

Mere deployment of renewables or industry formation, too?

Exploring the role of advocacy communities for the Argentinean energy policy mix

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Abstract

In 2014 Argentina has adopted a new policy strategy aiming at the diffusion of renewable energies. In this paper, we analyze the associated policy making process and the impacts of the emerging policy mix on socio-technical change in the Argentinean electricity sector, with a particular focus on the development of a national renewables industry. Our analysis is based on a novel analytical framework which enriches the literature on policy mixes for sustainability transitions with concepts from the Advocacy Coalition Framework. Methodologically, we conduct a qualitative analysis drawing on document analysis and expert interviews. We find that the design of the Argentinean policy mix has been influenced by a dominant advocacy community with fiscal concerns and investments in renewable energy as its main beliefs, thereby limiting national industry development. Based on this we derive implications for better integrating the industrial policy dimension in policy mixes for transitions towards renewable energy.

Keywords: sustainable energy transition, policy mix, industrial policy, advocacy coalitions, policy beliefs, Argentina

1 Introduction

Many countries in the world are transiting, albeit through different pathways, to more sustainable energy systems (Markard, 2018) – a global trend which is strengthened through the Paris Agreement (UN, 2015). However, the reasons to pursue energy transitions vary among countries, as they encompass also drivers other than climate change (IRENA, 2018). For instance, countries in Latin America, such as Argentina, suffer energy security issues from increasing fuel imports which affect their economy, and therefore the livelihoods of their citizens. In this context, renewable energy (RE) technologies which need to be locally adapted represent an opportunity for creating value in national economies under the paradigm of sustainable development, potentially allowing a more inclusive redistribution of their benefits (Pueyo et al., 2011; Perez, 2013; Schmidt & Huenteler, 2016)

Such sustainability transitions are influenced by policies and the underlying policy making processes in which actors interact to make their beliefs prevail (Kern & Rogge, 2017; Markard, et al., 2012). However, so far limited attention has been given to explicitly linking policy making processes and their distinct influence on policy mixes and socio-technical change (Kern & Rogge, 2017; Rogge, et al., 2017). In addition, most studies have focused on advanced energy transition processes in developed countries such as Germany, the UK, or Switzerland, each with well-established policy subsystems (Geels, et al., 2016; Edmondson, et al., 2019, Markard, et al., 2016). In contrast, some developing countries have just recently initiated such transition processes (Wieczorek, 2018), and thus often exhibit rather *nascent policy subsystems* for sustainable energy transitions.

Given these shortcomings in the literature, the objective of this article is to more closely analyse the link between policy making processes and the resulting elements of policy mixes aimed at promoting sustainable energy transitions. In addition, the broader concerns of developing countries are taken on board by not only focusing on the deployment of renewable energies but by also investigating opportunities associated with industry development. In particular, we are interested in answering the research question of *how policy beliefs influence the industrial policy dimension of policy mixes for sustainable energy transitions*. Our aim is to explain how the dynamics of policy processes influence the components of policy mixes for sustainability transitions and how it impacts on as well as is affected by socio-technical change. To answer this question we build on recent advances on a

broader understanding of policy mixes and their role for sustainability transitions which goes beyond a consideration of interacting instruments only (Rogge & Reichardt, 2016). More precisely, we highlight the role of policy beliefs and resources in policy processes shaping the development of policy strategies, instrument mixes and policy mix characteristics. We do so by drawing on the Advocacy Coalition Framework (Sabatier, 1988; Sabatier & Jenkins-Smith, 1999; Sabatier & Weible, 2014), including its attention to power (Sewell 2005; Avelino & Rotmans 2009) and learning (Moyson, 2017; Moyson, et al., 2017) in explaining policy change.

The resulting analytical framework is applied to the ongoing Argentinean energy transition. Argentina was chosen as research case as this country recently started to elaborate a policy mix to promote a fundamental change in its electricity mix by significantly enlarging the share of RE; however, opportunities for national industry development were largely neglected – after three tenders the local component average of the awarded wind projects, adding 993.4 MW of capacity, was 35.1% (CMMESA b & c, 2016; CMMESA b & c, 2017). Empirically, we thus aim at understanding who participated in the policy making process, how this participation shaped the resulting policy mix, as well as how its outcomes have influenced subsequent policy processes and thus led to adjustments in the mix. Thereby, the article contributes to the emerging literature on policy feedbacks and their role for accelerating sustainability transitions (Edmondson, et al., 2019; Roberts, et al. 2018; Schmidt & Sewerin 2017).

The remainder of the article is organized as follows. Section 2 reviews the existing literature based on which the analytical framework is derived. Section 3 outlines the Argentinean context, before section 4 elaborates the methodology for our empirical analysis. Section 5 then presents the results which are discussed in section 6 regarding the co-evolutionary dynamics of policy mix and socio-technical change. Section 7 concludes the paper.

2 Towards an integrated analytical framework for investigating the emergence of policy mixes for socio-technical transitions

Governing socio-technical transitions towards sustainable systems of production and consumption involves multiple actors with various interests (Markard, et al., 2012; Kern & Smith, 2008). Policies play a key role for sustainability transitions, but their adoption and implementation tend to be

associated with power struggles between those to gain and those to lose from such transitions (Kern, 2011; Meadowcroft, 2009; 2011). Therefore, there have been calls for greater attention to the politics of sustainability transitions (Geels, 2014; Normann, 2015). To gain a better understanding of such contested processes and how to govern transitions through policy mixes it has been argued that transition research should harness theories of the policy process (Kern & Rogge, 2017), such as the Advocacy Coalition Framework (Markard, et al., 2016; Lindberg, et al., 2018). In the following, we will first review the policy mix and the ACF literatures, which we then draw upon to develop our interdisciplinary analytical framework.

2.1 Policy mixes for sustainability transitions

Many studies on policies for sustainability transition have focused on how to support green niches (Smith & Raven, 2012), thereby contributing to changes in socio-technical regimes (Geels, et al., 2016). More recently, attention has shifted to explicitly differentiating between policies creating such more sustainable niches and those destabilizing existing unsustainable regimes (Kivimaa & Kern 2015). However, most policy-related studies so far have focused on the content of policies rather than on the policy processes that create them as outputs (Kern & Rogge, 2017; Markard, et al., 2012). Attention has also been given to the various market and system failures that call for policy interventions (Weber & Rohracher, 2012; Wieczorek & Hekkert, 2012), but less so on the coherence and credibility of policy mixes tackling these failures (Rogge & Schleich, 2018).

However, in recent years a broader conceptualisation of policy mixes for sustainability transitions has been proposed which combines three building blocks (Rogge & Reichardt, 2016): (1) the policy strategy and the instrument mix, which together comprise the elements of a policy mix, that is, its content; (2) the policy making and implementation processes which shape these elements; and (3) the characteristics of the policy mix, such as its consistency, coherence, comprehensiveness and credibility. This broad policy mix concept integrates studies on instrument design (Kemp & Pontoglio, 2011), the interplay of the instruments (Del Río González, 2007), the notion of a policy strategy (Quitrow, 2015), the characteristic of policy mixes (Howlett & Rayner, 2013; Reichardt & Rogge, 2014) and underlying policy processes (Flanagan, et al., 2011), thereby bridging several literatures.

While innovation scholars have focused on investigating the elements of policy mixes, the latter building blocks, and in particular policy processes, have been studied by political scientists, drawing on a range of theories of the policy process (Sabatier & Weible, 2014; Kern, et al., 2019). However, empirical studies investigating policy processes within sustainability transitions have been limited in number and scope (Kern & Smith, 2008; Normann, 2017; Rosenbloom, et al., 2016). For example, Lindberg et al. (2018) have drawn on the Advocacy Coalition Framework to explain actor preferences and the related European Union energy policy mix.

Yet, few studies have gone beyond such an analysis of the way policy mixes for transitions are shaped to also address how this impacts socio-technical change (Kern & Rogge, 2017), despite increasing recognition of the importance of considering policy feedbacks (Schmidt & Sewerin 2017, Roberts, et al. 2018). Edmondson, et al. (2019) have made a first step in this regard by integrating the policy feedback and transitions literature to examine unfolding policy and transition processes and the corresponding co-evolution of policy mixes and socio-technical systems through feedback mechanisms.

Here we build on this emerging literature on broader policy mixes for socio-technical transitions linking policy processes, elements (i.e. policy strategies and instrument mixes) and characteristics of policy mixes, which calls for drawing on policy process theories to explain the interplay between policy change and socio-technical change (Rogge & Reichardt, 2016, Kern & Rogge, 2017).

2.2 The Advocacy Coalition Framework

While multiple theories of the policy process exist (Sabatier & Weible, 2014; Pierce, et al., 2017) which can be harnessed for analysing the politics of sustainability transitions (Kern & Rogge 2017), such as Kingdon's Multiple Streams (Kingdon, 1995; 1984) or Policy Feedbacks (Pierson, 1993; 2000; 2004), here we draw on the Advocacy Coalition Framework (ACF) as one of the most powerful frameworks to explain policy change and stability (Weible & Sabatier, 2009). The reasons for selecting the ACF are sixfold: first, it acknowledges that policy change can be based on negotiated agreements, external and internal shocks, and policy learning (Weible, et al., 2009; 2011). Second, the conceptualization of nascent policy subsystems and advocacy communities resonates well with energy transitions in early phases (Stritch, 2015). Third, the ACF, compared to other policy

process theories, provides the possibility of grouping actors in coalitions based on common belief systems and shared patterns of coordination, thereby enabling the investigation of multi-stakeholders policy processes and common advocacy attempts by actor coalitions with shared policy beliefs. Fourth, the ACF allows explaining the coordination within an advocacy coalition and its effects on a certain policy by addressing the resources available to a coalition. Fifth, the ACF has been widely applied in environmental policy, a policy field closely related to sustainable energy transitions, including in South America (Arnold, 2003; Donadelli, 2016). And sixth, the ACF has already been applied in the transitions literature (Markard, et al., 2016), including a focus on the notion of power to explain policy change (Sewell, 2005; Avelino & Rotmans, 2009). In addition, more recent work has demonstrated the usefulness of the ACF for explaining changes in energy policy, albeit detached from socio-technical transitions approaches (Jankowska, 2012; Jimeno, 2014).

The ACF was originally developed by Sabatier (1988, 1993), Sabatier & Weible (1991) and Sabatier & Jenkins-Smith (1993) as an alternative approach explaining policy change in the US. Building on an integration of bottom-up and top-down approaches, the recognition of the role of scientific and technical knowledge in the policy process and by moving away from the classic notion of "stages" in the policy cycle, the ACF tries to predict problem adjustments and major policy changes (Sotirov & Memmler, 2012).

As its name indicates, policy change is conceptualized to take place through the formation and interplay between advocacy coalitions (ACs) constituted of governmental and non-governmental actors who share common belief systems and who systematically coordinate to influence public policy within a specific 'policy subsystem', relying on their resources to do so (Sabatier & Jenkins-Smith, 1999). The belief system allows capturing wider aspects than interests, since it encompasses shared preferences, perceptions and values among actors (Sabatier, & Jenkins-Smith 1999). It differentiates three analytical levels: *deep core beliefs* capture the underlying philosophy that goes beyond a specific policy subsystem; *policy or near core beliefs* are those values attached to a policy subsystem which can include the role of governments, general public and markets, for instance. The *secondary aspects* are narrower in scope accounting for particular rules (Sabatier & Jenkins-Smith, 1999). In a range from un-negotiable to negotiable issues, the deep core is the most rigid component of a belief system, whereas the secondary aspects are the most prompt for change within the policy process (Sabatier & Jenkins-Smith, 1999). Major policy changes are explained by a preceding shift in

the deep core or policy core beliefs of at least one of the coalitions, whereas minor policy changes are related to shifts in secondary aspects (Sabatier & Jenkins-Smith, 1999).

The policy subsystem is the arena where the actors interact, and is demarcated by a geographical space and substantive content of the policies. The ACF differentiates between mature and thus well-established policy subsystems, and nascent subsystems for new policy issues (Sabatier & Jenkins-Smith, 1999). For such nascent policy subsystems with a short tradition – less than ten years – and therefore with less mature advocacy coalitions, Stritch (2015) introduces the concept of *advocacy communities* characterized by actors that interact in the same policy subsystem, share policy core beliefs but do not systematically coordinate with other actors with similar policy core beliefs.

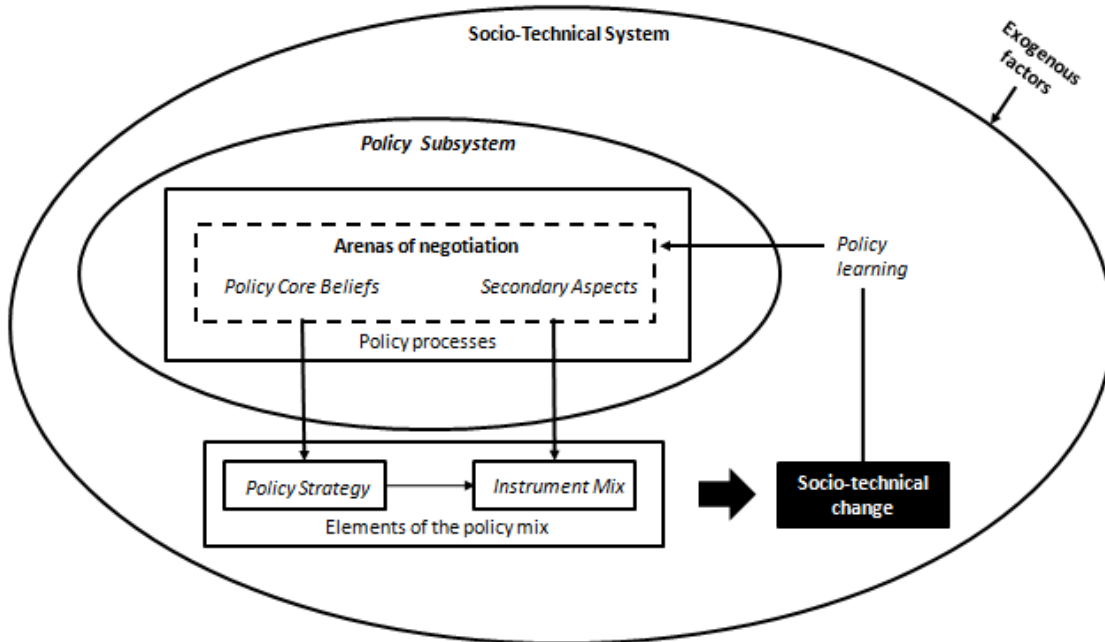
Lastly, within the ACF power can be understood as the capacity and limits coalitions have to mobilize resources to make their policy belief prevail in a specific policy subsystem (Sewell, 2005). For this, resources can be categorized into: *formal legal authority* as the capacity to take formal decisions – usually embodied by governmental decision makers; *public opinion* referring to how the public supports a specific coalition; *information* as the ability to strengthen a coalition and convince others through technical and general information; *mobilizing troops* capturing the capacity to organize public demonstrations; *financial resources* as the ability to get other resources and *skillful leadership* referring to planning an advocacy strategy through maximizing and enlarging resources (Sabatier & Weible, 2007).

2.3 Harnessing the advocacy coalition framework to unpack the link between policy processes, policy mixes and socio-technical change

Building upon the reviewed literature, we develop a novel analytical framework that enables the investigation of the role of advocacy coalitions or – in the case of nascent policy subsystems – advocacy communities and their policy beliefs for the emergence of policy mixes for sustainability transitions, such as of the energy system. For simplicity we refer to policy beliefs as those components of the belief system specific to a policy subsystem, i.e. the policy core beliefs and the secondary aspects.

Figure 1 visualizes the our resulting analytical framework, portraying the dynamics between the policy process, which shapes the elements of the policy mix, which in turn leads to socio-technical change, which enables policy learning and may thus influence subsequent policy making.

Figure 1: Analytical framework for investigating the link between policy processes, policy mixes and socio-technical change



Source: Own, based on Sabatier & Weible (2007), Rogge & Reichardt (2016) and Edmondson, et al. (2019)

For the policy process we differentiate between two *arenas of negotiation* in which actors from different advocacy coalitions interact – using their resources to make their policy belief prevail in policy processes and thus to influence policy outputs: one arena is related to the policy strategy for which policy core beliefs play a key role in negotiation processes; and the other arena focuses on the instrument mix with discussions largely guided by secondary aspects in actors' belief systems¹. One could further unpack the latter arena of negotiation into different parts based on the instruments that are being subsequently negotiated, oftentimes several in parallel. In contrast, negotiations on the policy strategy tend to be rarer given their intended long-term nature and the guidance they are meant to provide – through targets and principal plans – for subsequent arenas

¹ Despite this conceptual distinction we recognize the holistic nature of the belief system, with the components of the belief system clearly being interlinked.

of negotiation on concrete policy instruments. For example, in the Argentinean case, the imports tax exemption over certain manufacturing components for renewable energy saw several changes; whereas over the same time period, the policy strategy with its focus on adding renewable capacity was never changed.

Our framework also considers *policy learning* based on changes in the socio-technical system, with a focus on policy-induced ones (Sabatier & Jenkins-Smith, 1999; Moyson, 2017). Such policy learning can be triggered by short term and long term socio-technical change as an outcome of the implementation of the policy mix. In the short term, over periods of a few years, such policy learning may be primarily observable in minor changes – i.e. in the secondary aspects of the advocacy coalitions or communities. However, in the longer term, e.g. over periods of five to ten years, such policy learning may also lead to major changes in the policy core beliefs as well. We argue that in a situation where a new policy strategy is introduced and subsequently implemented through one or several policy instruments, that short term policy learning can help to explain incremental changes in the design of single policy instruments as well as the design of the instrument mix. In contrast, changes in the policy strategy are likely to arise only when policy learning leads to shifts in policy core beliefs, which may likely take more time.

The ways in which these links operate are also affected by *exogenous factors* (Sabatier, 1998; Edmondson et al., 2019), like the macro-economic conditions, the politics and the political context, among others. Such exogenous factors can affect the socio-technical system as well as the policy subsystem and thus further help to explain changes and stability in the policy mix. For instance, Argentinean macro-economic conditions affect the development of the whole policy mix since access to international finance is a key aspect for developing renewable energy, which affects national industry development as well.

We propose that these links between policy process, policy mix and socio-technical change can be further unpacked by drawing on the *characteristics of policy mixes* (Kern and Howlett 2009, Rogge and Reichardt 2016). A case in point is that the coherence and comprehensiveness of the policy process may influence the consistency and comprehensiveness of the elements of the policy mix. For example, the capabilities of the government in dealing with the actors involved in the policy process and the acknowledgment of the complexities associated with the policy process can impact

how well a given policy objective is pursued through a well aligned policy mix. Another example concerns the attempt of integrating polarized policy beliefs which can lead to inconsistent policy mix elements. Moreover, the comprehensiveness of the instrument mix can be affected by how well the policy process encompasses the different policy core and secondary aspects.

3 Research case: Energy transition in Argentina

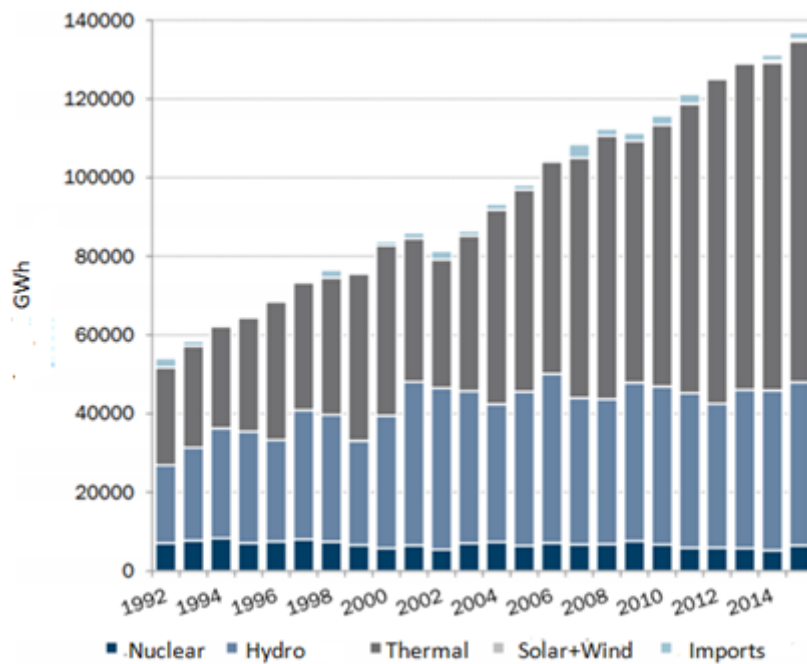
We have chosen to investigate the emerging policy mix for renewable energies in Argentina for two main reasons: first, Argentina has just recently embarked on the journey towards renewable energies, with policy mix negotiations on its strategy and instrument mix occurring in a nascent policy subsystem; and second, little is known about energy transition processes in developing countries in South America. Hence, we are able to address a conceptual and empirical gap in the sustainability transitions literature. In the following, we first provide an overview of Argentina's electricity system, earlier RE policies and the national RE industry, followed by an introduction to the specificities of the Argentinean policy process.

3.1 The Argentinean energy system and its related industry context

In 2015 – when the Law 27.191 was sanctioned and implemented - the Argentinean electricity generation mix was composed of 64.7% fossil fuels, 30.2% large hydro, 4.7% nuclear, 0.44% renewables and 1.2% imported electricity (see

Figure 2) (CAMMESA a, 2016). The total electricity generation capacity accounted for 34 GW, supplying 95% of the population through the grid (Alazraki & Haselip, 2017; MinEM b, 2016). While electricity generation is market driven with specific national regulations for each source, transmission and distribution constitute public services which are licensed to private actors who own, operate and maintain the grids – with transmission being ruled by the nation state, whereas distribution is regulated on a provincial level (Law 15.336; Law 24.065).

Figure 2: Annual electricity generation per type in Argentina (in GWh)



Source: CAMMESA a, 2016 (own translation)

These low figures for RE can be traced back to two main policies with limited success: law 25.019 (1998) and law 26.190 (2006). The former established a Feed in Tariff (FiT) in pesos for solar and wind, which was diluted once the peso to USD parity (the Convertibility Plan) stopped². The latter established a RE electricity consumption target of 8% by 2016, a FiT in Argentinean pesos per technology and several fiscal incentives, implemented through the Program GENREN (2010). However, it largely failed to ensure project profitability, and as a consequence, by 2015 only 17% of the adjudicated RE projects were generating electricity (see Table 1) (Recalde 2011; Recalde, et al., 2015).

Table 1: Installed capacity by 2015 (MW) due to the implementation of the RE Law 26.190/GENREN

Technology	Capacity auctioned (MW)	Capacity adjudicated (MW) [no. of projects]	Price range (USD/MWh) [weighted average]	Effective projects by 2015 (MW)
Wind	500	754 [17]	121-134 [126.9]	130
Thermals with Biofuels	150	110.4 [4]	258-297 [287.6]	1
Small hydro	60	10.6 [5]	150-180 [162.4]	1
Solar PV	20	20 [6]	547-598 [571.6]	7.2
Biogas	20	16.6 [2]	122.8-123.9 [123.3]	16.6
Urban Waste	120	-	-	-

² The 28.8 MW wind projects installed between 1994 and 2003 were possible because of agreements between the governments of the European Community and the cooperatives that own the installations.

Biomass	100	7.5 [2]	107	7.5
Geothermal	30	-	-	-
Total	1000	919.1 [36]	229.8	163.3

Source: Own elaboration based on *Energía Argentina SA* (ENARSA, 2013), *Auditoría General de la Nación* (AGN, 2014); Villalonga, et al. (2013) and Recalde et al. (2015)

Even though these earlier national RE policies aiming at on-grid electricity did not have the expected outcomes, it was at this time that the Argentinean supply chain for wind and solar PV – also promoted by the off-grid installation program PERMER (1999) – started to form³.

For onshore wind the slower rate of decrease of the international costs of the technology, the national context and the outstanding wind resources available in Patagonia (Lu, et al., 2009)⁴, enabled the formation of national wind technology providers. The national wind turbine manufacturers IMPSA, INVAP and *NRG Patagonia*⁵ had capabilities to absorb the international RE technological development based on their previous hydroelectric and nuclear know-how (Tece, et al., 1997; CADER, 2009; CIPIBIC, 2016; MHyFP, 2016). By 2015 12% of wind installations had participation of national industry, mainly in the *Parque Eólico Arauco*⁶ (CIPIBIC, 2017).

For solar PV, technological development followed a different trajectory, strongly affected by China becoming the world leading manufacturer (Schmidt & Huenteler, 2016). Hence, in Argentina national development was limited to grid connections and substations as well as to trackers, panel assembly and installation, and maintenance services (MHyFP, 2016; CIPIBIC, 2016; Solartec, 2018).

In December 2015, Mauricio Macri from the *Partido Propuesta Republicana* (PRO-Cambiamos) assumed the presidency, following market oriented policies (Zelaznik, 2013). Given the severity of energy security concerns and blackouts⁷, Macri decided to revise the energy tariffs (Decree

³ Organisations that were formed include the *Cámara Argentina de Energías Renovables* in 2006 (Argentinean Chamber of RE, CADER, for its Spanish Acronym), the *Clúster de Industrias y Tecnologías de las Energías Renovables en Argentina* in 2011 - Cluster of Industries and Technologies of the Renewable Energy in Argentina, CIPIBIC, for its Spanish acronym - and the RE Direction within the *Instituto Nacional de Tecnología Industria* in 2008 - National Institute of Industrial Technology, INTI, for its Spanish acronym (Jimeno, 2014).

⁴ In Argentina 70% of its territory has an annual average speed of 6m/s measured over 50mts (Lu, et al., 2009).

⁵ *IMPSA* is located in the province of Mendoza and produces wind turbines of 1 MW, 1.5 MW and 2 MW. It was founded in 2000 and developed its market mainly in Brazil where in 2009 it developed 13 parks for a total of 317 MW. It also has some developments also in Argentina, with the main one being a 90 MW installation in the province of *La Rioja*. *INVAP* specializes also in nuclear energy and was founded in 198. Finally, *NRG Patagonia* was founded by oil companies and currently produces special wind turbines of 1.5 MW for the winds of Patagonia and Buenos Aires (IMPSA, 2018; INVAP, 2014).

⁶ The 12% share of national production in wind turbine is from 4 wind parks: Arauco I (25.2 MW), Arauco III (25.2 MW), El Jume (8 MW) and El Tordillo (3 MW) (CIPIBIC, 2017).

⁷ Fuel imports from Bolivia increased, reaching a trade balance deficit of USD 2,784 millions in 2011, growing 263% in 2013 to USD 6,200 million (INDEC, 2016). In addition, the Buenos Aires Metropolitan Area, supplied by the distribution companies EDENOR and EDESUR, suffered from an average accumulated hours of black outs of 32 hours in 2016 (Krakowiak & Gandini, 2017).

134/2015). This led to a 200-300% increase in the wholesale electricity price and 150% increase in the electricity tariffs in Buenos Aires for residential consumers (Smink, 2016; Resolution 67/2017; El País, 2017).

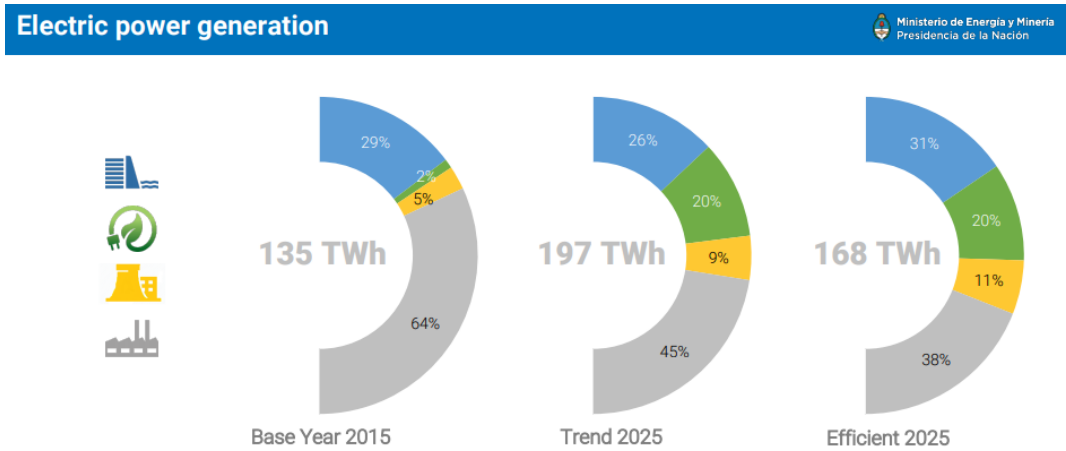
In this context, the third and latest RE Law 27.191 - from now on simply referred to as RE Law - was implemented through the Program RenovAr, forming part of the Energy Plan 2025 (see Figure 3). The plan forecasts a 4% annual electricity demand increase, foresees emission reductions of 11 MMtnCO₂e compared to business as usual⁸ and a decrease of the energy share in the trade balance of 0.2% of GDP compared to the inefficient scenario (UNFCCC, 2015; 2016; MinEM a, 2016). Moreover, in 2017 the president declared the “Renewable Energy Year” (Decree 9/2017). Finally, even though Argentina already presented its Nationally Determined Contribution (NDC) during Cristina Kirchner’s mandate – the former president - its ratification under Argentinean legislation and a revised version of the NDC was elaborated by Macri’s government, in an attempt to show more commitment to the Paris Agreement⁹. However, there is not an explicit integration of the energy plan and the NDC with the RE Law (Law 27.270; UNFCCC, 2015; 2016; MinEM a, 2016; Law 27.191)¹⁰.

⁸ This represents more than 40% of the Argentinean CO₂ budget for 2030.

⁹ It increased the unconditional reduction to 18% (from 570 to 480 million tCO₂eq) and the conditional to 37% (rising to 369 million tCO₂eq). Argentina is responsible for 0.7% of global GHG emissions, with the energy sector as main contributor (43%), followed by agriculture (28%), changes in land use (21%), waste (5%) and industry (3%) (UNFCCC, 2015).

¹⁰ The fundamentals of the bill mention the potential contributions of developing RE to tackle climate change. However, these do not have regulatory effects (Law 27.191).

Figure 3: Electricity generation plan for Argentina 2025



Source: Ministry of Energy and Mining (MinEM a, 2016)

3.2 The politics of the policy making process in Argentina

Argentina is a federal republic where the power is divided among the executive, legislative and judiciary branches (Argentine Constitution, 1994). It has a presidential system where the president and legislators are directly elected by its citizens, and has 23 autonomous jurisdictions that replicate - with some particularities - that power division. The legislative power is divided in two chambers: the deputies and the senate (Argentine Constitution, Sections: 1, 44, 45, 54, 56, 87, 116, 1994; Reynoso, 2004).

In order to pass a law, a bill is presented to one of the chambers and the policy making process follows specific rules for its debate and sanction by the two chambers (Argentine Constitution, Chapter V, 1994)¹¹. The definitive sanction relies on president enactment (Argentine Constitution, Section 99, point 3, 1994). Normally the president assigns an authority, i.e. a certain Ministry, which continues the regimentation and the implementation of the law through resolutions and/or

¹¹ Each chamber is organized in specialized committees where the bills are debated and approved before they are voted upon in the plenary (HCDN, 2014; CSN b, 2016).

dispositions (Argentine Constitution, Article 100, 1994). This process is quiet discretionary because the executive power is not obliged to implement all contents from the law (Colautti, 2001)¹².

In other words, in Argentina the laws typically contain the policy strategy with its policy objectives and principal plans for achieving them, thereby framing policy implementation. In contrast, the instrument mix can be found in the regimentations of a law in the form of decrees, resolutions and dispositions, elaborated by the executive power. As such, laws are harder to change due to the formal process mentioned above, whereas the more concrete policies within the regimentation are easier to change (Colautti, 2001; Sarthou, 2014).

Lastly, Argentina has a poorly implemented decree that establishes the publication of actors' participation in the policy making process within the executive branch, while a comprehensive lobby law was never sanctioned (Decree 1172/2003; Fundación Directorio Legislativo, 2017). Thereby, access to structured information about the processes we analyse is limited, as there is no public nor systematized access to this type of information. Other regulations for citizen participation – apart from traditional elections – are the ones for citizen initiatives and citizen consultation which have been poorly applied (Welp, 2010).

4 Research design

For our exploratory study we pursued a qualitative research design combining archival and interview data, similarly as in comparable studies (Norman, 2017; Hoppmann, et al., 2014). In the following, we first explain the boundaries of our policy mix mapping (section 4.1) before turning to describing the data we collected (section 4.2) and how we analyzed it (section 4.3).

4.1 Boundary setting

We mapped the relevant elements of the policy mix through a combined top-down and bottom-up approach, following best-practice developed by Ossenbrink, et al. (2019). For the top down mapping

¹² It is a common debate in the congress how 'regimentary' a law becomes, as for changing a law the Congress has cumbersome processes, but at the same time the legislative power is reluctant to provide a lot of freedom to the executive power.

we depart from a specific law – RE Law 27.191 – which in our case constitutes the policy strategy with concrete policy objectives and principal plans. Based on it, we identify the instrument mix elaborated by the executive power to implement the policy strategy. In addition, through a bottom up approach we add all additional instruments relevant for national RE industry development, even if not directly linked to the RE Law, and refer to these as *ad hoc* instruments.

We limit the scope of our study in the following way: First, in terms of the governance level we limit our qualitative analysis to the national level as it is the Argentinean government which is responsible for electricity generation policies (Law 15.336 & Law 24.065)¹³. Second, regarding time we focus on the period 2014-2017, thus starting with the presentation of the bill at the senate until industry related regulations were launched before July 2018, when this research was conducted. Third, as for the technology we analyse the policy processes for wind energy and solar PV, which together account for 94% of the adjudicated projects in the RE tenders (MinEM a, 2018)¹⁴.

Based on this analysis we were also able to elaborate a timeline for the emergence of the policy mix associated with the RE law (see Figure 5). The timeline is subdivided in two phases: “Congressional phase” and “regimentation and implementation”.

4.2 Data collection

For our analysis we rely on a combination of document analysis of archival data and interviews (Pierce, et al., 2017). Regarding the former we compiled a database consisting of 110 documents from the policy making process in the Parliament and the executive branch (see Table 2). For the latter, 10 semi-structured interviews were conducted with key actors in the policy subsystem (see Table 23)¹⁵, for which interview guides were tailored to governmental and non-governmental actors (see Appendix B). These aimed at triangulating and supplementing our desktop research

¹³ There are central aspects that depend on the provinces, with natural resources and provincial taxes (relevant influencers over every economic activity) being under their prerogatives. For example, the implementation of the different elements of the policy mix relies on the adoption of the Law by the provinces. They have strong incentives to do so, as by adopting it the provinces have access to the financial instruments the policy mix offers. This “carrot” is a common practice in Argentina as a federal country with sub-national units politically powerful but not as much economically (Falleti, et al., 2013; Leiras, 2012); which in return requests provinces to comply with several standards, such as not taxing the generation activity. This negotiation is part of the policy process, but is outside of the scope of this paper (Falleti, et al., 2013; Leiras, 2012).

¹⁴ From a total of 147 adjudicated projects in the three Rounds (1, 1.5 and 2), accounting for 4,466.5MW, wind projects represent 55.2% and Solar PV 38.8% of the total capacity. In contrast, biomass, biogas and small hydro only represent 3.5%, 1.74% and 0.75% of the total adjudicated capacity, respectively.

¹⁵ Interviews were held in Spanish via Skype, recorded and transcribed. The key passages for addressing the research question were translated into English.

Table 2: Type and amount of archival data

Type of document	Amount of documents [%]	Amount of pages
Unpublished official documents (recommendations from stakeholders ^{16,17} , governmental internal agreements and transcribed meetings from commission of energy, mining and fuels in the senate ¹⁸)	36 [32%]	482
Governmental official and public information (laws, decrees, resolutions, reports and official statistics)	54 [49%]	780
Media articles and reports	20 [18%]	79
Total	110 [100%]	1,341

Source: own elaboration

Table 3: Overview of expert interviews with actors in the policy subsystem for renewable energies in Argentina

No	Actor type	Organization	Date	Duration
1	Business	LV-Energy	19/06/2018	1 h 32 mins
2	Business	Cámara Argentina De Energías Renovables (CADER)	06/07/2018	1 h 34 mins
3	Business	Genneia & Cámara Eólica Argentina (CEA)	14/07/2018	1 h 4 mins
4	Business	Cámara de Industriales de Proyectos e Ingeniería de Bienes de Capital de la República Argentina (CIPIBIC)	22/06/2018	45 mins
5	Business	Vestas Argentina	27/07/2018	30 mins
6	NGO	Alianza por las Energías Renovables en Argentina (AERA)	21/06/2018	34 mins
7	Policy	National Ministry of Production	16/07/2018	58 mins
8	Policy	Former Ministry of Planning, Public Investment and Services	27/07/2018	1 h
9	Policy	Renewable Energy Direction at Instituto Nacional de Tecnología Industrial (INTI)	27/08/2018	1 h 45 mins
10	Policy	National Ministry of Energy and Mining & legislative branch	25/06/2018	30 mins
	Total			10 h 12 mins

Source: own elaboration

¹⁶ Due to the unwillingness of some entities it was impossible to have access to all documents sent by the stakeholders as part of the formal process of the public consultation to receive suggestions for the elaboration of the final sheet for the Round 1 of the first auction (Resolution 71/2016). However, most of the content of these recommendations was present in other documents elaborated by the stakeholders, like media articles. The interviews were useful to fill these gaps as well, as most of them were with representatives of industrial-business chambers.

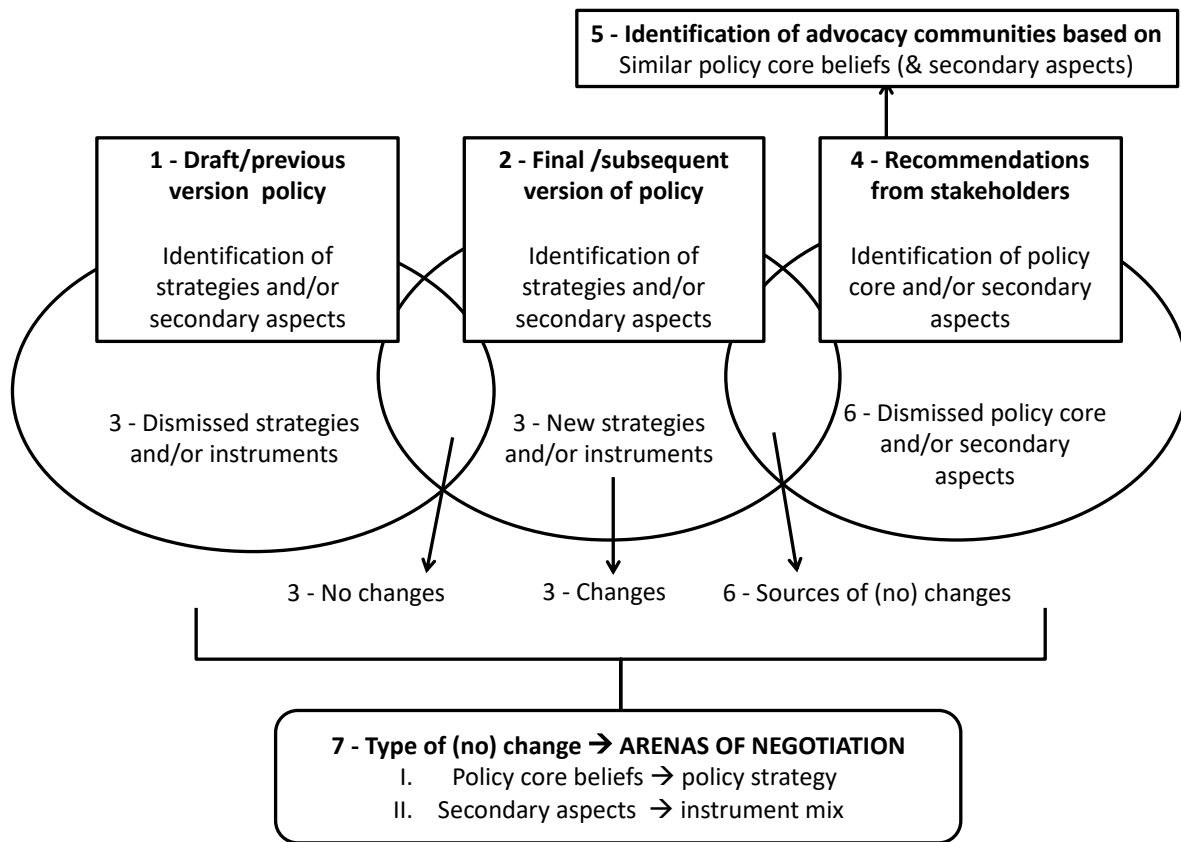
¹⁷ The recommendations were sent within official and unofficial processes to decision makers in the Congress and to the Undersecretary of Renewable Energy of the National Ministry of Energy and Mining; and the current Undersecretary of Argentinean Purchase and Development of Suppliers (former Undersecretary of Production Management of the National Ministry of Production).

¹⁸ Some of these were held with the commission of Budget (CSN c, d, e, 2014).

4.3 Data analysis

We analysed the policy process related to each policy by identifying the differences and commonalities between the final release and its previous (or draft) version (see Figure 4). For this, we first identified the elements in each policy and its correspondent draft(s) version(s) (Figure 4, steps 1 and 2). For these, we identified the differences (change) and commonalities (no change) between draft and final versions¹⁹ (Figure 4, step 3). These changes were distinguished between *dismissed* (present in the draft/ previous but not in the final version) and *new* elements in the final version (not previously included in the previous or draft version).

Figure 4: Step-wise approach in analysing the emerging policy mix and the role of advocacy communities



It is for these dismissed and new policy mix elements that we then tracked the origins of each change (and also lack thereof) in the analysis of the policy process (Figure 4, step 3). Hence, we analysed our archival data (see Table 2) and our expert interviews (see Table 3) to identify policy core beliefs

¹⁹ In those cases where there were no official drafts, we applied the same procedure comparing the previous version of the regulation with its subsequent version.

and secondary aspects of actors (Figure 4, step 4). Subsequently, the similarities among actors' policy beliefs led to the identification of two advocacy communities (Figure 4, step 5). Based on this we were able to identify the sources of the differences and commonalities recognized in steps 1 to 3, contrasting them with the process done in steps 4 and 5. Moreover, we thereby were also able to track the policy core beliefs and secondary aspects that were not included in the final versions nor the drafts of the various policy mix elements (Figure, 4, step 6).

Overall, this analysis was facilitated by approaching the policy process through the concept of arenas of negotiation (Figure 4, step 7). In other words, the changes (and lack thereof) were identified due to the previous analysis of the policy core beliefs and secondary aspects in actors' belief systems, and matching these with the policy strategies (I) and policy instruments (II). When the final policy version did not include one of them, we concluded which policy core beliefs and secondary aspects were dismissed in the policy.

Finally, we sought to identify the policy outcomes of the policy mix, i.e. the changes in the socio-technical system, with a particular focus on RE investments and national RE industry development. The latter was approximated by the share of national content resulting from the tenders for RE generation projects (CMMESA, b 2016; a, b & c 2017; Gil, et al., 2017).

5 Findings on the links between the policy process, policy mix and socio-technical change

We start the results section by providing an overview of the identified advocacy communities (section 5.1), followed by a time line of the focal policy mix (section 5.2). We then turn to present our findings on the role of policy beliefs and resources for the emergence of the policy mix for renewable energies in Argentina by differentiating two phases: the first one took place in Congress, where the policy strategy with its objectives and principal plans was decided (section 5.3), while the second one is still ongoing and concerns the regimentation and implementation of the instrument mix by the Executive power (section 5.4).

5.1 Identification of advocacy communities

We find two groups of actors in the nascent policy subsystem for renewable energies in Argentina who share similar policy beliefs (see

Table). As the actors interviewed did not recognize systematic collective action among them - with the exception of AERA²⁰ - we refer to these two actor groups as advocacy communities (Stitch, 2015) instead of the traditional advocacy coalitions (Sabatier & Weible, 1991; 2007).

Actors in the first advocacy community (AC1) share the policy core belief that the development of RE should follow international market logics as it requires foreign finance, thus tying national industry development to it (Table). In contrast, actors in AC2 share the policy core belief that the development of a national RE industry should be a priority together with investing in RE generation. AC1 is composed of governmental and non-governmental actors, which is also the case for the second advocacy community (AC2). However, AC1 contains more governmental actors directly linked to the Executive branch. In this sense, AC1 has formal legal resources that AC2 does not, which we identify as the most relevant reason for the power imbalance between both ACs.

For two actors we find that they are in between AC1 and AC2 – UIA (*Unión Industrial Argentina*) and CADER (*Cámara Argentina de Energías Renovables*). The former has double interests due to big consumers fearful of electricity prices increase. Consequently, we find UIA's position in-between as their policy core encompasses the promotion of the national industry related to REs, but also a rejection to possible increases in the energy prices due to REs development. The latter unites renewable energy developers and some manufacturers, albeit only with a weak determination to channel a concrete position. Therefore, in the first phase CADER is part of the multi-stakeholder group AERA (*Alianza por las Energías Renovables en Argentina*) and thus is arguably part of AC2, while in the second phase we find them with one foot in each AC.

²⁰ AERA (*Alianza por las Energías Renovables en Argentina*) is a multi-stakeholder group formed to influence the policy process in the Congressional phase. It is coordinated by *Fundación Directorio Legislativo* and integrates CADER, INTI, Genneia, *Foro de Vivienda, Sustentabilidad y Energía* (FOVISEE), *Fundación Ambiente y Recursos Naturales*(FARN), AAEE, *Fundación Avina*, *Interconexión a red de Energía Solar Urbana Distribuida* (IRESUD) and *Fundación Cambio Democrático*. Once the Congressional phase ended, CADER, Genneia and INTI continued being active in the policy process.

Table 4: Identification of advocacy communities (ACs) by actor type ²¹

AC	Actor Type	Exemplary (interview) quotes for policy core beliefs (own translation from Spanish to English)
AC1	Policy	<i>"Our objective is to integrate national component, not at any cost, second, that the energy doesn't have a higher price, and third that it doesn't provoke that when the incentive is removed, the sector has to deal with competitiveness issues."</i>
		<i>"The first signal that is needed to attract investments are targets and a market, then national industry integrations. The approach of guaranteeing national productions is useless."</i>
		<i>"When a national producer wants to manufacture wind turbines in Argentina, goes to the international market and doesn't get the finance because the financier doesn't like that machine. And that is not my appreciation neither the national government, is a reality of the international market, which we can't, don't want neither do 'deaf ears'. We will have a market of RE, and if it is with national industry, better."</i>
Business	[We consider] <i>"that the current regulations 1-E/2017 and 814/17 are the best possible regulations and produced due to the participation of stakeholders"</i> .	
Inbetween	Business	<i>"There should be promotion and finance policies for local manufacturers without setting barriers to the imports. Don't generate a bubble and artificial competition through closing the customs"</i> .
		<i>"The approval of the project implies an increase in the cost of electric energy, thus affecting industrial competitiveness (...). The absence of encouragement to the national industry, given the speed of the established proposals and the strong tax benefits, we will have imported equipment since the national industry will not have time to develop"</i> (UIA intervention in senators advisers' meeting, CSN c, 2014)
AC2	NGO	<i>"To the current dependence on fuels imported, renewable sources are an essential part of the solution, not only as a response to the juncture, but also to develop new energy sources energy and an industry associated to them"</i> (Villalonga, et al., 2013)
	Business	<i>"It is not possible to think of an energy source without an associated technology, since it is embedded in the forms of prospecting. Exploiting, transforming, transporting and using them, mean an association related to the development process. This relationship can be virtuous if there are adequate public policies inducing technological and industry development for the entire society"</i> (CIPIBIC, 2017)
		<i>"National industry must be with production process, if it is integration or only assembly of imported goods is being an 'instructed consumer'. Having industry with production process allows repairing, regenerating and recycling the products, which is not possible with imported technology."</i>
	Policy	<i>"If the opportunity for the national industry is not provided at the same time, then after allowing the first 2,000MW of imports, we will have to allow other 2,000MW (...). But, if we do not allow that, in part, that substitution is effectively done protecting what is available from the national industry, and instead we only look to what is outside, as there is an extremely mature and developed technology versus a technology that maybe we have to develop in Argentina"</i> (CSN a, p. 25, EPSE ²² intervention in senators meeting, 2014)
<i>"I can't conceive the development of the renewable sector without the local industry as well"</i> .		

Source: Own elaboration based on interviews and Villalonga, et al. (2013), CSN a (2014), CSN c (2014), CIPIBIC (2017)

²¹ Due to confidentiality agreements we are only able to provide actor types rather than the specific actors as members of the respective ACs. Also, note that there are actors that are not included in the list because they are within larger groups or represented by chambers, i.e. the *Asociación Argentina de Energía Eólica* (AAEE, for its Spanish acronym) in AERA, the wind industry *Calviño* in CEA and the wind industry *IMPSPA* in CIPIBIC.

²² *Energía Provincial Sociedad del Estado de San Juan* (EPSE) is the state company of the province of San Juan which manages and distributes electricity in that province (EPSE, 2018).

5.2 Overview of the emerging policy mix for renewable energies in Argentina (2014-2017)

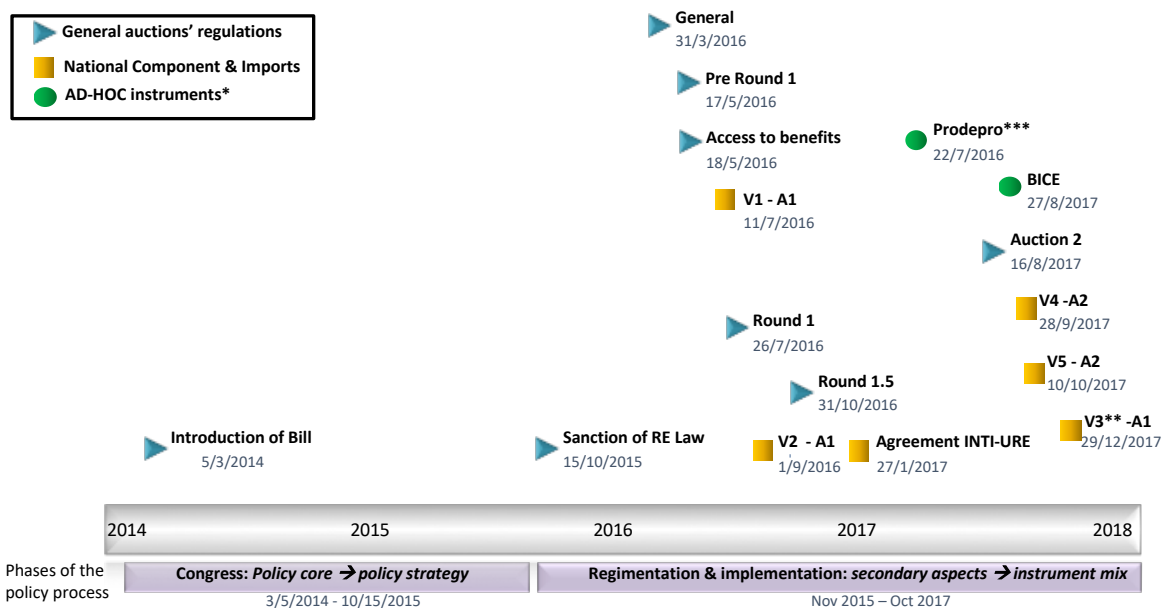
Figure 5 portraits the main policy mix elements relevant for investments in RE (light blue triangles) and for national industry development linked to RE generation (orange squares); including some ad hoc instruments (green circles). After sanctioning the RE Law in October 2015 it has been implemented by a range of policy instruments, with our analysis focusing on those of relevance for industry development²³. A more detailed overview of the policy strategy is provided in

Table , and of the relevant instrument mix in

²³ For instance, we do not analyze those instruments related to priority of dispatch, or how the payment guarantees were designed and implemented.

Table . The corresponding policy making and implementation process will be unpacked in the following sections.

Figure 5: Timeline of the emergence of the policy mix related to RE Law 27.191 (2014-2017)



* Policies that were mentioned as relevant to industry development by interviewees apart from those directly linked to the RE Law.
 ** Modification over the import scheme (policy instrument) that affected the adjudicated projects in the First Auction.
 ***Prodepro (*Programa de Desarrollo de Proveedores*) was officially launched on 22/7/2016, but only affected RE manufacturers once they were recognized to provide national components, therefore it is listed after Agreement INTI-SSER which allowed that recognition.

Source: Own elaboration based on Guinle (2014), Law 27.191 (2015), Decree 531/16 (2016), Resolution 71/16 (2016), Resolution 72/16 (2016), Joint Resolution 123-313/2016 (2016), Resolution 136/16 (2016), Resolution 252-E/2016 (2016), Joint Resolution (1-E/2016, 2016), Resolution 339-E/2016 (2016), Resolution 275-E/2017 (2017), SSER-INTI a & b (2017), BICE (2017), Casa Rosada (2017), Joint Resolution 1-E/2017 (2017), Decree 814/17 (2017), Joint Resolution 4-E/2017 (2017)

5.3 First arena of negotiation (2014-2015): How policy core beliefs shaped the policy strategy

The sanctioned RE Law contains step-wise mandatory RE targets and a principal plan laying out which instruments can be used to implement the policy strategy (

Table). Here we focus on those elements relevant for RE investment and industry development, which can be differentiated in four key areas: first, the targets to integrate RE in the electricity

system; second, the division of demand schemes implying that big consumers (above 300 kW) must comply with the RE targets individually, while small consumers (below 300 kW) do so through the energy purchases done by the distributors that provide them the energy; third, an investment scheme, including fiscal incentives as well as finance and guarantee tools for RE generation projects (FODER); and fourth, national supply chain support, such as through fiscal incentives in an import scheme for components and parts and financial incentives through the fund FODER. That is, national industry development is intended to be supported directly and indirectly, despite not being recognized through a target. An example of direct support is the foreseen import scheme for parts and components for the national industry. An example for indirect support is that the tax credit certificate²⁴ applicable to national taxes and the funds for investors are attached to the shares of national components in the projects (Law 27.191).

Table 5: Identification of the policy objectives and principal plans of the policy strategy contained in RE Law 27.191

No	Content of the policy strategy (with relevance to national industry development)	Type
1	National targets to integrate RE ²⁵ to electricity mix: 8% by 2018 (3 GW), 12% by 2019, 16% by 2021, 18% by 2023, 20% by 2025 (10 GW).	Policy Objective
2	Division of demand schemes and options to comply with obligations for those above 300 kW ²⁶	Principal plan
3	<i>Investment scheme for generators with energy destined to wholesale market (CAMMESA)</i> - Fiscal incentives ²⁷ - Fund FODER: finance and guarantee tools ²⁸	Principal plan
4	<i>Domestic supply chain promotion</i> 1. Fiscal scheme - Tax credit certificate equivalent to 20% of the national component costs, applicable for projects with a minimum of 30% of national component in electro-mechanic installations. - Exemption of import tax for goods, pieces, components and raw materials 2. Financial support (through fund FODER) - Priority of access to fund for projects with higher share of national component - Funds for national suppliers	Principal plan

Source: own elaboration based on Law 27.191 (2015)

The RE Law is the result of a policy process in the Congress which started in 2014 when the bill was introduced by Senator Marcelo Guinle who represented the province of Chubut as member of the

²⁴ The tax credit certificate is assigned to those investments which have a minimum of 30% of national component. The value of that tax credit certificate is equivalent to 20% of the national components costs and serves for the payment of national taxes (Tax Income, Tax on Minimum Presumed Income, Value Added Tax and Internal Taxes).

²⁵ REs: wind, solar PV and solar thermal, geothermal, tidal, wave, ocean currents, hydraulics, biomass, landfill gases, gases from waste water treatment plants, biogas and biofuels (exempting shares for transport fuels).

²⁶ Options to comply with demand obligations for contracted consumptions above 300kW include self-generation, private agreements with generators, and purchase in wholesale market to CAMMESA.

²⁷ The fiscal incentives include: exemption of Import Duties (until 31/12/17); Accelerated Fiscal Depreciation; Advance VAT Return; exemption of minimum presumed income tax; exemption of dividend tax for the re-investment in infrastructure; tax deduction of all financial expenses when calculating income tax; tax credit certificate subject to a minimum of 30% of national component integration.

²⁸ The fund FODER provides direct funds to RE generators and guarantees the payment to generators if CAMMESA fails.

political force *Frente para la Victoria*– the same as the executive power at that moment. Back then the foreseen principal plan already included the possibility to implement policies supporting the national RE industry, but such industry development was not backed up by its own policy objective, which was only foreseen for deploying RE generation²⁹ (Guinle, 2014).

In the following we present the policy changes which occurred between the initial presentation of the bill until its sanction into the RE Law. For this in a first instance we identified the policy core beliefs for each AC regarding the policy strategy (see Table). While AC1 argued for focusing on the international market for RE development, AC2 aimed at leveraging national industry development by integrating renewables and industrial strategy objectives.

Table 6: Policy core beliefs of AC 1 and AC2, resulting policy changes in the policy strategy, and main exclusions

Policy Core	AC1	RE and its related industry development attached to international market. * Promote private investment, specifically international * National industry promotion according to the projects' demand
	AC 2	Generating electricity with RE should leverage industry development associated in an integral plan * Include Distributed Generation * Merit generation projects considering national component as core aspect
	Policy changes (in principal plan only)	* Tax credit certificate for developers attached to national component * Priority access to funds to projects with higher national component
Main exclusions	AC1	* Tax credit certificate independent from national component
	AC2	* Distributed generation * National component as factor to determine the beneficiaries of the promotion scheme (not only consider lowest offered price)

Source: Own elaboration based on Guinle (2014), Law 27.191 (2015), CSN a; b; c; d; e; f, 2014; interviews and documents elaborated by the actors

The negotiation until the sanction of the RE Law was influenced by the macro-economy being hit by a trade balance deficit mainly due to gasoil and fuel oil imports for electricity generation while the demand continued growing (CSN a, p. 4, 2014). Due to this external factor political decision makers and other stakeholders agreed on the need to sanction this bill, even though the broader political scenario was extremely polarized (Parlamentario, 2014; CSN b, 2014). Moreover, there was an internal division among the members of parliament aligned with the presidency and the executive branch regarding the role of RE in the overall economy. *“The hardest challenge was to make the*

²⁹ Foreseen policies for the promotion of local industry development were: access to funds for manufacturers and an import scheme with free import tax for the first 2.000MW installed, assuming that the local industry would be able to mature and absorb the demand once the import scheme attached to the capacity installed finished (Guinle, 2014; CSN a, d & e, 2014). As for the integration of RE it stated the same stepped targets as the ones sanctioned in the law (Guinle, 2014).

executive power understand that this law couldn't be dead ink. Therefore, convincing them that requesting 70% of national component in the plants was something undoable" (AC1). These exogenous conditions resulted in strengthening AC1 and leaving AC2 without enough political support from the executive branch, hence without formal legal resources to mobilize.

As a consequence, the RE Law was sanctioned without a target for national industry development. However, as a result of the negotiations and as shown in Table , two main changes occurred in the principal plan of the strategy regarding i) the priority of access to funds for investments with higher national component and ii) the dependency of the access to the tax credit certificate on the integration of national component in the RE projects (AERA, 2014; CIPIBIC, 2014; UIA, 2016). These provided the space for further negotiations when implementing the strategy, as both aspects as well as the financial incentives for national producers had to be further negotiated for their implementation (CSN d, 2014). Our analysis also shows which aspects of the policy core from each AC were excluded from the final RE Law. For example, as portrayed in Table 6, AC2 had wanted to consider the national component of the projects as a factor to assign the winners of the auctions, which was not included in the law. AC1 also suffered from exclusions of parts of their position, since the tax credit certificate continued being attached to the national component.

5.4 Second arena of negotiation (2015-2017): How secondary aspects influenced the instrument mix, and how policy outcomes in turn led to policy learning

5.4.1 Overview of the development of the instrument mix

In the regimentation process the policy strategy contained in the RE Law is implemented through a mix of policy instruments. As summarized in

Table – following the chronological order of the release of each policy, as shown in Figure 5 – we identified the resulting instrument mix relevant for RE investment and industry development. We divided the table according to the national industry related instruments that were applied in each auction, because the – potential – demand for the national industry emerged from the winners of each auction. Hence, for Auction 1 (including Rounds 1 and 1.5) and Auction 2 (Round 2) we added the average share for the national industry participation in the awarded projects, as well as the specific instruments for the national industry – investment and import schemes. Appendix A contains the details for awarded projects in wind and solar PV for Auction 1 (Table A1) and Auction 2 (Table A2). Moreover, separately, we incorporate the ad-hoc instruments – which were applicable since Auction 2.

Table 7: Identification of the main instruments in the policy mix related to industry development

	Policy instruments (and summary of their design features)	References to Figure 5
RE Law regimentation	1) Auction 1 – Round 1 (Resolution 136/16) - Fiscal benefit quota per technology - Capacity tendered per technology (total 1000MW, of this 600MW for wind; 300MW for solar PV) - Projects merit order based on price per technology - Max electricity price per technology set according to offers 1') Auction 1 – Round 1.5 (Resolution 252/16) - Fiscal quota per technology: only solar and wind - Capacity tendered per technology & region (total 600MW, of which 400 MW for wind; 200 MW for solar PV) - Max electricity price per technology (based on Round 1 prices) ³⁰	Round 1 Round 1.5
	Investment scheme (Resolution 72/16) - Calculation of declared national component (CND) in offers to access fiscal certificate - Procedure for access import tax exemption - INTI controls CND and destination of imported goods	Access to benefits
	Import Scheme (Resolutions 123-313/2016 1-E/2016 4-E/2017) - List of goods with import tax exemption - Definition of national production in national products and parks attached to access the fiscal certificate - Solar PV will have a particular scheme in a specific regulation - “Critical projects”: different import tax exemption for wind technology	V1-A1 V2-A1 V3-A1
	3) Auction 2 - Round 2 (Resolution 275/2017) - Fiscal quota per technology - Capacity tendered (total 1200MW) per technology and region (550 MW for wind; 450 for solar PV) - Max price per technology ³¹ - Penalties reduction of 40% of the monthly billing	Auction 2
	Agreement Undersecretary of RE and INTI (related to import and investment schemes) - INTI provides technical assistance for the identification and control of national products in local products and projects →ReProEr	Agreement INTI-URE
	Import scheme (Resolution 1-E/2017 Presidential Decree 814/17) - New list of taxed and exempted goods from import duties - Wind Industry Integration Plan - New list of goods: weight its parts for considering national production (wind industry) - New register for manufacturers to apply to import scheme (Min Prod)	V4-A2 V5-A2
Ad hoc	BICE (Banco de Inversión y Comercio Exterior) - 15 years credit for up to 70% of the investment ³² for the project winners - Interest rate reduction up to 3% for purchasing the national components declared in the offer	BICE
	Prodepro (Resolution 339-E/2016) - Subsidized rate of interest for manufacturers - Subsidy ³³ for product development, plant expansion and technological upgrade - Technical Assistance - Network with international technologists	Prodepro

Source: Own elaboration based on Decree 531/16 (2016), Resolution 71/16 (2016), Resolution 72/16 (2016), Joint Resolution 123-313/2016 (2016), Resolution 136/16 (2016), Resolution 252-E/2016 (2016), Joint Resolution (1-E/2016, 2016), Resolution 339-E/2016 (2016), Resolution 275-E/2017 (2017), SSER-INTI a (2017), SSER-INTI b (2017), BICE (2017), Casa Rosada (2017), Joint Resolution 1-E/2017 (2017), Decree 814/17 (2017), Joint Resolution 4-E/2017 (2017); Gubinelli b (2018).

³⁰ Wind US\$/MWh59.39; Solar US\$/MWh 59.75

³¹ Wind US\$/MWh 56.25; Solar PV US\$/MWh 57.04; Biomass US\$/MWh 110; Biogas US\$/MWh 160; Biogas from landfill US\$/MWh 130; Small Hydro US\$/MWh 105

³² Max ARS\$200 millions per project. Total amount of fund: USD200 millions (BICE, 2017)

³³ Max ARS\$3 millions per manufacturer

5.4.2 Identification of the policy beliefs of the two advocacy communities

Our analysis of the policy beliefs of the two advocacy communities revealed clear differences in the secondary aspects of AC1 and AC2 arising from the different policy core beliefs (see Table). We find that multiple policy changes have been implemented over the analysed time period, with all of the secondary aspects of AC1 being taken up. In contrast, some policy instruments argued for by AC2 were not included, hence impeding socio-technical changes in favour of integrating national components in the projects adjudicated from the tenders.

Table 8: Policy core and secondary aspects of AC 1 and 2, resulting policy changes in the instrument mix, main exclusions and outcomes of RE auctions

AC1	Policy Core	RE and its related industry development attached to international market.
	Secondary aspects	<ul style="list-style-type: none"> * Fiscal stability to run the auctions quickly * Partnerships between international technologists and national manufacturers for developing national components * Focus on assembly
AC2	Policy core	Generating electricity with RES should leverage industry development associated in an integral plan
	Secondary aspects	<ul style="list-style-type: none"> * Implement simultaneously the instruments for developing national industry with the auctions * List of goods with import tax exemption * Plans for integrating national component per technology * Reduction of penalties for non-compliance with national component for accessing fiscal benefits
	Policy changes	<ul style="list-style-type: none"> * Requirements and measurement of national production * List of imported goods with and without import tax * Two manufacturers and importers registers * Targets for integrating national component for wind industry attached to related imported goods * Penalties
Main exclusions	AC1	-
	AC2	<ul style="list-style-type: none"> * Implementation of FODER (RE Law fund) as a fund for manufacturers * Specific plan to integrate national component for Solar PV
	Main outcomes	<p><i>Auctions 1 - Round 1 & 1.5:</i></p> <ul style="list-style-type: none"> - 59 projects adjudicated (2,396MW): of which 1,499MW wind & 897MW solar PV - 58.49 US\$/MWh average adjudicated price - National component: Wind 11.11%, solar PV 31.63% <p><i>Auction 2 - Round 2:</i></p> <ul style="list-style-type: none"> - 88 projects adjudicated (2,043MW): 993.4MW wind & 816.3MW solar PV - Average adjudicated price: 51.48 US\$/MWh - National component: Wind 35.1%, solar PV 18.85%- 260 industries in Suppliers register <p><i>ReProEr</i></p> <ul style="list-style-type: none"> - 19 Small and Medium Companies in Prodepro

Source: Own elaboration based on interviews, analysis of actors' proposals in documents, Decree 531/16 (2016), Resolution 71/16 (2016), Resolution 72/16 (2016), INTI b (2016); Joint Resolution 123-313/2016 (2016), Resolution 136/16 (2016), Resolution 252-E/2016 (2016), Joint Resolution (1-E/2016, 2016), Resolution 339-E/2016 (2016), Resolution 275-E/2017 (2017), SSER-INTI a (2017),

SSER-INTI b (2017), BICE (2017), Casa Rosada (2017), Joint Resolution 1-E/2017 (2017), Decree 814/17 (2017), Joint Resolution 4-E/2017 (2017), CAMMESA b (2016), CAMMESA a, b & c (2017), Gil, et al., (2017); Gubinelli c (2018)

In the following we present in three subsections our key findings regarding the development of the instrument mix, with a particular focus on instruments affecting national industry development. In doing so we focus on two different types of dynamics: the negotiations between AC1 and AC2 (section 5.4.2.1); and technological differences between wind and solar PV (section 5.4.2.2). Finally, in section 5.4.2.3 we turn to the outcomes of the policy mix and how changes in the Argentinean energy system eventually led to further policy changes.

5.4.2.1 Role of the negotiations between AC1 and AC2 for the emerging instrument mix related to national industry development

When aggregating all policy changes related to industrial policy we find a number of contradictions which can be traced back to dynamics between AC1 and AC2.

While the first auction was launched the specific instruments to promote the national industry were still being elaborated, with this delay impeding the national industry to absorb the demand created by the auction adjudications. Moreover, the elaboration and implementation of the instruments for promoting the national industry were full of ups and downs, which also negatively affected the national industry providing less certainty. As seen in Table 8, the import scheme and the measurement of national component in the national products and in the electricity generation projects suffered many changes (V1 to V5, Table 8 & Figure 6). These included modifications in the list of goods to be exempted of the import tax, which added the finished wind turbine and incompatibilities with the Mercosur norms negatively affecting national industry³⁴ (from V1 to V2, Table 7 & Figure 6) (INTI a, 2016; LV-Energy a, b & c, 2016; Fenés a & b, 2017; Massare a, 2018). A key issue to explain the measurement of the declared national component in the solar PV projects is that the structure can represent up to 35% of the national component. This can be interpreted as a measure to facilitate solar PV projects to achieve the 30% required for accessing the tax credit

³⁴ The Mercosur norms establish tariff positions for the imported goods and parts. The tariff positions allow identifying the products by position, sub-position, item and sub-item. The resolution 123-313/2016 requested for identifying local production a change in the chapter from the imported product to the final one. This request was not applicable as in most cases the imported part has the same chapter as the final product –i.e. the photovoltaic chapter is the 85 which encompasses all the electro-mechanic products, like PV cells which are needed to produce the final PV equipment.

certificate benefit. This means that the industrial link being considered is not the renewable energy technology per se, but the steel associated to its installation.

Consequently, the outcomes of Auction 1 (Round 1 and 1.5 together) show higher shares of national declared component for solar PV than wind, even though the wind industry is further developed in Argentina, with 11.11% for wind and 31.63% for solar PV (Appendix A). This shows that in the implementation process AC1 policy beliefs predominated, with the development of RE capacity being disjointed from national industry participation in the projects. In fact, AC1 thought of the first auction as a success since the offers tripled the tendered capacity (Fenés, 2016; CIPBIC, 2016; 2017; Massare a, b, 2018). Regarding the second Auction (Round 2) two key changes of the instruments promoting national industry were implemented. Firstly, the tax exemption to import wind turbines was eliminated and the instruments were aligned to Mercosur regulations. Secondly, the penalties for not complying with the national components declared in the auctions were reduced, which can be interpreted as an attempt to encourage competitors to make an effort to integrate more national components even if it later turns out that they cannot incorporate them to the full extent (Annex 21.5, Resolution 275-E/2017). Thirdly, the exact weight of national components in wind projects for determining the national declared component were clearly established, e.g. by assigning 23% to towers (Annex 2, Resolution 1-E/2017). Given the local industry weighting structure, the only possibility of achieving the tax credit certificate was by locally producing the tower and importing or assembling the rest of the parts. However, definitions for solar PV were not provided. That is, we find a limited policy learning process as the low national content outcomes in Auction 1 eventually led to changes in favour of the domestic wind national industry, leading to higher shares of national components in the subsequent tenders. More precisely, the average of national declared components in awarded wind projects increased to 35.1%, while for solar PV it decreased to 18.85% (see Appendix A). This decrease can be explained by the fact that in Auction 2 more international players competed and offered very low prices with little local components in comparison to Auction 1.

However, there were still difficulties for the national producers to be officially recognized as such. In principle, a mandatory label was necessary to be able to report the extent to which domestic components are being integrated into RE projects (INTI b, 2017). Yet, the state duplicated the register for national manufacturers, creating confusion among industry and exposing conflicts

within the administration. This conflict is also visible by some governmental actors belonging to AC1 and others to AC2. As a result of the confusion arising from the two registers the recognition of national products was delayed, thereby making it difficult for national manufacturers to absorb the demand created by the offers in the bidding rounds (INTI, 2018; Interview – AC2)³⁵.

Apart from these inconsistencies in the policy mix we also find an incomplete implementation of the instruments foreseen in the principal plan regarding the development of the national RE industry. More precisely, the fund FODER for manufacturers was not implemented. A lack of sufficient public budget – and thus an exogenous condition – was put forward as a main reason, as stated by one decision maker: *“We could not push forward the implementation of FODER as a financial fund because the bed sheet is short and the national treasure has a deficit that is constantly trying to be reduced. [...] Our position as civil servants is to balance the interests of the sectors”* (AC1). However, the lacking implementation of the fund FODER was somewhat compensated by the two ad-hoc instruments BICE and Prodepro³⁶. As put by one interviewee: *“Prodepro and BICE were developed as FODER wasn't instrumented as a finance fund. These mechanisms are due to the lack of conviction in the Ministry of Energy that the local industry will have a relevant role. The Ministry of Energy has as its North to generate the maximum amount of MWh without prioritizing the local component”* (AC1/2).

AC2 policy beliefs were not taken up by the policy mix in other cases as well. The most relevant case was the exclusion of the national components as an evaluation category in the tenders equal to the offered price and the technology (CIPBIC, 2016; INTI a, 2016; Fenés a & b, 2017; Ensinnck, 2017; Massare a, 2018; Gubinelli a, 2018; Gil, et al. 2017). The marginalization was also perceived by the actors from AC2 in the policy process itself, as AC1 requested their approval to move forward in a policy superficially supported by the actors, endowing it with legitimacy, when in the content it was not *“There is a policy of public validation of what decision makers want to do before discussing any issue, pretending to have processes of consultancy. In more specific issues they do make modifications but within an already digested policy context”* (AC1/2). This adds to the notion that AC1 had formal legal resources that allowed proceeding using this strategy.

³⁵ *“Despite of being national industry, we don't have the complete recognition as such because the audit processes and regimentation weren't finished yet. As it was delayed in the regimentation related to the industry, there is a delay in recognizing us as national industry. We are still waiting today.”*

³⁶ Even though Prodepro was launched on July 22, 2016, it was only applicable to the national RE industry once the manufacturers were recognized as such, therefore depending on the other instruments.

5.4.2.2 *Technological differences between wind energy and solar PV*

We now turn to differences between the national wind energy and solar PV industry and their respective success in influencing the policy process. We find that the wind industry was more successful in changing the policy mix in its favour. For example, the wind industry accomplished to eliminate the tax exemption to the final wind turbine and participated in elaborating the instrument for assigning the weight of the components, which allowed defining the thresholds to consider a final product as national production. Moreover, the specific regulation for the solar PV industry was never released despite negotiations among both ACs (CIPIBIC, 2018; INTI a & b, 2016; 2017).

Arguably, this difference in influence is because the wind industry has been previously and further developed in Argentina (see section 3.1). However, while Argentina's wind industry has more mature actors than the solar PV industry, these are still grouped in different institutions (CIPIBIC, CADER, AAEE and CEA) which are either not part of the same AC, or when they are, lack systematic coordination. In that sense the power weakness of AC2 is not only because they lacked formal legal resources, but also because of limited leadership in organizing and maximizing other resources they may have had –i.e. access to press and public opinion or economic resources. In the words of one AC2 representative: *"The RE sector representation in Argentina is much atomized. Each one has different interest but uses the word 'renewable' in their name. We have good relationship with many of them, but are only grouped for specific issues"* (AC2).

The emerging policy mix for renewable energies in Argentina with its limited attention to industrial policy objectives has already impacted Argentina's energy system. On the one hand, the adjudication of approximately 4.5 GW of new capacities in wind and solar PV positively contributes to reaching the RE expansion target foreseen in the policy strategy. On the other hand, the participation of the national industry in these RE generation projects remained relatively low, with approximately 35.1% of the components of the wind projects due to national production and 18.85% for solar PV in Auction Round 2 (CAMMESA b & c, 2017). However, as industrial policy was not included in the policy objectives of the RE law but only in the principal plans, a policy evaluation would not flag this as being ineffective, despite foregone economic opportunities of RE expansion.

5.4.2.3 Policy mix outcomes and feedbacks through policy learning

We now turn to changes in the socio-technical system influenced by the Argentinean energy policy mix. When taking a closer look at wind we find that the national production share has increased from originally 11.11% to 35.1%, which seems to have been at least partly driven by improvements in the policy mix³⁷. As one AC1 member put it: *“We, with an offensive and positive vision, think that in Argentina the wind sector has a space to win, thus we achieved a regulation according to our objectives: integrate national component, not at any cost, second, that the energy doesn't have a higher price, and third that it doesn't provoke that when the incentive is removed, the sector has to deal with competitiveness issues”* (AC1).

The resulting share of approximately one third is, however, still low when compared with the 70-80% of the investments in national production suggested by Ruben Fabrizio, executive director of CIPIBIC, according to which the Argentinean wind industry could annually supply 120 MW of the installed capacity considering the weight assigned to certain wind components and the capabilities of the industry (Tables 9 & 10) (CIPIBIC, 2017; Massare b, 2018).

Table 9: Parts of electro-mechanic components of a (wind) park by national component level

Component	Weight in electro mechanic part (%)	Effect scale in in the national value chain		
Blades	13.78	Absence of local producer		
Generator	32.93	40.62		86.22
Frequency converter	7.68			
Nacelle	10.49	13.54		45.60
Fairing	3,05			
Tower	15	16.71	32.06	
Foundation ring	1,71			
Wind turbine transformer	4,15	15.35		
Electric equipment	11,20			

Source: own translation from CIPIBIC, 2017.

³⁷ These were possible as international technologists associated with local suppliers. The first and only case is Vestas that installed manufacture for producing part of the wind turbine -nacelle and bushing- with local providers of metal mechanic parts (*Newsan*) and partnered with two local manufacturers for the production of the towers (*Sica* and *Calviño*) (Manzoni, 2018; MinEM b, 2018; Gandini, 2018).

Table 10: Number of supplier enterprises by activity in Argentina for wind technology

Product, part or component	Number of enterprises
Transformers	11
Towers	22
Wind turbines	3
Mid-tension cells/switches	2
Electric components	12
Electronic components	6
Installations developers	12
Integrated materials	3
Foundry and machining	2

Source: own translation based on CIPIBC, 2017

In the case of solar PV, less information about the capabilities of the national industry is available. However, the industry expressed that a solar PV park of 30-50 MW could be totally supplied by local production of panels (Fenés, 2017). Data from INTI (2015) provide further details on the Argentinean solar PV production capacity (Table 11). Considering that the awarded 31 projects for solar PV had an average local component of 26.7%, the opportunities for this industry in Argentina are not yet fully harnessed.

Table 11: manufacture capacity of main products for Solar PV in Argentina (2015)

Product	Manufacture annual capacity (Unities/year)	Estimated capacity	Quantity manufactured in 2015 (unities/year)	Declared capacity	Equivalent power of unit MW
Metallic structure for PV cells.	80.000	-	-	100%	-
Solar PV panel	40.000	40.000	600	100%	250-255-260-265 W
Metallic structure for PV cells	3.000	3.000	50	100%	for 2,5-3 kW
Solar PV panel	45.000	27.000	27.000	60%	3 a 64 Wp
Solar PV generator	11.667	7.000	7.000	60%	75 a 150 Wp
Solar PV module	78.133	62.507	2.400	80%	250 W
Solar PV module	130.222	104.178	0	80%	150 W
Solar PV module	126.576	126.576	0	100%	300

Source: own translation based on INTI c, 2016

Moreover, these figures also appear low when compared to Brazil which had less historical development in wind technology, but has been implementing an ambitious policy to incentivize the national production of a local industry (Hochstetler & Kostka, 2015). During the first years of the *Programa de Incentivo às Fontes Alternativas de Energia Elétrica* (PROINFA, for its Brazilian acronym) it established a 90% share of national production in line with their RE installation targets³⁸, implying 170 to 330 MW installed capacity with national components (Dutra & Szklo, 2008). These incentives were attached to the promotion for parks development, with developers only receiving finance from BNDES if they complied with minimum purchases of national components (Lima, 2016). As one interviewee acknowledged: *“As we lack of both local companies that push the (RE) sector - the ones that exist had bad reputation, experience and/or lack of scale -, and of our own financial market – as Brazil does have with the BNDES -, the policy should be about bringing technologists and make them see that the Argentinean market is tempting”* (AC1). The perception of this executive branch decision maker reveals that AC1 saw AC2 as lacking reputation, which also harms AC2's advocacy power.

Finally, while the scope of our analysis was for solar PV and wind, a similar picture emerges for other RE technologies in Argentina, such as small hydro and bio-energy sources. These technologies have significant potential for national industry development, but accounted for only 6% of the total adjudicated projects from the tenders, as the prices of these technologies are less competitive in comparison to solar PV and wind (see Table 12). So the current policy mix with its alignment to international finance dynamics leads to a marginalization of these technologies, thereby further jeopardizing the economic opportunities arising from a dedicated industrial strategy.

³⁸ Brazil has supported wind technology development since 2002 incentive programs such as PROINFA and the Brazilian national bank of development, BNDES, through Finame and Finem. PROINFA seeks to install 3,299.40 MW in 6 years and with 90% (and then reduced to 60%) nationalization of the ventures (PROINFA, 2004; Dutra & Szklo, 2008).

Table 12: comparison of adjudicated projects by technology, capacity, price, amount of projects and national component

Technology	Adjudicated capacity in MW (%)	Projects (#)	Average Price (US\$/MWh)	National component (%)
Wind	2,466.0 (55.2)	34	50.07	23
Solar PV	1,732.0 (38.8)	41	50.35	26.24
Small hydro	32.1 (0.7)	14	101.00	76.2
Biogas	78.0 (1.7)	40	144.45	28.2
Biomass	157.7 (3.5)	18	116.50	23.9
Total	4,466.0 (100)	147	54.72 (average)	33.8 (average)

Source: own elaboration based on MinEM a (2018); CAMMESA a, b & c (2016); a, b & c (2017); Gil et al. (2017).

6 Discussion

In this section we discuss our findings for the emergence of the energy policy mix in the nascent policy subsystem in Argentina (section 6.1), offer some reflections on the proposed analytical framework (section 6.2) and present key implications for Argentinean energy policy making (section 6.3).

6.1 Tracking the role of power for the emerging policy mix for renewable energies in Argentina

Our analysis finds that the changes identified in the elements of the policy mix occurred in a context where one of the advocacy communities (ACs) had more power. More specifically, AC2 was less resourceful and coordinated in comparison to AC1, which clearly benefited from the inclusion of decision makers from both the legislative and the executive branches. This was harnessed by AC1 who was able to limit the scope of the policy strategy by only including renewable expansion targets, while omitting industrial policy objectives - something which could easily be overlooked since the principal plans did allow for the introduction of instruments promoting the national renewables industry.

Yet, the advocacy strategy of AC1 enabled them to also limit subsequent negotiations on the instrument mix to those aspects aligned to their own policy beliefs, while avoiding changes to the policy strategy. For example, policy changes were done to the list of goods for the import tax exemption needed for the production of national components, thereby fixing flaws in the initial instrument design (Figure 5, V1). In contrast, the consideration of the bidders' national components integration was never considered as part of the factors for the adjudications, as proposed by AC2. Such modifications of the instrument mix might have had repercussions on achieving the policy objective of the policy strategy, as requesting higher integration of national components, according to AC1, would have disincentivized investments in renewables and/or raised energy prices.

Two further aspects are noteworthy for the case of Argentina. First, while Argentina had already seen some attempts on introducing renewable energies through earlier policy initiatives, the actors in the policy subsystem for renewable energies have shown very little systematic coordination to influence the policy process, which underlines that indeed it is correct to speak of a nascent policy subsystem for renewable energies for the case of Argentina (Sabatier & Weible, 2007; Stritch, 2015). In effect, AC2 is less powerful also due to a lack of coordination and skilful leadership, which strengthened AC1 – i.e. AC2 actors with their similar policy beliefs participated independently in the policy process, weakening their possibilities of effectively influencing the policy mix. AC1, hence, looked for validation of their policy beliefs rather than nourishing decision making due to the negotiations with AC2. However, the success of AC1 cannot be explained only by superiority in systematic cooperation within the advocacy community, but instead mainly through the availability of greater resources and access to the policy making process –as more actors in it are part from the executive and legislative powers.

Second, and contrary to what might be commonly expected due to experiences in other countries, Argentina did not have a powerful AC that opposed the expansion of renewable energy in the time period analyzed. An illustration of this is that the Congress – where the legislators, who represent different interests, have been historically keen to defend fossil fuels - passed the RE Law with only 4 nays out of 62 votes, and 8 nays out of 191 votes in the senate and the deputies chamber respectively (CSN f, 2014; HCDN, 2015). We argue that the main reasons for this are the increasing energy demand and the weight of the fuel imports in the trade balance, for which increasing the

share of REs according to the targets of the RE law is seen as a solution which does not threaten the development of other energy sources (MinEM a, 2016).

6.2 Reflections on the analytical framework and its further applicability

We now turn to providing four main reflections arising from the combination of concepts drawn from the policy mix and the ACF literature to unpack the underlying policy processes relevant for the emergence of policy mixes for sustainability transitions, such as the Argentinean energy transition.

First, the differentiation between two arenas of negotiation – one for debating the policy strategy, the other for debating its implementation through the adoption of various instruments – allowed for a nuanced yet well bounded analysis of the dynamics between the policy process, the resulting elements of the policy mix, and the energy transition in Argentina. Thereby, we build on comparable studies which have already applied similar methods, albeit not to socio-technical change (Pierce, et al., 2017; Poljak, 2018). Our analysis confirmed the proposed dominant role of policy core beliefs in negotiations on the policy strategy on the one hand, and the foregrounding of secondary aspects in negotiations on the instrument mix. We argue that by introducing this differentiation between a strategic and an instrumental arena of negotiation our analytical framework allows bridging the dynamics of policy processes, policy mix elements and their outcomes for sustainability transitions, thereby enabling further research of this underexplored topic for other countries and fields.

Second, we argue that a focus on policy beliefs and resources – i.e. politics - of different advocacy communities or coalitions enables a fresh look for evaluating policy mix characteristics. For example, in the eyes of AC1 the policy mix may have appeared consistent and comprehensive, as the policy mix reflects their policy beliefs. In contrast, AC2 would argue that the policy strategy is not comprehensive as it does not include a policy objective for national industry development, and because there are not enough instruments in the mix for promoting industry, for example through R&D funds. In addition, when adopting the perspective of AC2 the instrument mix would appear inconsistent with the promotion of national industry development, such as evidenced by the presence of two overlapping registers for national manufacturers and the changes in the imports scheme. In contrast, the policy mix may actually appear perfectly consistent in the eyes of AC1,

which holds the policy belief that incentivizing international investments for new RE generation projects should be the main policy objective. This implies that depending on stakeholders' policy beliefs they may hold very different perceptions of the consistency and comprehensiveness of the policy mix. In that sense, further research evaluating the consistency and comprehensiveness of policy mixes should go beyond the comparison of the instrument mix with the written policy strategy and instead add a politically sensitive analysis relying on the preferences of the actors involved in the policy process.

Third, our analysis shows that policy subsystems are equally nascent as emerging policy mixes and their outcomes, and that through their co-evolution they enable opportunities for deeper transitions (Geels & Schot, 2007; Sabatier & Weible et al., 2009; Stritch, 2015). Thus, by explicitly exploring the characteristics of the nascent policy subsystems - i.e. imbalance in access to resources, nonsystematic coordination of actors with similar policy beliefs - the application of the advocacy coalition framework (ACF) can strengthen socio-technical analyses of transition processes. In addition, due to the specific socio-political and macro-economic context of Argentina which is highly influenced by a historical financial dependence on foreign investment, our research shows the applicability of a combined ACF and policy mix framework for sustainability transitions in South America, as most of the countries share similar socio-political and economic contexts because of common general historical backgrounds (Medeiros, 2008; 2011; Garretón, et al., 2003). Moreover, even though our interest was on the industrial dimension of the policy mix, we argue that the proposed analytical framework can be applied to other policy dimensions as well.

Finally, by applying our framework to the case of the Argentinean energy transition, this article makes an effort to learn from the use of transitions and policy mix frameworks in a country and region which has received limited attention in the transitions literature so far, thereby not only deepening our understanding of the case but also enriching corresponding analytical frameworks. While our focus on nascent policy subsystems may be particularly relevant in situations of beginning transition processes, which may often be the case in the global South but also in the North, we argue that the framework can also be applied more widely. In particular, while in the case of nascent subsystems we would expect to find advocacy communities, but as transitions and policy subsystems advance we would expect to identify advocacy coalitions. Regardless of this, the principal idea of different arenas of negotiations still holds, with the main difference being that

longer time periods will allow, among others, for policy learning which goes beyond secondary aspects, as found in our case, and rather may also lead to changes in policy core beliefs, which may in turn lead to amendments in policy strategies with its knock-on effects on the whole policy mix.

6.3 Policy implications for Argentinean energy policy making

Based on our findings we argue that the current policy strategy and corresponding instrument mix are mainly rooted in the fiscal and energy policy field, leading to a focus on promoting investments in RE generation projects. In that sense, we challenge the scope of the 'sustainability' of the energy transition in Argentina. We argue that a sustainable energy transition calls for a policy strategy that goes beyond the inclusion of expansion targets for renewable energies. Therefore, the policy mix associated with the RE Law can still be improved to harness the potential benefits of increased RE generation in terms of national industry development, job creation and tackling a range of societal challenges. Argentina would not be the only country to do so, as other countries such as Brazil have already moved to integrating national industry development with RE generation targets (Dutra & Szklo, 2008; Lima, 2016). In addition, such an extension of the policy mix would be in line with the literature on the windows of opportunities that RE development provides for national development (Perez, 2008; 2010, 2013; Schmidt & Huenteler, 2016).

Moreover, we argue that the stakeholders have the possibility of converging to more coordinated and resourceful advocacy coalitions in the Argentinean case. Specifically, for industry development the co-evolution dynamic between the nascent policy subsystem, the policy mix and the socio-technical system provide opportunities to develop coordinated actions that smartly use coalition resources to call for an integrated policy strategy which combines the expansion of renewable energies with national industry development. In addition, given that energy policy has implications on the whole economy, the actors interested in the promotion of the co-benefits of promoting renewable energy as part of sustainable energy transitions have a promising opportunity to build ties with other actors that are not specific to this policy subsystem but still relevant for the endeavor.

7 Conclusion

The purpose of this article was to investigate how policy beliefs influence the industrial policy dimension of the policy mix for sustainable energy transitions. Through the application of a novel analytical framework to the case of Argentina's energy transition it was possible to unpack how the policy process affects the elements - i.e. the policy strategy and the implementing instrument mix - and characteristics of the policy mix. More specifically, the concept of arenas of negotiation enabled a better understanding of the links between the policy process and the elements of the policy mix by connecting the policy core beliefs with the policy strategy and the secondary aspects with the instruments mix, thereby also capturing associated power struggles. It also shed light into the *coherence* of the policy process, the *consistency* of the elements and the *comprehensiveness* of the policy mix for the case. Moreover, the inclusion of policy mix and socio-technical change contributed to new insights into the shortcomings of the energy transition policies by explicitly including policy outcomes, with a focus on harnessing opportunities for the development of a national RE industry.

Additionally, the application of the analytical framework in a nascent policy subsystem which is composed of advocacy communities that are not systematically coordinated nor strongly resourced – AC2 in particular – to influence policies illuminates the co-evolutionary logic of policy mixes and socio-technical change for the first stages of sustainability transitions. Following this line we argue that as sustainability transitions may open new policy subsystems, and as ACF has been widely applied in mature policy subsystems, further research on nascent policy subsystems for sustainability transition benefits from a combination of both literatures.

Lastly, as this article is based on a single case study and focuses on a limited time period, further research is needed to fully unpack the policy process, its impact on the policy mix and socio-technical changes and how policy beliefs are updated through policy learning, including at the policy core. This is particularly true for nascent policy subsystems where future studies should continue to enrich the transition literature by drawing on the ACF and potentially other theories of the policy process so as to contribute to enhanced policy advice on steering sustainable energy transitions in the Global South and beyond.

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Appendix A

Table A1: Technology type, Capacity, Declared National Component and price of the awarded projects in Auction 1

Technology	Round	Project Name	Offered capacity (MW)	Declared National Component (%)	Offered price (U\$S/MWh)
Solar PV	1	La Puna	100	0,50	58,98
		Cauchari 1	100	22,65	60,00
		Cauchari 2	100	22,62	60,00
		Cauchari 3	100	22,62	60,00
	1.5	Lavalle	17,6	87,81	55,00
		Lujan de Cuyo	22	83,84	55,00
		La Paz	14,08	82,52	55,00
		PASIP	1,15	89,70	52,00
		General Alvear	17,6	86,39	55,00
		Nonogasta	35	9,78	56,43
		Fiambalá	11	9,78	53,75
		Tinogasta	15	9,76	53,43
		Saujil	22,5	9,75	51,93
		Sarmiento	35	13,38	52,95
		Ullum 3	36,5	12,53	57,63
		Anchoris	21,3	17,74	48,00
		Cafayate	50	12,15	56,28
		Caldenes del Oeste	24,75	22,70	58,90
		Ullum 4	20	10,35	56,30
		La Cumbre	22	35,54	56,70
Ullum N2	25	12,53	55,23		
Ullum N1	25	12,53	53,73		
Iglesia-Guañizuli	80	13,97	54,10		
Las Lomitas	1,7	57,93	59,20		
Wind	1	Vientos Los Hércules	97,2	14,36	62,88
		Villalonga	50	16,70	54,96
		Chubut Norte	49,88	12,85	49,90
		García el Río	10	5,93	49,81
		Cerro Alto	50	9,40	56,98
		Los Meandros	75	9,17	53,88
		Vientos del Secano	50	7,96	49,08
		Garayalde	24,15	21,00	59,00
		Kosten	24	8,00	59,41
		La Castellana	99	13,44	61,50
		Corti	100	6,18	58,00
		Arauco II (Etapa 1 y 2)	99,75	7,14	67,19
		Pomonal	100	9,45	54,88

Technology	Round	Project Name	Offered capacity (MW)	Declared National Component (%)	Offered price (U\$\$/MWh)
	1.5	La Banderita	36,75	22,24	49,98
		Del Bicentenario	100	14,66	49,50
		Loma Blanca 6	100	0,45	53,53
		Miramar	97,65	10,53	56,38
		El Sosneado	50	3,50	55,00
		Achiras	48	11,87	59,38
		Pampa	100	25,00	46,00
		Arauco II (Etapa 3 y 4)	99,75	7,14	56,67
		Vientos de Necochea 1	37,95	7,50	55,90
Total Capacity (MW)					2396,26
Total Wind Capacity (MW) – share of total capacity [%]					1499 [62,5%]
Average Wind Price (U\$\$/MWh)					55,45
Average Wind national declared component (%)					11,11
Total Solar PV Capacity (MW) – share of total capacity [%]					897 [37,5%]
Average Solar PV national declared component (%)					31,63
Average Solar PV Price (U\$\$/MWh)					55,65

Source: own elaboration based on CAMMESA b & c, 2016

Table A2: Technology type, Capacity, National Declared Component and price of the awarded projects in Auction 2

Technology	Project Name	Awarded capacity (MW)	National Declared Component (%)	Awarded price (U\$S/MWh)
Solar PV	Tinogasta II	6,96	6,79	41,7
	Saujil II	20	10,38	41,85
	Nonogasta II	20,04	6,28	40,44
	Altiplano I	100	25,46	40,8
	La Pirka	100	22,82	42
	Ullum X	100	26,27	42
	Verano Capital Solar 1	99,9	22,30	42,5
	V. Maria Del Rio Seco	20	33,15	48,95
	Cura Brochero	17	27,02	49,95
	Villa Dolores	26,85	6,40	51,9
	Añatuya I	6	31,03	52,27
	Arroyo Del Cabral	40	0,00	49,97
	Tocota	72	7,92	40,8
	Zapata	37	29,30	41,76
	Nonogasta IV	1	30,41	41,76
	Wind	Guañizuil II	100	7,94
Los Zorritos		49,5	26,99	41,76
Energetica I		79,8	15,01	37,3
Chubutnorte IV		82,8	27,45	38,9
Chubut Norte III		57,6	26,98	38,9
Vientos Fray Guen		100	8,60	39,55
La Genoveva		86,63	97,33	40,9
Cañada Leon		99	16,80	41,5
General Acha		60	26,82	45,67
ARAUCO II (ETAPA 5 Y 6)		100	9,13	46,67
Diadema II		27,6	9,10	40,27
Pampa Chubut		100	5,27	40,27
San Jorge		100	89,35	40,27
El Mataco		100	89,34	40,27
Total Capacity wind & solar PV (MW)				1809
Total Wind Capacity (MW) – share of total capacity [%]				993,43 [54,8%]
Average Wind Price (U\$S/MWh)				40,87
Average Wind National Declared Component (%)				35,1
Total Solar PV Capacity (MW) – share of total capacity [%]				816,25 [45,2%]
Average Solar PV National Declared Component (%)				18,85
Average Solar Price (U\$S/MWh)				44,24

Source: own elaboration based on CAMMESA b & c, 2017

Appendix B: Semi-structured interview guide for non-governmental and governmental actors (own translation from Spanish to English)

Example B1: interview guide for non-governmental actors

Interview guide for the “analysis of the influence of the policy process associated with the policy mix for national industry and renewable energy within transitions to sustainable energy systems in Argentina”

In this interview, we want to focus on the development of the policies for the promotion of the national industry for the renewable sector under the legal framework of the Law 27.191 and its further norms. In doing so, the first section is centred on general importance and the resources and barriers the actors find to influence the policies. The second section is focused on the work with the different governmental actors in order to understand the interaction between the actors and the government. Lastly, the third section digs deeper on the work with other organizations involved in the policy process.

Questions

Section I – General aspects

1. *What role should the promotion of the national industry have in the policies for incentivizing renewable energy generation in Argentina?*
2. *Which resources do you have to influence policies to promote the national industry in the renewable sector? These can be related to particular knowledge, budget, supporters, legal authority, and partnership with other actors, etc.*
3. *What are the barriers to succeed in influencing policies to promote national industry in the renewable sector? These can be related to lack of resources and/or other external factors.*
4. *How would you evaluate the following norms related to*
 - *Registers of manufacturers of components*
 - *Calculation of the national component for developers and manufacturers*
 - *Access to funds*

Section II – Actors interplay with governmental agencies

5. *How would you evaluate the work with the different governmental actors (Undersecretary of Renewable Energy, Ministry of Production, INTI, others)? in terms of:*
 - *Receptivity*
 - *Changes in the content of the policies*
 - *Coordination among governmental actors for developing and implementing the policies?*
6. *In which ways do you consider this process challenges decision makers?*
7. *In your experience, what formal legal or organizational structures have helped in generating policy change? And which ones have hindered or slowed change?*
8. *In your experience, what informal or unwritten routines or practices have helped generating policy change? And what informal rules have hindered or slowed the change? Could you identify changes within your position due to the work with the governmental actors?*

Section III – Work with other organizations

9. *Which organizations and policies have enabled or constrained the influence on the policies promoting the national industry for the renewable sector?*
10. *In case you participated in collective actions with other organizations, did you find barriers within them regarding the influence on the policies?*
11. *Could you identify changes within your position due to the work within the aforementioned collective actions?*

Wrap-up

12. *Do you have any concluding comments or thoughts on the topic of the interview?*
13. *Which experts would you recommend to also interview for our research?*

Thank you very much for your time in answering these questions, it is much appreciated!

Example B2: interview guide for governmental actors

Interview guide for the “analysis of the influence of the policy process associated with the policy mix for national industry and renewable energy within transitions to sustainable energy systems in Argentina”

In this interview, we want to focus on the design and adoption of the policies for the promotion of the national industry for the renewable sector for the generation of electricity under the legal framework of the Law 27.191 and its further norms. In that sense, the questions target the challenges when designing policies for supporting the national industry as well as the interaction between governmental agencies and other governmental and non-governmental actors involved in the process of policy design and implementation. Moreover, questions related to the learning associated with this process will be asked.

Questions

- 1. What are the challenges for the integration of national industry components - for each technology - in the renewable sector under the RenovAr program as an outcome of the Law 27.191?*
- 2. Which are the measures that try to tackle those challenges?*
- 3. How do you evaluate the exchanges with the non-governmental organizations (industrial-business chambers, developers, and industry integrators – i.e. CIPIBIC, CADER, among others)?*
- 4. How do you evaluate the policy making process in Congress in terms of openness and the incorporation of suggestions based on the proposals done by the actors?*
- 5. Which were the formal and/or informal spaces you identify as relevant for the policy making process?*
- 6. Could you identify learnings (in terms of modes of policy elaboration, content of policies, others) as a product of the policy making process with other governmental actors for the support of the national industry for renewables?*
- 7. Could you identify learnings (in terms of modes of policy elaboration, content of policies, others) as a product of the policy making process with other non-governmental actors for the support of the national industry for renewables?*

Wrap up

8. *Do you have any further comments or reflections that you would like to add in relation to the topics of the interview?*
9. *Which other actors would you recommend to be included in the interviews for this research Project?*

Thank you very much for your time in answering these questions, it is much appreciated!

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