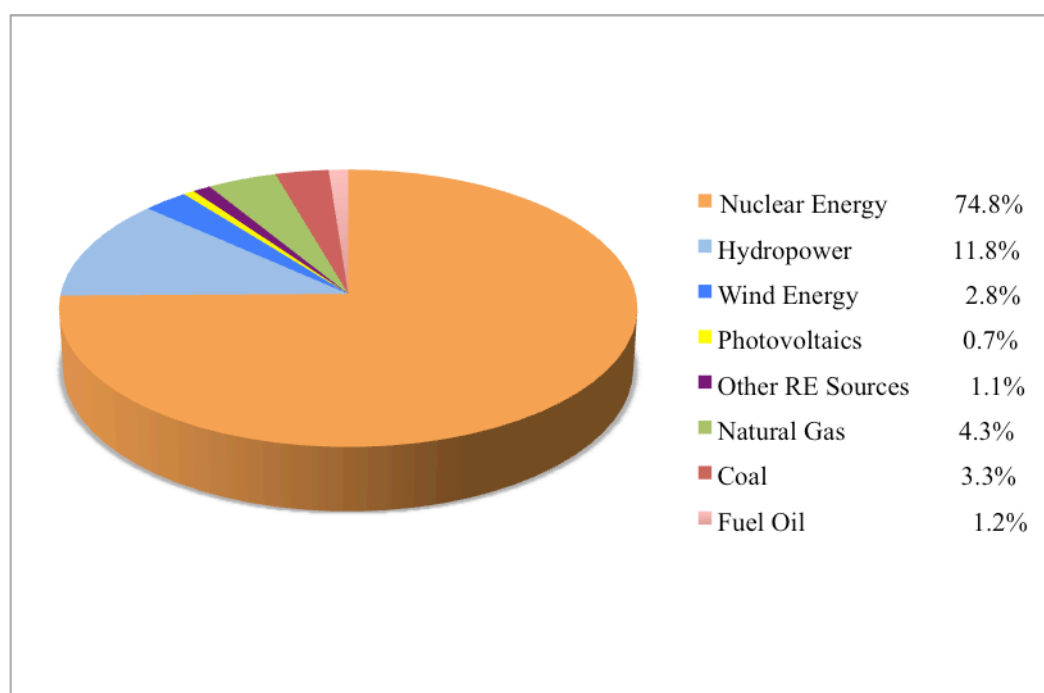
**SOURCE: Bundesverband der Energie- und Wasserwirtschaft e.V. (BDEW)**

Figure 7.1 shows the national mix of the electricity generated by source in percentages for 2012 from a total of 617 billion kWh (617000 GW). Although, brown coal remains the most important source in the German electricity mix with 25.6%, the participation of renewable energy has continuously increased since the end of the 1990s and today represents the second most important source of energy in the country with 21.9%, followed by black coal and nuclear (Figure 7.1).

<sup>164</sup> Source: RTE “Bilan Électrique”. See: [http://www.rte-france.com/uploads/Mediatheque\\_docs/vie\\_systeme/annuelles/Bilan\\_electrique/2013\\_01\\_22\\_RTE\\_Bilan\\_Electrique\\_2012\\_pres.pdf](http://www.rte-france.com/uploads/Mediatheque_docs/vie_systeme/annuelles/Bilan_electrique/2013_01_22_RTE_Bilan_Electrique_2012_pres.pdf).

<sup>165</sup> Source: <http://www.rte-france.com/en/news-cases/news/rte-publishes-2013-electricity-results-french-electricity-consumption-remains-stable-1>.

**FIGURE 7.2. NATIONAL ELECTRICITY MIX IN FRANCE (2012)**



**SOURCE: Réseau de Transport d'Électricité (RTE)**

Figure 7.2 shows the national mix of the electricity generation, by source in percentages for 2012 from a total of 541.4 TWh (541400 GW).<sup>166</sup> As it is possible to see the electricity mix of France is far less diversified than the German mix. Accounting for near 75%, nuclear energy was down by 3.8% compared with 2011 (RTE 2012).<sup>167</sup> Although the participation of renewable energy is still low, its share in the French energy mix has represented the highest value recorded for five years (Ibid. 167). It is important to highlight that France remains Western Europe's leading energy exporter with 47.2 TWh. These exchanges export towards all neighbouring countries, except for Germany, where there is an import balance of 9.8 TWh compared with 8.7 in 2012 (RTE 2013).<sup>168</sup>

Being a worldwide leader of countries pursuing energy transitions, especially in the wind energy field, Germany still has some issues which remain under

<sup>166</sup> Source: [http://www.rte-france.com/uploads/Mediatheque\\_docs/vie\\_systeme/annuelles/Bilan\\_electrique/2013\\_01\\_22\\_RTE\\_Bilan\\_Electrique\\_2012\\_pres.pdf](http://www.rte-france.com/uploads/Mediatheque_docs/vie_systeme/annuelles/Bilan_electrique/2013_01_22_RTE_Bilan_Electrique_2012_pres.pdf).

<sup>167</sup> Source: <http://www.rte-france.com/en/news-cases/news/rte-publishes-the-2012-french-electricity-report-1>.

<sup>168</sup> Source: <http://www.rte-france.com/en/news-cases/news/rte-publishes-2013-electricity-results-french-electricity-consumption-remains-stable-1>.

discussion. After setting the goals of the energy transition in 2011, several issues about how to achieve these objectives began to be discussed within domestic politics. Yet, it seems that the regime has reached a general consensus of traditional divergent beliefs within the electricity system, providing some lessons for countries currently moving to this direction on their agendas like Uruguay. In the case of France, being a pioneer and leading nuclear country, the deployment of renewable energies and introduction of energy efficiency or conservation concepts has been far more difficult. The French electricity system was traditionally based almost purely on nuclear power and the expansion of electricity supply capacity. Only after the imposition of renewable energy targets through EU directives, was it possible for France to start moving towards the integration of more wind energy. Still, nuclear energy continues to account for nearly 75% of the electricity mix. A great share of nuclear power supplemented by an increasing participation of renewable energy is the most likely future scenario for France and is a possible path that Argentina will follow.

### **7.7 French and German Nuclear and Renewable Energy Experiences: Lessons for Latin America**

As was explained in Chapter 2, policymaking can evolve in an incremental and path dependent way, avoiding sometimes the opportunities of deeper and faster policy change. Policy change can be the result of a slow process over a long period of time (Sabatier & Jenkins-Smith 1993), characterized by the status quo and domestic biases in policymaking. However extending the range of options considered can help to overcome path dependency, especially when external events open a unique opportunity to set out on an alternative course of actions. Learning from foreign models offers an escape from domestic confines and enables for a new beginning (Weyland 2004, p. 22). The likelihood of learning is higher when a “window of opportunity” appears. “During periods of rapid change, positive feedback dominates; each action generates disproportionately large responses, so change accelerates. Critical points occur before the initiation of a positive-feedback process; such periods are referred to as windows of opportunity” (Baumgartner and Jones 2009, p. 236). When the opportunity is presented and examples of successful experiences already exist, policy change gets a greater chance to overcome negative feedback. This is not always the case however.

The convergence between window of opportunity and international learning is what happened in Germany and also in Uruguay with the development of wind energy. As Ohlhorst (2009) explained Chernobyl meant a turning point for German energy policy; change was boosted by the examples of the frontrunners, California in the U.S. and Denmark. In Uruguay a scarce energy supply with a steady growing electricity demand was the event that opened a window of opportunity to the renewable energy coalition to undertake energy policy change. Similar to Germany, this decision was motivated by successful examples abroad, especially from European countries (i.e. Germany, Spain, Sweden, and Finland). Searching for alternative solutions bureaucrats from UTE, helped by scientists from the Udelar, were inspired by European renewable developments and made use of their established relationships with actors from these countries. Renewable energy developments in Europe were more a source of inspiration for Uruguay than models to be transplanted and followed.

In Uruguay the international policy-learning process vis-à-vis renewable energy development entailed two elements. First has been the contribution of foreign countries with their greater and longer experience in renewable energies to a country that is at the beginning of its renewable energy development. It is assumed that pioneers will be likely to collaborate with less experienced countries as well as the latter can benefit from learning from countries, which are more advanced and have greater experience concerning a particular issue. Why do *'earlier energy transition'* countries like Germany and Spain collaborate in the policy learning process of a *'later energy transition'* country like Uruguay? This dissertation examines international institutions that have been working in domestic renewable energy developments. The importance of the AHK with the support of the German Embassy and the AECID with the support of the Spanish Embassy were founded (see chapter 6). One of the purposes of Germany and Spain in giving this support has been to create and consolidate new markets for their companies in countries which are beginning new energy transitions. In relation to this, the director of the AHK Uruguay explained, "Chinese investments in wind energy may grow in Uruguay but this is not a good signal because it could generate wind energy public acceptance problems in the country. In fact, Chinese wind energy technology has a lower quality than the German, threatening the wind energy development of Uruguay" (T. Winter, oral



interview, 15.12.2012). Creating new wind energy markets in which German companies prevail over other national companies is also a way to create new wind energy followers and thus consolidate the worldwide leadership of Germany in the overall *Energiewende*. The other objective is international cooperation. For example, since 2011 Germany and Uruguay have a cooperation agreement within the framework of the cooperation program between the AHKs and the Centre for International Migration and Development (CIM).<sup>169</sup> As a result of the cooperation several Uruguayan energy experts participated in 2012 and 2013 in the practice-oriented training course under the European Energy Manager (EUREM) system that allows joining the EUREM global network; the course was organized by Winter and supported by the ‘renewables-Made in Germany’ initiative. It is important to highlight that in 2013 the same course was also organized in Argentina by the AHK. In the case of Spain, the country has a historical tradition of bilateral cooperation in several issues with the Latin American region, including Uruguay. Thus, since 2010 the Spanish cooperation agency, AECID, has been collaborating with the Energy Policy 2005-2030 of Uruguay in the promotion of renewable energy, especially wind.

Second, it considers how countries observe, and learn from foreign experiences and practices. This opens a wide spectrum of more questions. Indeed, what motivates policy makers to turn to foreign practices? And how do they adapt foreign practices to their own peculiarities? (Weyland 2004, pp. 2-3). I found that in the case of how actors in Uruguay have learned from European contributions regarding renewable energy, the international policy learning process was the result of autonomous learning from foreign ideas and experiences that have interacted with, but have never replaced, domestic practice and national objectives.

It can be also learned from Germany that wind energy development entails a long process that evolves over time, involving different phases and overcoming several challenges before it can become a consolidated subsystem. Ohlhorst (2009) highlighted a “break down” phase in Germany that began in 1991 (up to 1995), which can correspond with the phase that is now transiting Uruguay.

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<sup>169</sup> The aim of the CIM-AHK Programme, which is being implemented by GIZ on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), is to link the activities of the German private sector in developing and emerging countries more closely to the objectives of Germany’s development policies. To this end, CIM places experts in areas such as energy consulting, technology transfer and vocational education at the AHKs.

Like Germany, where Chernobyl was relevant because it increased the significance of antinuclear movements in Uruguay the impact of environmental NGOs and antinuclear movements was important for the legal prohibition of nuclear energy. This has set an important precedent for the later discussions about nuclear and/or renewable energy. When president Vazquez came to power, the newly elected authorities of UTE pursued the development of renewable energy and considered the possibility to overturn the antinuclear law. But the possibility to develop nuclear energy was discarded within a relatively short period of time. The reason was that a few personnel of the state-owned utility company, UTE, and some engineers of the Udelar had the aspiration to develop renewable energy. This was before any public debates began. UTE had more of a proclivity to renewable energy than nuclear and since the company has a great influence in political decisions, similar to EDF in France, the process of developing renewable energy instead of nuclear power was accelerated. A combination of unfavourable public opinion towards nuclear and UTE's objectives, which exerted great influence on the political agenda of the energy sector, drove the decision to develop renewable energy instead of nuclear power.

As was seen for the case of France, technological autonomy and expansion of the energy supply capacity represented by nuclear power has reigned. In the beginning, this was driven by the CEA with the support of president de Gaulle. Nuclear energy not only provided national independency and glory—initial goals pursued by de Gaulle—but also forged French national identity, pervaded with the perception of a *technopolitical* nation.

Like the first years of the CEA in France, in the beginning the CNEA exerted a strong presence in Argentina. The CEA was always under the office of the head of state and had no competitors, either private or public, until 1983 (Casarales 1999). The lack of questioning “and special treatment of the CNEA were largely due to the fact that its leaders were always officers of the Argentinean armed forces until the consolidation of democracy in 1983” (Casarales 1999, p. 53). There are some parallels between the initial goals of French nuclear policy, including the achievement of autonomous technological development, and the main Argentinean nuclear objective supported by President Peron and subsequent presidents between 1950 and 1970. The authorities assigned a large budget to the development of a reactor of national design so that in the long run, instead of buying foreign nuclear technology,

they could build their own. But given the economic situation and technological capacity of 1967, CNEA was forced to import its first nuclear reactors from Germany and Canada; the policy belief of the nuclear coalition was that the country would eventually become technologically independent.

The emphasis in the Nuclear Plan (1975-1985) was put first on the complete nuclear fuel cycle and, then, on the construction of nuclear plants using progressively Argentinean technology. Argentina, as Casarales (1999) points out, “pursued a (nuclear) program, whose objective was to achieve mastery of the complete nuclear fuel cycle, so as to make the country independent of foreign suppliers and influence” (p. 51). Even though the deterioration of the economic situation affected the continuity of the Nuclear Plan, the complete nuclear fuel cycle objective was achieved in 1983. Why was it so important for policymakers to develop the complete nuclear fuel cycle and national technological capacity in the nuclear sector? The achievement of this goal in a technology that, at least until the 1990s, was associated with well developed countries would help Argentines to recover their socioeconomic position—that of a highly modernized country, a position that was lost before the Second World War. This would reinforce the perception of Argentina being more advanced than other developing countries, especially Latin American countries. This was important for those that still identified with Europe and sought to retain European socioeconomic standards (Casarales 1999). Casarales explained, “nuclear policy maintained by successive Argentinean governments always enjoyed the support, sometimes explicit but generally implicit, of the Argentinean people, who considered national nuclear development to be a confirmation of the country’s intellectual and scientific qualities” (1999, p. 52).

In Argentina, authorities’ dominant belief in the 1960s regarding technological autonomy was similar to those claimed during the 1950s and 1960s in France. In the latter, this belief did not last forever. In the 1970s the main goal of the nuclear sector changed from technological autonomy to the achievement of a more competitive and industrial nuclear policy manifested in the adoption of the LWK American reactor, instead of the gas-graphite model. Still the expansion of electricity supply capacity remained always an objective. The shift that occurred in France can help to understand better the nuclear energy path adopted in Argentina. The nuclear advocacy coalition insisted on the importance of developing a nuclear industry in the country in

a relatively short period of time. Thus, following what occurred in France and other countries, their idea was to start importing reactors from more advanced countries to achieve technological transfer. The final objective was constructing the reactors using purely national technology and having nuclear fuel produced completely in the country.

Since the mid 1980s and during the 1990s, the referred nuclear plan was sidelined. Under the democratic regime the priority for Argentina was to improve international relations with its neighbouring countries, especially Chile and Brazil, as well as the United States. The emphasis was put on the export of nuclear reactors in the research area, mainly to other developing countries. To achieve these objectives the government committed to abandon its traditional position of having substantial technological development in the nuclear sector. A foreign policy of cooperation with Chile and Brazil and of alignment with Western countries, and especially the U.S., favoured openness in nuclear policy. Moreover, the financial crisis in the country and the end of dictatorship contributed to a drastic reduction of economic resources to CNEA and Invap, which resulted in a decrease in their political power and, thus, of their autonomy to take decisions. Yet, since 2004 CNEA began to receive more economic resources from the state. This has not meant the recovery of all their privileges and their autonomy, however. The open nuclear policy has continued and the government objectives have been to further nuclear industry development and expand electricity export capacity. Less important is whether additional reactors will be constructed locally or will be imported. This contradicts the objective of the nuclear coalition, whose main goal is to produce locally heavy water reactors with natural uranium or slightly enriched uranium, against importing light water reactors with enriched uranium, because it is available in the country. This is a discussion among the government and the nuclear coalition about nuclear industry development versus technological autonomy. Still, the government supports technological autonomy in the field of nuclear research because the latter would help the country to diversify and improve export quality.

Unlike Germany, in France there was far less influence from abroad as well as from antinuclear movements. In France's case, where renewable energies were not considered important to develop, despite international examples and the pressure of antinuclear movements, renewable energy development was only possible at any

notable scale when the EU directives set renewable energy goals for its members. Although non coercive, EU directives succeeded in accomplishing a convergence of renewable energy policies in the EU thanks to a kind of diffusion process (Jacobs 2012). When explaining diffusion, Busch and Jörgens highlight its unilateral and voluntary characteristics in contrast to the notions of external imposition or collective decision-making contained in the concepts of coercion and cooperation respectively (2010, 2012). Diffusion has been very useful to explain the adoption of renewable energy policies in a highly institutionalized international context like the EU, having many examples in the literature (Busch and Jörgens 2010, 2012; Jacobsson and Johnson 2000; Jacobs 2012) (Chapter 2). The EU explains why although being a highly nuclear dependent country, France could succeed in introducing renewable energy and start thinking about the idea of reducing nuclear power.

Regarding renewable energy, Argentina, similar to France, was less influenced from international experiences than for example was Uruguay. But, different from France, Argentina is not involved in a highly integrated regional organization like the EU. MERCOSUR, which is still a customs union, does not have the capacity to set common directives to country members fostering the development of a particular sector like renewable energy. Common renewable energy policies are thus difficult to implement in such a context, and technological enthusiasm towards nuclear energy remains to be quite present in the country. Only if MERCOSUR becomes stronger in the future, it may have the capacity to indirectly influence regional renewable energy policies. Still, as it was mentioned in chapter 5, since the late 2000s Argentina and Brazil have intensified their bilateral cooperation in the field of civil nuclear energy research.

Like France, antinuclear movements did not have significant sway over nuclear energy policy in Argentina. They did not stop any reactor, nor change the main goals of the political agenda. Antinuclear movements, whose influence was limited, still contributed indirectly to a few very important accomplishments. The first major achievement was the closedown of uranium mining at Los Gigantes (Province of Córdoba) in 1989, after it polluted a lake basin close to the mining operations. The decision was also the result of the economic context; it was cheaper to import uranium than produce it locally (Chapter 6). Moreover, actions of the antinuclear and grassroots movements helped to halt the construction of a radioactive waste dump in

Salinas Grandes. This contributed indirectly to stopping the Gastre repository for high-level waste (HLW), and halted the installation of uranium mining in a touristic area (Traslasierra). The latter was very important because it prompted an ordinance project that declared a nuclear-free zone in the area of Traslasierra, which was later endorsed by several municipalities. But the most important achievement may be the Article 41 of the Constitution, prohibiting the entry of radioactive wastes into the national territory. The article was drawn up in 1994 by Juan Schröder, who had before been coordinator of the Greenpeace antinuclear campaign (Greenpeace 2002). Although Article 41 was not always respected, the most important contribution of the antinuclear movements since the return of democracy was the increasing visibility of the Argentinean nuclear plans in the country (Montenegro 2007). Indeed before that time, nuclear energy policy was imbued with great secrecy.

Regarding renewable energy policies in Argentina and Uruguay, what Jasper (1990) explained for European nuclear politics is relevant. Peter Katzenstein (1985, p. 32) usefully explained “in Europe ‘small states in world markets’ have developed political and economic structures that allow them to adjust flexibly to trends that larger countries are shielded from. These mechanisms include ‘an ideology of social partnership expressed at the national level; a relatively centralized and concentrated system of interest groups; and voluntary and informal coordination of conflicting objectives through continuous bargaining between interest groups, state bureaucracies, and political parties’” (Jasper 1990, p. 101). Compared to Argentina, in Uruguay it was easier for the two conflicting coalitions to reach a consensus that renewable energy was more cost-effective, and safe to diversify and strengthen the electricity mix.



## **8 Final Conclusions**

This chapter discusses the main findings from the empirical analysis related to Argentina and Uruguay included in this dissertation as well as the lessons learned from the examination of the cases of Germany and France (Chapters 4, 5, 6, and 7). The explanations of the main empirical findings will be based upon the theories and approaches discussed in Chapter 2 and the interpretation of the two case studies from Chapters 5 and 6. The present doctoral research seeks to explain the energy policy paths in two South American countries that are experiencing rapid socioeconomic transitions. Both the favourable and adverse conditioning factors are explored. This will contribute to understanding why although Argentina and Uruguay have faced similar energy supply challenges since the mid 2000s, Argentina has decided to develop more nuclear power and less renewable energy, while Uruguay has decided not to develop nuclear and, instead to deploy renewable energy. In order to understand this why question and how renewable and nuclear energy options have been considered in these two countries, it is necessary to understand conditioning factors, as well as who are the actors, what are their ideas and fundamental positions, how they interact, and how their interactions are conditioned, facilitated or constrained by institutions. Additionally, the relationship with international actors coming from lead countries in renewable energy is considered. These are the core elements that explain policy change or path dependency in these two different electricity systems between the years 2003 and 2014.

In section 8.2, I will discuss the main findings related to each of the hypotheses (Chapter 2). In section 8.4, the theoretical contribution of this dissertation is explained. Finally, in section 8.5 prospects of the main findings and possible research areas for the future are suggested. Before proceeding to discuss the main findings related to each of the hypotheses, in the next section (8.1) the limitations of the present dissertation are addressed.

### **8.1 Limitations**

One of the assumptions here is that the institutional setting of the electricity system boosts or constrains the introduction of new energy sources like renewable and nuclear energy. It is clear that it is very difficult to define the exact extent of the



influence. An effort to overcome this difficulty was made by focusing on the impact of the most relevant institutional changes, which were the electricity reforms. Through the interviews that were conducted it was possible to confirm that in Uruguay the liberalization of the electricity generation area has been more favourable to strengthening the introduction of renewable energy sources. In contrast, in Argentina “post-neoliberal electricity re-reforms” (Haselip and Potter 2009), specifically electricity subsidies, have not favored the deployment of renewable energy. These same reforms have not had any major impact on the nuclear sector.

Another concern is how to evaluate the extent of international policy learning from developments abroad, since there has not been a straight adoption of either the German or Spanish policy model, nor the product of external suggestions or pressure. Rather policy learning was the product of autonomous observation and was fully adapted to national needs. The qualitative interviews conducted in Argentina and Uruguay—the interviews with the *Deutsch-Uruguayische Industrie- und Handelskammer* (AHK Uruguay), the National Direction of Energy (DNE), The Greens, and the Argentinean Wind Energy Association (AAEE)—confirm that the German and Spanish experiences and the ensuing relationship developed with the AHK Uruguay, GIZ, the Spanish AECID, and the IDB were important. Yet official documents proving this are scarce, except for the plans about the first wind turbine installed by UTE, Los Caracoles wind park, which was financed by the Spanish government, the Diadema wind park in Argentina, financed by the IDB as well as the detailed information provided by the AHKs Argentina and Uruguay and the GIZ about the European Energy Manager course financed by the German program CIM-AHK. The institutional web pages of the AHKs, the AECID Uruguay, INTI, among others, provide additional information about their work on the renewable energy field.

The scarcity of up-to-date data and/or official documents for both case studies, and the reliability of the data for the case of Argentina were at times a problem. Interviews in some cases proved to be a unique source of information, even though it is difficult to confirm all of what is said with specific data from other sources. Similarly, trustworthiness challenges can appear when the policy beliefs and interests of interviewees are analyzed. Nonetheless, qualitative interviews were conducted with several crucial decision makers, who at some point made similar arguments to each

other, which were also related with historical facts. In this way it was possible to confirm statements through reiteration.

## **8.2 Discussion of the Main Findings: Implications of the Case Studies**

The hypotheses, answering the leading research questions, were examined from the perspective provided by the “punctuated equilibrium” theory together with the approaches of the “advocacy coalition framework” (ACF), and historical institutionalism (Chapter 2). Chapter 3 described the methodological framework that corresponded to the comparative case study and explained the methodological approach (i.e. the qualitative research methodology and the case study). As the unit of analysis was the adopted energy paths, the purpose was to study this process in each electricity policy system and compare them (including the similarities and differences). This could help to explain why both countries set different goals in their public agendas. Renewable and nuclear energy deployment was analyzed only in the context of the electricity system, excluding the transport and heating systems.

Argentina had early experiences with wind energy policies development. Both Argentina and Uruguay began to look more seriously at renewable energy in 2006 in response to their respective energy crises.<sup>170</sup> Yet wind and renewable energy goals in Argentina are far less ambitious than those of Uruguay. This paradox becomes even more pronounced if it is considered that Argentina has one of the most advanced domestic wind industries in South America plus outstanding wind resources while Uruguay must import all of the components for its wind turbines. Also, Argentina has set relatively ambitious nuclear energy goals, while Uruguay postponed its consideration to the year 2030. To understand these differences, it is essential to pay attention to the interaction of the relevant advocacy coalitions, their fundamental positions, and the institutional structures of reinforcement they consequently establish. I have shown how these interactions have been conditioned by relevant institutions and policies established at previous “critical junctures” in their electricity systems.

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<sup>170</sup> In 1998 it was issued the first wind and solar energy act in Argentina. Also, in 1994 the first wind small-scale park (500 kW) was installed in Comodoro Rivadavia (province of Chubut) by the cooperative S.C.P.L.

### **8.2.1 Crisis as an Opportunity or as a Barrier for Policy Change**

Here the relationship between electricity crises and the fundamental positions or “policy core beliefs” (Sabatier and Jenkins-Smiths 1993; Sabatier and Weible 2007) of dominant coalitions will be addressed. In both countries relevant actors have attempted to address similar challenges in different ways. New coalitions tend to confront pre-established coalitions to impose their beliefs in the electricity system and lead to policy change. But in the confrontation process, emerging coalitions usually try to use the context conditions to their favor and in this way to achieve their goals, as it is possible to see in the electricity system.

In Uruguay, an inadequate electricity supply was caused by rapid socioeconomic growth that caused a great growth in domestic demand, by the decision of Argentina to cut their electricity exports to Uruguay, and by the depletion of hydropower capacity. The resulting crisis triggered in the electricity system was used as a chance for the renewable and nuclear energy coalitions to succeed. During the renewable energy and nuclear debates, the costs of renewable energy dropped significantly. As the issue of costs was one of the main concerns of political leaders, the renewable energy coalition used this additional argument to convince politicians sidelining policy beliefs of the nuclear energy coalition. Also, the precedent of the nuclear protests occurred in the 1990s has indirectly influenced the delay of the decision to develop nuclear power (see Chapter 6). The context of the electricity crisis and cost-efficiency were crucial because they both positively influenced the framework of interactions of the actors, opening a “window of opportunity” (Baumgartner and Jones 1993, 2009) for the renewable energy coalition. This did not imply the complete destruction and replacement of the dominant policy monopolies, as the first hypothesis suggests (Chapter 6). Rather this conducted to changes in the policy core attributes of the governmental program in the electricity system leading to a weakening of the dominant policy duopoly (fossil fuels and large hydropower).

In the case of Argentina, socioeconomic growth and the depletion of natural gas reserves provoked the same problem that supply could not meet demand. This opened a “window of opportunity” for the renewable and nuclear energy coalitions. Actors of the renewable advocacy coalition confronted with the nuclear coalition and tried to influence political decisions to implement more ambitious renewable energy policies. However they could only partially succeed. The government chose to invest

more in the nuclear sector, re-launching in 2006 a plan that was suspended for almost two decades, apart from projecting large-scale hydropower plants as well as non-conventional fossil fuel extraction for the next years. Competition is more difficult than in the case of Uruguay because all the competing advocacy coalitions, except for environmental NGOs or local movements, support nuclear energy and large hydropower to different extents. In Argentina the general pattern is that all coalitions support a reduction of fossil fuels, and an increase of nuclear, large hydropower and renewable energy; the difference is in the role assigned to each source. Renewable energy is seen as secondary, except for the renewable coalition. In this context, relatively stronger nuclear goals and weaker renewable objectives were included in the agenda due to the government responding to the interests of the nuclear coalition as well as including some innovation elements to preserve their political legitimacy. Pre-established policy core attributes of the governmental program have not been significantly revised, however, it was possible to introduce small changes in the policy core attributes.

Although the renewable energy coalition had a context determined by the need to produce more electricity to meet the unsatisfied electricity demand, this context interacted with well established “images” in the electricity system that were difficult to change. The electricity crisis entailed an opportunity of access for renewable energy but this was limited by the government that continued favoring more fossil fuels and began supporting more nuclear power. Fossil fuel supporters continued having the most dominant policy monopoly in the electricity system but this time the supposed unalterable policy monopoly was forced to open a small door and accept the introduction of some changes in the governmental program. The government has started to support nuclear power and has incorporated small renewable energy targets. This has slightly weakened the policy monopoly held by the fossil fuel coalition in the electricity system. There has been path dependency but there are also now some signs of incremental change (Chapter 2).

Depending on how established dominant advocacy coalitions are, electricity supply crises and changes in natural conditions will affect the opportunities for new energy technologies. Established policy monopolies can be either more closed or more open to allow more or less access of a new issue definition in the public agenda. Issue definition is then crucial for subsequent greater changes and is often conducted

by strategic political actors that try to gain agenda entrance through “venue shopping”. The latter relies “on the dual strategy of the presentation of image and the search for a more receptive political venue [...] those on the losing side of a debate will have the incentive to look for allies elsewhere [...] They may identify particular venues, such as congressional committees, state government organizations, courts, private business, or any other relevant institution in their search for allies. In this process of searching for a more favourable venue for consideration of an issue, image manipulation is a key element [...]; they must explain why the issue is appropriate for consideration within that venue” (Baumgartner and Jones 2009, p. 36). The process of searching for allies in specific favourable venues using different opportunities was important to understand how the renewable energy coalition in Uruguay attempted to seek the support of other actors, also from abroad, to crumble and sideline the fossil fuel and nuclear coalitions, respectively. The hydropower coalition had already been weakened due to the natural conditions and this was an advantage for the renewable energy coalition. Conversely, in the case of Argentina the fossil fuel advocacy coalition restricted the access of the renewable and nuclear energy advocacy coalitions trying to keep a closed system in which it was more difficult to enter, though not completely impossible. The renewable energy coalition also organized networks like the Argentine Renewable Energy Alliance (AERA) and venues where they presented official reports such as the presentation of the AERA report in the Senate or the presentation of the Energy Scenarios 2030 to seek the support of other actors.

As it was explained in chapter 2, a policy monopoly entails not only political understandings concerning a particular policy of interest but also “an institutional arrangement that reinforces that understanding” (Baumgartner and Jones 1993, 2009, p. 6). The institutional arrangement or structure matters because it is responsible for policymaking, and also because it limits access of the competing coalitions to the policy process (Baumgartner and Jones 1993, 2009).

- **Institutions Matter**

As Ohlhorst points out there is no previously established path to develop or foster innovation; active players create their own paths (2008, p. 199). When active players began creating their path towards new energy sources, they tried to establish an energy policy framework suitable for the achievement of their ambitious goals

(Chapter 2). Conversely, when advocacy coalitions continued exercising a control over the energy sector they used the established energy policy framework to protect this policy system but incorporated some modest legal regulations to pursue the goals of the adversary. The energy policy and legal framework is the other fundamental piece that shapes the nature of the policy monopolies in the electricity system.

The Argentinean government has adopted a few legal regulations and policies to achieve their (weak) renewable energy goals. However, as was explained, there was a long delay until the law was effectively implemented and tariffs were set too low and for a shorter period of time than usually expected (Chapter 5). Also, the reversals in the policy decision-making regarding renewable energy policies constrained even more the possibility of the renewable energy advocacy coalition to find a way to build a subsystem (Chapter 5). This fragile renewable energy policy framework shows the limited interest politicians have in setting more ambitious renewable energy goals and policies. The motivation to promote renewable energy goals and to respond to the demands of the renewable energy coalition (especially actors from the private sector and other interest groups like renewable energy associations as well as NGOs), is primarily to project an image of innovation, and, in a second place, to boost local technological development.

The case of Uruguay gives an example of how improvements in the energy policy and legal framework have stimulated authorities to achieve even more ambitious renewable energy goals. The first years when wind energy policies failed, there was little development of wind energy. However, since late 2008 renewable energy actors have strengthened political support, enabling a slow but successful departure. They are motivated to achieve their goals (Chapter 6). The contrasting results produced by the two attempts to foster wind energy shows that legal regulations and policies are neither static, nor pre-established but rather conscious actors can, under certain conditions, change policies over time. To achieve certain goals—renewable energy development—the support of a legal and energy policy framework planned for the long-term and that ensures that national commitment won't change with leadership is required. The most influential decision was the establishment of a consensual and long-term national energy policy clearly favoring renewable energies. The new Energy Policy 2005–2030 agreed to by the four political parties shows that the legal and energy policy framework has been deliberately

improved. This decision has facilitated the introduction of further decrees for wind energy auctions as well as renewable energy regulation (i.e. a low-voltage public network of micro-generators and the possibility for large industries to produce their own electricity) (Chapter 6).

What matters here is the long-term character of the decision, considering that before political decisions were adopted for short periods of time. Until then the lack of continuity and stability in energy policies, as was the case in Argentina, failed for years to set a more favorable and stable policy framework to develop innovative energy sources. But the decision of the political parties to agree to a long-term energy policy has enabled the country to improve the framework conditions of the fledgling renewable energy coalition. As an indirect consequence, renewable energy has additionally served to strengthen and stabilize the electricity system and thus as an element of policy innovation.

This is the point of departure that contributes to answering the main research question. Policy changes or small policy changes were also possible, even if the policy monopolies of the dominant advocacy coalitions were not replaced by other coalitions' policy monopolies in the electricity system. To understand these policy changes or small policy changes the other sub-questions explaining the relationship with foreign actors and the factors that have facilitated or hampered the initial deployment of renewable and/or nuclear energy must also be considered (Chapter 1).

### **8.2.2 International Inputs and Domestic Practices**

The international dimension of policy learning played a crucial role in explaining the decision of renewable energy development in both Argentina and Uruguay. In the words of Howlett and Ramesh (1993) the choice of policy instruments does constitute an experience learned by state and social actors that could be extended over the space dimension (*transnational dimension*), among other dimensions. Since the electricity crisis was triggered, the renewable energy coalition in Uruguay and Argentina started to observe several experiences of countries with renewable energy in an attempt to broaden the scope of alternatives. In this context the renewable energy coalition, motivated by their policy convictions to introduce new energy sources began to build a relationship with international actors mainly from Germany and Spain as well as international organizations. This was a voluntary and horizontal relationship in which

many actors were involved. They've achieved a permanent bilateral dialogue in which domestic actors have observed and consulted international actors while they have contributed to the learning process of Uruguay and Argentina (Chapter 6). The autonomous character of the relationship is emphasized in the definition of international policy learning provided in Chapter 2.

Accordingly, Uruguayan government and private developers decided to interact with actors from abroad (e.g. AECID Uruguay, AHK Uruguay, UNDP, WB, IRENA, as well as German, Spanish, and Finish private renewable energy companies) independently of any kind of inducement or pressure of these actors (Chapter 6). The example that shows how the Uruguayan administration preserved its priorities, adapting foreign practices to their specific needs, was the decision to implement and adapt a variety of available policy instruments in order to foster and boost renewable energy development. In this context, Uruguay decided to use competitive auction schemes to achieve a cost-efficient benchmark price for large-scale wind energy, a FIT for biomass, and net-metering for small-scale renewable energy projects; policies that have been supported by Germany and Spain (Chapter 6). In the case of nuclear energy in Argentina, international influence was very important during the first decades of this industry, mainly in the 1970s when the nuclear plan was formulated, being less significant when it was decided to reactivate the sector and finish the previous unrealized goals. Still after the decision was taken, new nuclear countries like China started to exert an influence for the further development of nuclear energy in Argentina. Although in the case of renewable energy, international actors had rather a limited influence, international conferences and actors (e.g. GIZ, IDB, the Bonn Conference, IRENA) were perhaps the most important reason of the issue of renewable and especially wind energy targets in the political agenda. Unlike Uruguay, foreign private renewable energy developers were less involved in the policy process.

In both Argentina and Uruguay, the decision to implement competitive auction schemes for large-scale wind energy may correspond to a trend seen in many Latin American countries. Argentina decided to implement a competitive tender process in 2009 to boost renewable energy and overcome the inadequate performance of the FIT law previously established, which had not properly worked (Chapter 5). Something similar occurred in Costa Rica, Ecuador, and in Brazil where the government explicitly ended FITs in 2010 (IRENA Report 2013; Jacobs et al. 2013,



p. 602).<sup>171</sup> These examples demonstrate that there is a tendency to incrementally implement auction schemes in Latin American countries. Some countries in the region have set auctions as their dominant support scheme for renewable energy, but they also coexist with other support mechanisms such as FITs, like in Uruguay and (though in name only) Argentina (IRENA Report 2013).<sup>172</sup> This shows that domestic actors have thought about which policy instruments were the most appropriate to their national situations, determining how to apply and better adapt a foreign policy. This observation and adaptation process from international experiences entailed self-learning in Uruguay, with Germany and Spain as the inputs.

To Germany and Spain it represented the possibility of opening and building a nascent renewable energy market in the MERCOSUR area. The AHK Uruguay and AHK Argentina assumed that first supporting renewable energy developments in Uruguay could generate a domino effect in Argentina, where it is still quite difficult to develop renewable energy and drive an energy transition (Chapters 5 and 6). Germany, supporting wind energy policy in Uruguay, might indirectly influence the development of wind energy in Argentina. With this in mind, the AHK (Argentina and Uruguay) switched its position and began arguing that it was unnecessary to insist on identically transferring the German model of FITs to Uruguay, or to Argentina. Rather they decided to contribute to Uruguay's learning and adaptation by delivering support to the learning process. International policy learning in relation to renewable energy development served to open a room for discussion between domestic and international actors, preserving the autonomous character of the relationship. Beyond serving the purpose to directly contribute to the learning process of one country, international policy learning can also serve as a channel to indirectly influence nearby third-party countries in the future, through the spread of interregional renewable energy policies; the so-called policy diffusion that occurred in Europe (Busch and Jörgens 2012; Jacobs 2012).

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<sup>171</sup> Source:  
[www.irena.org/DocumentDownloads/Publications/IRENA\\_Renewable\\_energy\\_auctions\\_in\\_developing\\_countries.pdf](http://www.irena.org/DocumentDownloads/Publications/IRENA_Renewable_energy_auctions_in_developing_countries.pdf).

<sup>172</sup> Source: Ibid. Previous (130).

### **8.2.3 Structure of the Electricity System as a Constraint or Facilitator to Renewable Energy Development**

To understand policy change or small policy change within the electricity systems of Argentina and Uruguay, it is essential to pay attention not only to the access of the weak advocacy coalitions to the political agenda, influenced by the socioeconomic and natural contexts, but also to the previous institutional mechanisms of reproduction (Thelen 1999; Lieberman 2002) in the broader electricity policy system. The impact of these reproduction mechanisms coming from the broader electricity system matter because they can either hinder or facilitate the ability of advocacy coalitions to set adequate policies to build a new subsystem. This will then influence policy changes within an electricity system. Looking at the electricity system of Argentina and Uruguay their differing natures can be identified: more closed or more open.

- **Closed versus Open Electricity Systems**

The ability of the renewable and nuclear energy advocacy coalition to setup a policy subsystem is constrained or facilitated by institutional reforms in the electricity system. These shape the nature of the electricity policy systems that can result in either more closed or more open directions.

As was seen with the case of Argentina, a greater intervention of the government in the electricity generation market has created an incentive for the domestic population to make ever-increasing social demands, expecting low-priced and subsidized energy, and for the government to meet the demands. This political mechanism of reproduction has engendered a “locked in” effect within the electricity system in which it was especially hard for private actors to invest in new innovative sources like wind energy and has limited the ability of the renewable advocacy coalition to build a new policy subsystem. Nuclear energy was not affected because as it remained fully state-owned, the national government was the actor responsible to invest in the sector subsidizing the difference in the energy price.

This closed functioning of the electricity system has constrained the possibility of more significant policy change, resulting in a continuation of path dependency. However, electricity subsidies will gradually be reduced during the year 2014 and this is expected to further the deployment of renewable energy. The change in subsidy policies confirms that even if the current institutional setting of the

electricity system constrains the development of renewable energy, the situation is not static. Political structures are shaped by governmental actors and the domestic population who can re-interpret and change these structures. Similarly, “to proffer a collective action frame is to suggest that an opportunity to affect social change exists and that people are ‘potential agents of their own history’” (Benford and Snow 2000, p. 631).

In the case of Uruguay for example the country opened its state-owned electricity generation market facilitating the development of renewable energy. As shown, renewable energy developments in Uruguay could begin after UTE’s monopoly on electricity generation came to an end. This signaled the kickoff of a new energy source because it enabled the participation of private investors in the market that, otherwise, would have been very difficult for the state to pursue on its own. The reform was important because it opened the electricity system to energy from new sources, like wind, biomass, and to a lesser extent also nuclear. For nuclear energy it was more difficult because the same law that reformed the electricity generation market forbade the use of nuclear energy, though the possibility to overturn the antinuclear article has been there and has been strongly considered. Indeed, after the electricity crisis a debate between renewable energy and nuclear power was possible thanks to the previous reforms. Although the reform did not directly create a renewable energy policy subsystem, it facilitated the start down a path of energy innovation. A few years after the electricity reform was completed, an auction scheme was introduced for renewable energy projects with the objective to foster private investment. The current projection is that 80% of the wind parks will be privately held by 2015 leaving just 20% in the hands of UTE.<sup>173</sup> Again actors were the agents of their own history and the political opportunity structure was contingent on how the history was framed by the actors.

An analysis of how advocacy coalitions use different socioeconomic and natural conditions to impose (or not) their policy core beliefs, institutions, and how specific political mechanisms of reproduction condition the interaction and ability of relevant actors was performed. Elements addressed by the advocacy coalition approach, punctuated equilibrium theory, and historical institutionalism—coalitions,

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<sup>173</sup> Source: “UTE y Electrobras evalúan comprar parques eólicos” (*El País*, 22.08.2012).

their policy core beliefs, and their institutions, as well as socioeconomic context, natural conditions, and previous institutional settings—were studied.

### 8.3 State of Renewable Energy in Argentina and Uruguay

The following table summarizes the current conditions of renewable energy development in both study cases, and summarizes the findings of earlier chapters.

**Table 8.1 State of Renewable Energy in Argentina and Uruguay**

Country	Renewable Energy (Percentage of domestic output in electricity mix)	Renewable Energy Goals (Percentage of domestic output in electricity mix)	Renewable Energy Industry	Implemented Renewable Energy Policies
Argentina	0.5% (covers wind and some solar) 2013	8% (4% wind and the rest solar & small hydro) 2016	Increased diffusion of wind in domestic and South American markets	Auction Scheme & Suspended FIT
Uruguay	19% (covers wind and biomass) 2012	42% (24% wind and 18% biomass) in 2015-16	Import of wind technology	Auction Scheme & Mini-grid Net Metering

**SOURCE: AUTHOR.**

### 8.4 Main Theoretical Contributions

The PE theory and the ACF were used to examine policy change, small policy change, or the lack there of, within the electricity policy systems of Argentina and Uruguay. What theoretical contributions came from linking punctuated equilibrium theory to the advocacy coalition approach? The concept of the policy monopoly as a structural arrangement that is supported by powerful ideas and institutions was taken from the PE theory to explain more precisely the ACF in relation to when is an advocacy coalition strong enough to exercise a powerful control over the other weaker competing advocacy coalitions. Institutional structures and policy ideas or

political understandings are both elements of the advocacy coalition's policy monopoly.

In moments of agenda-setting, weak advocacy coalitions look for institutions and policy ideas to destroy or weaken the advocacy coalitions' policy monopolies that instituted the governmental program. To Baumgartner and Jones (1993, 2009), when an original policy monopoly is destroyed or weakened, its replacement by a new policy monopoly may follow leading to policy change; this is the stronger case of policy change and as Thelen and Steinmo (1992) point out it happens when there are changes in the institutions themselves. However, change may occur not only when the original policy monopoly is replaced by a new policy monopoly, as suggested by Baumgartner and Jones (1993, 2009). As the empirical analysis in Uruguay confirms, coalitions that established the original program are still very present in the electricity system but their policy monopolies have been weakened leading to an unstable situation for the system advocacy coalitions with the opposing renewable energy coalition gaining strength. This has resulted in policy change, although the policy duopoly has not been replaced. In the case of Argentina, the empirical analysis confirms that the agenda in the electricity system has experienced a rather small policy change, while the dominant advocacy coalition continued having its policy monopoly. In this case, the first hypothesis is largely confirmed, although small room to new energy sources like wind and nuclear energy has been opened. These policy changes are a distinct nuance of the change explained by the replacement of policy monopolies and are influenced by another external factor or variable.

As was stated in the second hypothesis, changes or small changes in the policy core attributes of governmental programs (policy change) are also influenced by international policy learning, especially in moments of issue definition and agenda-setting. The role of international renewable energy developments and interaction processes, either with German and Spanish actors or with international organizations was analyzed in Argentina and Uruguay. Relations established with international actors have helped introducing policy changes or small policy changes in the governmental programs.

When the new advocacy coalition used international policy-learning to support building an emergent path, an additional element to contribute to the policy-learning approach was found. In fact, in most of cases the literature refers to the

questions of *who* is learning, *what* is being learned and *to what effect* (Bennett and Howlett 1992). Regarding the specific context of social policies in Latin America, Weyland (2004, pp. 2-3) analyses the *how* question in relation to international policy learning, highlighting that learning can be the result of a careful evaluation of a foreign model, or learning can rely on cognitive shortcuts (Chapter 2). While policy learning resulted from a careful evaluation of foreign ideas and was fully adapted to national requirements and domestic needs, this learning was not a linear process occurring in a unique sense. That is, from international to national. Rather this was a dynamic process produced in a bidirectional sense, including both levels, international and national, at the same time. As was shown in Section 8.2.2, national actors chose to observe and learn from international agents, whereas the latter voluntarily contributed supporting to the learning process. From the moment that policymakers were comprehensively assessing the advantages and disadvantages of adopting the European policy model of FITs for the promotion of wind energy, they were already learning about different possible public policies and legal regulations, their domestic needs, as well as how to implement better policies and instruments in the electricity system. Observing different foreign options but retaining their independence and own priorities, has contributed to improving policy learning and accelerating innovation to more renewable energy.

On the contrary, attempts to boost renewable energy in Argentina by transplanting external policy models without considering the national context, like the FITs issued in the renewables law, have failed. As David Jacobs et al. points out “none of the current LAC FIT policies have resulted in a significant market response. In some cases, this is primarily attributable to the fact that the FIT policy has not been designed in a way that will attract investment. In other cases, there has been little renewable energy growth, despite the fact that the FIT offers potentially attractive generation cost-based rates and contract terms (e.g. Dominican Republic and Ecuador). In these cases, it is primary factors external to the feed-in tariff, such as political risk, regulatory risk, counterparty risk and/or currency risk that have constrained the market” (2013, p. 608).

Apart from changes in advocacy coalitions’ policy monopolies and international policy learning, there were other external conditions that conditioned, facilitated or constrained policy change to a certain extent. The ACF approach linked

to historical institutional theory enabled the shedding of light on the impact of electricity system institutions, their mechanisms of reproduction (Lieberman 2002; Thelen 1999), and the socioeconomic and political contexts (Chapter 2). One of the conditioning elements analyzed here was the impact of the institutional electricity reforms and “re-reforms”. Looking at the electricity policy systems of Argentina and Uruguay, greater state intervention in one case and liberalization in the other were relevant in either limiting or facilitating the introduction of new energy sources. However, electricity reforms alone could not explain policy changes.

Socioeconomic and technological conditions as well as the political context had to a different extent consequences in both electricity systems. As Lieberman (2002) points out “macro-historical arguments about politics must be sensitive not only to path-dependence and the mechanisms by which political processes and patterns reproduce themselves but also to contingency and happenstance” (p. 121). In the case of Uruguay, the renewable coalition succeeded against the nuclear coalition, favored by the context of the electricity crisis, the competitiveness of wind energy technology, and the emergent governing coalitions. In the case of Argentina, the electricity crisis has had two effects, it has reinforced the entrenched policy core attributes of the fossil fuel coalition but it has also opened the possibility for the renewable and nuclear energy coalitions to introduce new ideas in the electricity system. Cost-efficiency of wind energy mattered less for policymakers in Argentina than in Uruguay because they were more concerned about the re-nationalization of YPF and the development of a nuclear industry.

It is possible to conclude that even when policy monopolies remain in place, small policy changes can be expected from the influence of the international context. Policy monopolies are only partially stable because policy systems rest within a flowed process, in which dominant and weak coalitions interact among each other being influenced by international developments in a given sector, somewhat conditioned by changing institutions and other external events. Policy systems rest in a continuum of creation, weakening, or destruction and replacement of subsystems. To Baumgartener and Jones (1993, 2009) the forces of change “are not controlled or created by any single group or individual but are the result of many interactions among groups seeking to propose new understandings of issues, political leaders seeking new issues to make their name, agencies seeking to expand their jurisdictions,

and voters reacting to the whole spectacle” (p. 237). But the authors also recognize the relevance of the political leaders in steering these forces of change. “Leaders can influence the ways in which the broad tides of politics are channeled, but they cannot reverse the tides themselves [...] During these periods of change, they can be channeled in particular directions, and the most skillful political leaders may be those who recognize and channel those forces that present themselves” (Baumgartener and Jones 1993, 2009, p. 237).

In the cases of Argentina and Uruguay, it was found that the level of influence of international policy learning in policy change has varied depending on the discretion exercised by political leaders. For example in Argentina where pro-nuclear policy core beliefs were shared among top political and bureaucratic leaders the level of influence of international renewable energy developments was less than in Uruguay where top political leaders’ and DNE positions of the day were more dubious, involving compromise with other actors such as UTE and opposing political parties. Greater discretion on the part of political leaders in Argentina is also the reason why policy change in this country has been more incremental and slower than in Uruguay. In the latter a nonincremental and more rapid change can be perceived since the ratification of the energy policy, at least in the actions taken by the national administration. Instability or punctuated equilibrium has characterized the change in the electricity system of Uruguay. Policy change in the electricity system of Argentina was more incremental or path dependent and policy attributes fluctuated less.

## **8.5 Future Prospects and Research**

This doctoral research has focused more on the formulation of goals in the agenda-setting process and less on the implementation process. Some implementation problems already noted were mentioned in the respective chapters of Argentina and Uruguay but they were not the main focal point. These challenges to be analyzed in the future will be mentioned below but before I want to highlight an aspect of the present dissertation that was not analyzed in detail and should be considered for future analyses; the role of social movements in the construction of meanings, so-called “framing processes” (Benford and Snow 2000). Here the participation of



environmental NGOs and grass-roots movements in the agenda-setting processes for the introduction of renewable energy goals in Argentina and for the legal prohibition of nuclear energy in Uruguay were described, though a detailed analysis of the features of social movements and the dynamics of the generation, elaboration, and diffusion of collective frames or meanings is missing. The further analysis of this aspect would be a valuable contribution to the present dissertation.

Implementation challenges will be an important research area since Uruguay and Argentina are, to different extents, at the beginning of a path to energy innovation, becoming new potentials examples of countries that implement energy transitions. The current political consensus around renewable energy development supposes that Uruguay is likely to be a new example of implementing energy transition, having the political willingness to undertake the energy shift, to improve their regulatory framework, and to observe the experience of pioneering countries. The firm decision to develop renewable energy and delay the consideration of nuclear power development until 2030 may entail long-term consequences for the electricity system of Uruguay. As Jasper points out (1990) when politicians and bureaucrats in the US, Sweden and France opted different energy paths after the oil crisis, they didn't realize they were choosing the policy trajectories for decades to come; however the flexibility of policymakers has shrunk over time. Thus, renewable energy development is at an initial stage and its domestic wind industry remains a future challenge but the country can already be counted among those implementing innovative policies and it is likely that it will continue this path over the coming years.

Still, the path towards a new energy subsystem is characterized by a slow start so far due to expected delays and difficulties (i.e. bottlenecks in logistics, environmental and territorial institutional constraints and grid connections), which are common in initial phases and, especially, in social and economic transition countries.<sup>174</sup> A potential research area could be the implementation and coordination of energy, environmental, and territorial policies since they are closely related, especially when it comes to new energy technologies. As Jänicke (2011) confirmed

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<sup>174</sup> See the example of Brazil in which similar problems happened when they started to develop wind energy, biomass and small-scale hydropower in 2002. Source: [http://www.irena.org/DocumentDownloads/Publications/IRENA\\_Renewable\\_energy\\_auctions\\_in\\_developing\\_countries.pdf](http://www.irena.org/DocumentDownloads/Publications/IRENA_Renewable_energy_auctions_in_developing_countries.pdf).

“environmental innovations are characterized by the fact that they are largely dependent on political support in terms of market failure” (Johnstone 2007; Ernst and Young 2006; Jänicke 1978 and 2008, all found in Jänicke 2011, p. 12). Policy innovation is, therefore, essential to provide the necessary support for the successful development of renewable energy. Currently there are several signs of modernization in the electricity system conducted by the Energy Policy 2005–2030 based on renewable sources but this leads to new challenges that require new answers from energy policy.

Regarding technological barriers, technical bottlenecks are expected to be reduced over time. They are supposed to be temporary because of greater policy learning and improvements in the legal regulations and public policies over time. The ability of governmental actors to overcome these barriers will depend on how strong the electricity policy system becomes in the course of time and how they are able to learn from previous experience, this being another potential research area to be expanded in the future.

What could the development of renewable energy in Argentina look like in the coming years? Although the country has chosen to develop more nuclear and less renewable energy related to the tight and closed electricity system, some favorable conditions for more ambitious renewable energy goals could develop in the future. Renewable energy has in its favor a domestic wind industry, very good natural conditions, the experience of the wind energy cooperatives in the south, and an emerging legal framework that might be further improved in the next years. Argentina, like Uruguay, has an urgent energy security problem resulting from increased electricity demand and the collapse of domestic fossil fuel capacity. The electricity shortage has been aggravated by the scarcity of financial resources for investments in the sector and by the implementation of indirect electricity subsidies. However, as the latter will be gradually reduced in 2014, it is expected there will be an increased deployment of renewable energy.

What are the possibilities of Argentina following the path of Uruguay? Like Uruguay, these electricity problems may open a window of opportunity for the deployment of renewable energy. Growing electricity demand, international trends as well as the energy shift undertaken by some neighboring countries like Uruguay and Brazil represent a chance that can be used by the Argentinean renewable energy

advocacy coalition. Yet, it is very difficult to anticipate the extent of this impact because of other barriers like the decisions to expand the nuclear energy capacity and to produce shale gas and shale oil, which may restrict more ambitious policies towards renewable energy. Similar to the French case, where in addition to nuclear energy the country has developed renewable energy, the development of both renewable and nuclear power is expected in the next years, being a future potential area of study how the implementation policy process of these two energy sources is being performed and what the outcomes are.

Furthermore, since Uruguay and Brazil are enthusiastic about developing renewable energy, it would be possible in the future for the implementation of a national regulatory framework in Argentina to promote renewable and wind energy, through an *open (policy) coordination process* (Jacobs 2012) driven by MERCOSUR.<sup>175</sup> This is what occurred for example in Germany, France and Spain, where the EU exerted its influence—even though attempts of policy harmonization have failed—in their domestic renewable energy policies (Jacobs 2012). The difference between the EU and South America is that the renewable energy policies of western European countries, as well as China, are strongly related with their commitments to reduce their high CO<sub>2</sub> emissions (as an important part of climate change mitigation policies). On the contrary, since South American countries are not significant worldwide CO<sub>2</sub> emitters like the EU, U.S. and China, they do not have the same pressure to reduce CO<sub>2</sub> emissions as the latter countries (for the case of China see Lewis 2013). Thus, although reduction of CO<sub>2</sub> emissions also plays a role in the deployment of renewable energy, it is far less important to the development of renewable energy in South America and they are far less internationally compelled, having lower CO<sub>2</sub> emission reduction targets. Still the potential future implementation of a regional energy regulatory framework driven by the MERCOSUR constitutes an additional possible future research area.

Before ending the conclusion chapter, I would like to draw attention to what Jasper (1990) addresses in his theoretical conclusions about the relevance choices policymakers have. “Policy trajectories themselves can become powerful causal

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<sup>175</sup> Open coordination process is a method that refers to the way that the EU has influenced domestic renewable energy policies, that is, without legally binding measures but rather with targets, reporting and the threat of harmonization (see Jacobs 2012).

variables, reshaping political and economic variables so that they support the chosen trajectories. This is another way of pointing out the extent to which political and economic structures can be reshaped by actual choices made by policymakers [...] The factors that should provide a basis for making policy decisions can be heavily determined by those decisions. This reversal allow elites to rewrite history and to claim that their policy path had been inevitable all along [...] They create what Roberto Unger (1987b) calls ‘false necessity’” (Ibid., p. 275). Future studies about the implementation of renewable or nuclear energy policies do not have to dismiss this factor.

In summation, this dissertation is one of the first attempts to study in-depth policymaking processes in relation to nascent energy sectors, and in particular, nuclear and renewable energy in South American transition countries. As mentioned in Chapter 1, several South American countries share similar challenges in their social, economic, political, and energy sectors. They constitute young democracies that are experiencing socioeconomic transitions and have mid-level economic positions. They have experienced strong socioeconomic growth but still suffer from high social inequality rates. Regarding the energy sector, Argentina and Uruguay, as well as Brazil, have been experiencing a steady growth in electricity demand due to economic growth. Even though this is a comparative study of only two case studies, the findings are likely to be relevant for other South (or Latin) American countries that are experiencing socioeconomic transitions and starting down their own new paths towards greater use of new energies.



## Appendices

### Interview Guidelines

#### **Questionnaire for semi-structured interviews for the renewable energy sector (companies, associations, NGOs) as well as public policy-makers in Argentina (English)**

- 1) Who were the actors that supported from the beginning both renewable energy regulations, Law No. 25019 in 1998 as well as Law No. 26190 in 2006? Who were the actors that oppose to these laws during the discussions?
- 2) Which were the arguments that the opponents propose to object renewable energy development?
- 3) Why it does not exist until now, regulatory frameworks more effective and efficient than the Law No. 26190 and GENREN program to promote renewable and wind energy, letting renewable projects relegated to a marginal role?
- 4) Which other regulatory mechanism or incentive system should supplement existing regulatory mechanisms to improve effectiveness? What mechanism is, in your opinion, the best: the tender offer type like GENREN, an adequate system of feed-in tariffs similar to the German one, or other?
- 5) There are a variety of actors in Argentina that are working to promote the development of renewable energy from private developers, associations such as the Argentinean Wind Energy Association, NGOs, the Wind Energy Regional Center of Chubut, CADER, etc. Is there, among all these actors, any formal working relationship or bond as regular discussion meetings or joint projects?
- 6) Is there any international public or private support, such as the support of any Spanish, German, or European institution (financial or other) in the development of renewable energy?
- 7) What are, in your opinion, the main barriers for the deployment of renewable energy in Argentina? How it could be possible to overcome these obstacles?
- 8) Are traditional energy sources such as nuclear energy and fossil fuels, which have a long-standing development in Argentina, an obstacle for renewable energy development?
- 9) From all the renewable projects awarded by the GENREN program, how many have already got funding to begin the work?
- 10) It is possible in the current electricity market (unbundled in generation, transmission and distribution) of Argentina to develop renewable energy sources? In other words, is the Electricity Law (No. 24065/91) that regulates the electricity market appropriate for the

incorporation of new energy technologies? Or it should be adapted, so it can be better articulated with the renewable energy regulation?

11) From all the renewable energy, is wind the source with the most promising potential of development in Argentina? How do you expect the renewable energy projection for the coming years in the country?

12) Has the province of Chubut a major role in this development? There was a network of wind cooperatives in the late 1990s: What happened to them and why they did not prosper?

13) How do you consider the development of wind power and renewable energy in Argentina, compared to the other neighbouring countries of the region?

14) Is there any person that can provide valuable information for my work you can recommend me and give me the contact for an interview?

**Questionnaire for semi-structured interviews for the renewable energy sector (companies, associations, NGOs) as well as public policy-makers in Argentina (Spanish)**

1) ¿Quiénes fueron los actores que estuvieron apoyando desde el principio para impulsar las dos leyes regulatorias de las energías renovables, es decir la No. 25019 en 1998 y, posteriormente, la 26190 en el 2006? Y ¿Quiénes fueron los actores que se opusieron en las tratativas?

2) ¿Cuáles eran los argumentos que proponían a cambio, o lo que decían para oponerse al desarrollo de las energías renovables?

3) ¿Por qué hasta ahora no han salido adelante marcos regulatorios más efectivos y eficientes que la ley la No. 26190 y el GENREN para impulsar las energías renovables y la eólica, dejando que los proyectos renovables queden relegados a un rol marginal?

4) ¿Con qué otro mecanismo regulatorio o sistema de incentivos habría que complementar los mecanismos regulatorios existentes para mejorar la efectividad? y qué mecanismo es, en su opinión, el mejor: el de la oferta de licitaciones tipo GENREN, un adecuado sistema de *feed-in tariffs* a la alemana, o algún otro?

5) Hay una diversidad de actores en Argentina que están trabajando para impulsar el desarrollo de las energías renovable, desde empresas desarrolladoras eólicas a asociaciones como las Asociación Argentina de Energía Eólica, ONGs, el Centro Regional de Energía Eólica de Chubut, la CADER, etc. ¿Existe entre todos éstos actores alguna relación o vínculo de trabajo, como reuniones colectivas de discusión o trabajos conjuntos?

- 6) ¿Existe en Argentina algún apoyo público o privado internacional, por ejemplo el apoyo de alguna institución (de financiamiento o no) o empresa española, alemana, o europea, en el desarrollo de la energía renovable?
- 7) ¿Cuáles son, en su opinión, las principales barreras para el despegue de la energía renovable en Argentina? Y ¿Cómo se podrían superar éstos obstáculos?
- 8) ¿Son las fuentes de energía tradicional como la energía nuclear y los combustibles fósiles, las cuales cuentan con un desarrollo de larga data en la Argentina, un obstáculo para la energía renovable?
- 9) ¿De los proyectos renovables adjudicados por el programa GENREN cuantos ya han conseguido financiamiento para empezar la obra?
- 10) ¿Como ve usted el actual mercado de la electricidad (generación, transporte y distribución) en Argentina, como para que en el mismo sea posible desarrollar nuevas fuentes de energías? En otros términos, la ley de electricidad N° 24.065/91 que regula el mercado de la electricidad se ajusta, tal como está ahora, a la incorporación de nuevas tecnologías energéticas? O habría que adaptarla a otras condiciones más propicias?
- 11) ¿De todas las renovables, es la eólica la fuente con mayor potencial de desarrollo en Argentina? ¿Como estima la proyección de la eólica para los próximos años en el país?
- 12) ¿Tiene la provincia de Chubut un rol preponderante en éste desarrollo? Allí hubo una red de cooperativas eólicas hacia finales de los '90: ¿Que pasó con ellas y por qué no prosperaron?
- 13) ¿Cómo considera usted el desarrollo de la energía renovable y eólica en Argentina, comparado con el de otros países vecinos de la región?
- 14) ¿Hay alguna persona que me pueda recomendar y contactar, que pudiera brindarme información valiosa para mi trabajo?

### **Questionnaire for the semi-structured interview for the actors of the nuclear power sector in Argentina (English)**

- 1) What should be, in your opinion, the role of nuclear and renewable energies in the diversification of the national energy matrix?
- 2) What are the most important arguments that stand out for the development of nuclear power in Argentina?
- 3) Do Law No. 26566 of 2009 as well as Argentinean Nuclear Plan of 2006 constitute effective and sufficient mechanisms to foster the development of nuclear energy in Argentina?



- 4) What are the advantages of nuclear energy over renewable energy in the current context of Argentina? And conversely, what are the advantages of renewable energy over nuclear power?
- 5) Could renewable energy supplement nuclear energy to achieve the diversification of the national energy matrix? Which could be the share of renewables?
- 6) What are, in your opinion, the main barriers for the deployment of wind energy in Argentina? How it could be possible to overcome these obstacles?
- 7) Who are the actors that are working actively to promote nuclear energy development of Argentins? Is there, among them, any formal working relationship or bond as regular discussion meetings or joint projects in any particular venue?
- 8) What have been the relationships of domestic actors with international actors in the nuclear field? How have they interacted?
- 9) What are, in your opinion, the principal energy sources promoted by the administrations of Néstor Kirchner and the current one of Cristina Fernandez de Kirchner?
- 10) How have impacted Chernobyl and Fukushima accidents in Argentina?
- 11) Is there any person that can provide valuable information for my work you can recommend me and give me the contact for an interview?

**Questionnaire for the semi-structured interview for the actors of the nuclear power sector in Argentina (Spanish)**

- 1) ¿Cuál debería ser, a su criterio, el rol de la energía nuclear en la diversificación de la matriz energética nacional? ¿Cuál debería ser el rol de las energías renovables?
- 2) ¿Cuales son los argumentos que se destacan como los más importantes para el desarrollo de la energía nuclear en Argentina?
- 3) ¿Constituyen la ley 26566 del 2009 y el plan nuclear argentino del 2006, mecanismos efectivos y suficientes para propulsar el desarrollo de la energía nuclear en Argentina?
- 4) ¿Qué ventajas proporciona la energía nuclear con respecto a las renovables en el contexto actual argentino? Y al revés ¿qué ventajas proporcionan las ER con respecto a la nuclear?
- 5) ¿Sería posible que las energías renovables complementaran la energía nuclear para lograr la diversificación de la matriz energética nacional? ¿Y en qué proporciones?
- 6) ¿Cuáles son, según su opinión, las principales barreras para el despegue de las ER en Argentina? ¿Como se podrían, si es que se pueden, superar esos obstáculos?
- 7) ¿Quienes son los actores y de qué sectores provienen, principalmente, los que están trabajando activamente para impulsar el desarrollo de la energía nuclear en Argentina?

¿Existe entre todos éstos, alguna relación formal de trabajo, como por ej. reuniones regulares de discusión en el seno de algún organismo?

8) ¿Como ha sido la relación del sector nuclear argentino con los actores internacionales y en especial con los países más avanzados en el sector nuclear (ej. Francia, Japón, Canadá, Rusia, China)? ¿Ha habido algún tipo de aprendizaje o inspiración en base a sus experiencias?

9) ¿Cuales serían, a su criterio, las fuentes energéticas que más han promovido las administraciones de Néstor Kirchner y la actual de Cristina Fernández de Kirchner?

10) ¿Existen barreras de percepción social negativa, sobretodo después de Fukushima? ¿Las hubo después de Chernobyl

11) ¿Hay alguna persona que me pueda recomendar y contactar para que la entreviste y me pueda dar información valiosa para mi trabajo?

**Questionnaire for semi-structured interviews for the renewable energy sector (companies, association, chamber) as well as public policy-makers in Uruguay (English)**

1) Who were the actors (and to which parties or institutions belonged) that prompted the development of renewable energy and, in particular, wind power? And, who were the actors that oppose or were more skeptical without success?

2) What were the arguments that they have proposed to oppose renewable energy development?

3) Considering the creation of an Energy Committee in 2010 that approved the *Energy Policy 2005–2030* with short, mid, and long-term objectives, favoring renewable energy, who were the main actors who drove the referred Energy Policy?

4) Were there any attempt of laws, decrees or regulations in relation to renewable energy prior to the *Energy Policy 2005–2030*?

5) If so, who were the promoters and who the detractors? And, what were the reasons why they have not been implemented?

6) How did they overcome the obstacles that did not allow previous projects to be implemented?

7) How was the discussion of the system of incentives, bonuses and /or subsidies to help the deployment of renewable energy? What alternatives were shuffled (e.g. *feed-in tariffs*) and why it was eventually chosen the tender offer?

8) How do you assess the effectiveness of the current incentive mechanisms for the development of wind energy? It would be necessary to implement a *feed-in tariffs* system such as the German system?

- 9) There are a variety of actors in Uruguay that are working to promote the development of wind energy from foreign wind private developers, associations such as the Uruguayan Wind Energy Association, cooperative programs such as wind UNDP program, engineers, and the Uruguayan-German Chamber of Commerce and Industry. Are these actors articulated? Is there, among all these actors, any formal working relationship or bond as regular discussion meetings or joint projects?
- 10) Is there in Uruguay any international public or private support, such as the support of any Spanish, German, or European institution (financial or other) in the development of renewable energy?
- 11) What is the role of the Chamber of Commerce Uruguay-Germany?
- 12) Are there still, from your view, legal, political, technological or economic barriers to the take-off of renewable and wind energy in Uruguay? How it could be possible to overcome these challenges?
- 13) Why the government decided not to opt for nuclear energy after long public debates, (including the citizen initiative trial in 2010), and instead to opt for renewable energy?
- 14) What was the influence of the environmental NGOs in the decision of the government to legally forbid nuclear power in 1997 and in the decision adopted in 2010 when it was approved the *Energy Policy 2005–2030*?
- 15) How do you see the general perception of the Uruguayan society regarding nuclear energy issues?
- 16) Is there any person that can provide valuable information for my work you can recommend me and give me the contact for an interview?

**Questionnaire for semi-structured interviews for the renewable energy sector (companies, association, chamber) as well as public policy-makers in Uruguay (Spanish)**

- 1) ¿Quiénes fueron los actores (y a qué partidos o instituciones pertenecían), que impulsaron el desarrollo de las energías renovables y en particular de la eólica? ¿Quiénes fueron los actores que se opusieron o se mostraron más escépticos sin éxito?
- 2) ¿Cuáles eran los argumentos que proponían para oponerse al desarrollo de las energías renovables y la energía eólica?
- 3) Teniendo en cuenta la formación en el 2010 de una Comisión Energética que confirmó la *Política Energética 2005–2030* con objetivos a mediano y a largo plazo, ¿quiénes fueron los principales actores que la impulsaron?

- 4) ¿Hubo anteriormente a la *Política Energética 2005–2030* algunos intentos fallidos de leyes relacionadas a la energías renovables y eólica y/ o de programas energéticos también relacionados a las energías renovables?
- 5) Si existieron, ¿quienes fueron los que las propulsaron y quienes los detractores? Y ¿cuáles fueron las razones por las cuales no llegaron a implementarse?
- 6) ¿Como superaron esos obstáculos por los cuales no llegaron a implementarse los proyectos anteriores?
- 7) ¿Como fue la discusión del sistema de incentivos, primas y/o subvenciones para ayudar al despegue de las wnergías renovables? ¿Qué alternativas se barajaban (por ej. feed-in tariffs) y por qué se optó finalmente por la oferta de licitaciones?
- 8) ¿Cómo valoraría la efectividad de los mecanismos regulatorios actuales para el desarrollo de la energías renovables y de la eólica en particular? ¿Sería necesario implementar un sistema de *Feed-in tariffs* tal como el sistema alemán?
- 9) Hay una diversidad de actores en Uruguay que están trabajando para impulsar el desarrollo de la energía eólica, desde empresas desarrolladoras eólicas extranjeras, a programas de cooperación como el programa eólico del PNUD, ingenieros, asociaciones, la *Cámara de Comercio e Industria Uruguayo-Alemana* ¿Están articulados estos actores? ¿Existe entre ellos, alguna relación o vínculo de trabajo, como reuniones regulares y colectivas de discusión en el seno de alguno de éstos organismos?
- 10) ¿Existe en Uruguay algún apoyo público o privado de instituciones internacionales, como el apoyo de alguna organización alemana, española, o de otro país europeo, en el desarrollo de la energía renovable y eólica?
- 11) ¿Cual es el rol de la *Cámara de Comercio e Industria Uruguayo-Alemana*?
- 12) ¿Persisten, en su opinión, barreras legales, políticas, tecnológicas o económicas para el despegue de la energía renovable en Uruguay? ¿Como se podría trabajar y superar estos desafíos?
- 13) ¿Por qué se decidió no optar por la energía nuclear luego de largos debates públicos (incluyendo en 2010 la iniciativa del juicio ciudadano), y en cambio optar por las energías renovables?
- 14) ¿Que injerencia tuvieron las OnGs ambientales en la decisión del Gobierno de efectivamente no llevar adelante la energía nuclear, tanto en 1997 con la prohibición legal como a partir del 2010 con la aprobación de la *Política Energética 2005–2030*?
- 15) ¿Como ve usted la percepción general de la sociedad uruguaya con respecto a la energía nuclear?
- 16) ¿Alguna persona activa de éstas que me pueda recomendar y contactar para que la entreviste y me pueda brindar más información valiosa para mi trabajo?

**Questionnaire for semi-structured interviews for the renewable energy sector (companies, association, chamber) as well as public policy-makers in Germany (English)**

- 1) Do you think renewable energy and wind power in Germany have a high political acceptance? Why?
- 2) Are wind on-shore and off-shore different for the diverse political parties, organizations, and sectors?
- 3) There is any difference between the German political parties (SPD, CDU, Grün, FDP) about how to conduct the plan of the *Energiewende* or about which kind of renewable energy projects should be implemented?
- 4) Is important for you to achieve high political consensus? Why?
- 5) What is the real meaning for you of the *Deutsche Energiewende*?
- 6) There is any consensus of the *Deutsche Energiewende*? Where do you see the most conflictive issues or questions that must be resolved in order to reach those targets?
- 7) It is possible to translate the *Energiewende* or at least some of its instruments to developing countries?

## **Zusammenfassung**

Südamerika ist eine Region, die in der Literatur zur erneuerbaren Energienpolitik wenig Aufmerksamkeit erhalten hat. Es ist jedoch eine Region, die sich in drastischem Wandel befindet, was es zu einem wichtigen Untersuchungsfall macht. Diese Dissertation vergleicht Argentinien und Uruguay, zwei Länder, die einen raschen sozio-ökonomischen Wandel erleben und im Hinblick auf ihre Energiepolitik im Elektrizitätsbereich untersucht werden.

Das Ziel dieser Studie ist es, die Gemeinsamkeiten und Unterschiede der Energiepolitik in den beiden Ländern herauszuarbeiten. Am Beispiel von zwei ausgewählten Stromanlagen soll erklärt werden, warum und wie bestimmte politische Ideen, Einsichten oder Überzeugungen (andere aber nicht) von der Politik angenommen wurden. Diese vergleichende Fallstudie des historischen politischen Prozess der Energiepolitik sucht zu verstehen, warum sich die Länder gegenüber verschiedenen Energielösungen unterschiedlich positionierten, wie die Entwicklung der erneuerbaren Energien im Einzelfall erklärt werden kann, und dabei über die Zeit wirksame förderliche und hinderliche Faktoren zu identifizieren. Darüber hinaus wird den Entwicklungen der deutschen und französischen Atom- und/oder erneuerbaren Energiepolitik Aufmerksamkeit gegeben, da sie sich als gute Beispiele eignen im Hinblick auf ihr unterschiedlichen Energielösungen. Während in Deutschland zusammen mit Spanien, Dänemark und Kalifornien - als einer der weltweiten Pioniere im Einsatz von Wind- und erneuerbaren Energien gilt, sind Frankreich zusammen mit Kanada, Japan, Schweden und den USA eine Referenz in der Kernenergie. Diese Dissertation untersucht, was aus diesen beiden Ländern gelernt werden kann, und ob sie Elemente enthalten, die für Argentinien und Uruguay interessant sein könnten, um deren politischen Prozess besser zu verstehen.

Sowohl Argentinien als auch Uruguay sind seit Mitte der 2000er Jahre mit Energieversorgungsengpässen konfrontiert. Doch während Argentinien beschlossen hat, sich mehr auf die Steigerung der Atomkraft zu konzentrieren und begonnen hat erneuerbare Energien zu entwickeln, entschied Uruguay die Atomkraft abzulehnen und eine bedeutende Entwicklung von neuen erneuerbaren Energien zu beginnen.

Es ist paradox, dass Argentinien die Nutzung erneuerbarer Energien als wenig wichtige Quelle betrachtete, um seine Stromknappheit zu lösen, wobei eine der

wichtigsten heimischen Windindustrien Südamerikas mit hervorragenden erneuerbaren Ressourcen und bereits bestehenden Regulierungen in dieser Branche existiert. Im Gegensatz dazu muss Uruguay alle Komponenten für seine Windkraftanlagen importieren und hatte bisher keine Maßnahmen zur Förderung von erneuerbaren Energien, aber sah in der Entwicklung von neuen erneuerbaren Energien eine gute Alternative, um seinen Strom-Mix zu diversifizieren, und sein Stromknappheitsproblem zu lösen.

Der Vergleich von Ähnlichkeiten und Unterschiede bringt sowohl Fragen des ‚warum‘ und ‚wie‘ auf. Die Antwort auf die erste Frage erklärt, warum Argentinien und Uruguay angesichts einer ähnlichen Stromversorgungslücke seit Mitte der 2000er Jahre, beschlossen verschiedene Energieoptionen auf ihre politische Agenda zu setzen. Die Frage nach dem ‚wie‘ beschreibt den politischen Prozess, der hinter der Entwicklung von neuen erneuerbaren und neuer nuklearer Energie steht und die Art und Weise, wie Schlüsselakteuren diese Optionen bewerteten.

## Summary

South America is a region that has received little attention in the literature dealing with renewable energy policy politics. Yet, it is a region in dramatic transition and this makes it an important case for examination. In this dissertation, Argentina and Uruguay, two countries that are experiencing rapid socioeconomic and electricity transition, are compared in relation to their energy policies related to electricity supply. The aim of this study is to compare the similarities and differences of energy policies in the two countries—from two selected electricity systems—explaining *why* and *how* certain policy ideas, understandings or beliefs (but not others) were adopted in their energy policies. This comparative case study of the historical policy process of energy policy seeks to understand *why* the countries showed different commitments to different forms of energy and *how* the development of renewable energy in particular can be explained in each case, all the while trying to identify supportive and hindering factors. Additionally, attention is given to the evolution of the German and French nuclear and/or renewable energy policies as they provide good examples in relation to their different energy choices. While Germany—together with Spain, Denmark, and California—is considered one of the worldwide pioneers in the deployment of wind and renewable energy, France—together with Canada, Japan, Sweden, and US—is deemed to be a reference in nuclear energy. This dissertation examines what can be learned from these two countries and whether there are elements that might be interesting to apply in Argentina and Uruguay for a better understanding of the policy process in these two countries.

Both Argentina and Uruguay have faced energy supply shortages since the mid 2000s. Yet, while Argentina decided to focus more on increasing nuclear power and start developing some renewable energy, Uruguay rejected nuclear power and decided to begin significant development of renewable energy. The paradox is that having one of the most important domestic wind industries of South America, outstanding renewable resources and previous regulation in the sector, Argentina did not consider deploying renewable energy as a significant source to solve their electricity shortage. In contrast, Uruguay, which must import all components for their wind turbines and had no previous policies promoting renewable energy, saw in the development of renewable energy a good alternative to diversify their electricity mix and solve their electricity scarcity problem.



The comparison of similarities and differences entails both *why* and *how* questions. The answer to the first question explains why facing a similar electricity supply shortage since the mid 2000s, Argentina and Uruguay decided to set different renewable energy and nuclear power goals in their public agendas. The *how* question describes the (policy) process behind the development of renewable and nuclear energy and the way key actors related to these options.

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### **List of Interview Partners (oral, telephone, video call, and e-mail)**

1. Anonymous, 2012: Oral interview the 09.12.2012; ex–member of “Fundación Ambiente y Recursos Naturales”.
2. Arbor Gonzalez, Agustín, 2014: Written interview the 27.05.2014; member of the Nuclear Regulatory Authority and member of the Asociación de Profesionales de la Comisión Nacional de Energía Atómica y la Actividad Nuclear.
3. Barón, Jorge, 2012: Written interview the 11.06.2012; nuclear engineer and professor at “Universidad Nacional de Cuyo”.
4. Boenigk, Nils, 2010: Oral interview the 26.10.2010; member of the “Agentur für Erneuerbare Energien e.V.”.
5. Casavelos, Juan, 2012: Video call interview the 17.07.2012 and oral interview the 10.12.2012; member of the “Foro de Ecología Política-Los Verdes” [The Greens].
6. Díaz Araujo, Edgardo, 2013: Written interview the 04.07.2013; member of the Commission of Legal Affairs - Federal Council of the Electricity Energy.
7. Diwald, Werner, 2012: Oral interview the 20.01.2012; member of the board of ENERTRAG.
8. Esteves, Belén, 2012: Video call interview the 11.06.2012; ex–member of “Fundación Ambiente y Recursos Naturales”.
9. Farrace, Enrique, 2012: Video call interview the 17.04.2012; wind energy private developer.
10. Fernandez, Daniel, 2011: Oral interview the 19.01.2011; Project Manager of ABO Wind - Energías Renovables S.A.
11. Fernandez, María de los Angeles, 2010: Oral interview the 25.11.2010; responsible of the Press and Public Relations of the Ministry of Infrastructure La Rioja.

12. Guadagni, Alieto, 2012: Oral interview the 10.12.2012; ex–Secretary of Energy in Argentina (“Ministerio de Planificación Federal, Inversión Pública y Servicio”).
13. González, Rossanna, 2012: Oral interview the 17.12.2012; responsible of the social area at the National Direction of Energy in Uruguay (Ministry of Mining, Energy, and Industry–National Direction of Energy).
14. Gurcziks, Detlef, 2011: Oral interview the 25.11.2011; citizen movement “Wind Energy Freier Wald e.V. Brandenburg”.
15. Honti, Gerardo, 2014: Written interview the 05.03.2014; members of the “Red Uruguay de ONGs Ambientalistas” [Uruguayan Network of Environmental NGOs].
16. Hönlinger, Ingrid, 2011: Oral interview the 16.12.2011; member of the Parliament in representation of the Greens.
17. Jacob, Johannes, 2012: Oral interview the 16.11.2012; Commercial Project Manager - Project Development Latin America of Juwi Wind GmbH.
18. Jacobs, David, 2012: Oral interview the 16.07.2012; researcher at the Institute for Advanced Sustainability Studies.
19. Juri, Patricia, 2014: Written interview the 10.01.2014; member of the “Autoridad Regulatoria Nuclear” [Nuclear Regulatory Authority].
20. Karsten, Nikolaus, 2011: Oral interview the 04.12.2011; member of the Parliament in representation of the SPD.
21. Mendez, Ramon, 2012: Oral interview the 17.12.2012; Director of Energy in Uruguay (Ministry of Mining, Energy, and Industry–National Direction of Energy).
22. Mono, Rene, 2013: Oral interview the 11.06.2013; Director of “100 % erneuerbar stiftung”.

23. Mullin, Santiago, 2013: Video call interview the 27.07.2013; member of the Uruguayan Association of Wind Energy (AUdEE).
24. Murmann, Philipp, 2012: Oral interview the 19.01.2012; member of the Parliament in representation of the CDU.
25. Muttoni, Enrique, 2014: Written interview the 27.05.2014; expert in control systems engineering and author of the DVD Uruguay Nuclear?
26. Perez, Daniel, 2011: Oral interview the 02.02.2011 and written interview the 27.05.2011; General Coordinator of the “Programa de Energía Eólica en Uruguay” (Ministry of Mining, Energy, and Industry–National Direction of Energy).
27. Recalde, Marina, 2013: Video call interview the 10.12.2013; researcher of the National Scientific and Technical Research Council (CONICET).
28. Riba, Javier Alejandro, 2010: Oral interview the 26.11.2010; Manager of Impsa Wind Argentina.
29. Salaberri, Graciela, 2014: Written interview the 05.03.2014; members of the “Red Uruguay de ONGs Ambientalistas” [Uruguayan Network of Environmental NGOs].
30. Spinadel, Erico, 2010: Oral interview the 15.11.2010; Director of the Argentinean Association of Wind Energy (AAEE).
31. Vazquez, Sergio, 2012: Oral interview the 18.12.2012; Manager of the wind project La Estrellada.
32. Winter, Tobias, 2012: Oral interview the 15.12.2012; Director of “Kompetenzzentrum Umwelt und Erneuerbare Energien in Uruguay, Argentinien und Paraguay” and the “Deutsch-Uruguayische Industrie- und Handelskammer”.