



LUND UNIVERSITY

School of Economics and Management

Master's Programme in Innovation & Global Sustainable Development

## Sustainability Transition in the Italian Electricity System

### Incumbent Actors and their Power

by

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**Abstract:** On a global scale, the energy system is the biggest contributor to anthropogenic greenhouse gas emissions, which accelerate the processes of global warming and climate change. The sustainability transition of energy systems is fundamental if the Paris Agreement goal of keeping the increase in global average temperature to below 2°C compared to preindustrial levels is to be achieved. Transitions are considered to derive from the interaction between actors of three analytical levels: micro-level of niches, meso-level of regimes, and macro-level of the landscape. With a focus on the Italian electricity system in the decade 2008-2017, this study aims at analysing the dominant actors at the regime level, namely the government and the dominant energy firms, in order to understand how they used their power to influence the system's transition. A qualitative case study is conducted by examining the governmental energy strategies issued in the period of interest, as well as newspaper articles on energy topics from the main daily Italian newspapers. The results comply with existing research since it is demonstrated that dominant actors of the Italian electricity system used their power to actively resist a radical transition to a low-carbon system, thus favouring traditional fossil fuels for electricity production. This is especially noticed in periods of economic instability caused by the 2007 financial crisis. Nonetheless, it seems that, with decreasing economic concerns, regime actors started supporting the introduction of low-carbon solutions to electricity production. In conclusion, this study suggests that the Italian government needs to actively foster the transition of the electricity system, as well as every other highly polluting system, to low-carbon alternatives.

EKHS34

Master's Thesis (15 ECTS)

June 2020

Supervisor: Hana Nielsen

Examiner: Andrés Palacio

Word Count: 16,520



# Acknowledgements

In the first place, I want to acknowledge the enthusiasm, the support and the feedback that my supervisor Hana Nielsen provided in the past months. Her constructive comments have inspired and directed me in the right path when in situations of doubt along the writing process.

Moreover, I want to thank my friends Franziska, Jasmine and Jonas, who have always been available and supportive in the last period, even though far apart. Their patience, sensitivity and humour have been as fundamental during times of social distancing as they were during the academic year.

Ultimately, I am thankful for my family, who have always supported me every step of the way.

Filippo Guarnieri

*Malmö, 27<sup>th</sup> May 2020*

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# 1 Introduction

## 1.1 Research Problem

The World Energy Outlook 2019, published by the International Energy Agency, reported that “Current country commitments [...] and domestic energy policy plans fail to bring about the rapid, far-reaching changes required to avert dangerous and irreversible changes in the global climate system” (IEA, 2019a, p.96).

It is nowadays clear that the most pressuring issue concerning the entire global system is climate change and it is known that there is the need to move from fossil fuel-based transport, agro and energy systems to low-carbon alternatives, thus decreasing those anthropogenic emissions that are major contributors to accelerating the process of global warming (Geels et al., 2017).

Nonetheless, despite the signing of the Paris Agreement, UN document that sets the long-term goal of keeping the increase in global average temperature to below 2°C compared to pre-industrial levels and that calls for a reduction of emissions, in 2018 the global level of emissions increased by 2,1% compared to 2017 levels (UNFCCC, 2019).

The EU28 in the past decade has shown a constant decrease in overall emissions, with a decline of 1.3% in 2018 (UNFCCC, 2019). Some of this decline can be explained by the relocation of industrial manufacturing facilities to other developing countries, action that therefore leads to increasing emissions in those countries, but importantly also by the increasing contribution of low-carbon solutions to electricity production, mainly the transition to natural gas (less pollutant than other fossil fuels) and renewable sources of energy (Geels, 2014). Worldwide, the focus should be drawn towards the energy system, more specifically to the electricity system since this is the biggest global contributor to greenhouse gas emissions (GHG) derived from human activities, with a relative contribution of 30.4% of total GHG emissions (IEA, 2019b). The vast majority of electricity produced on a global level is generated by thermoelectric plants that burn fossil fuels, specifically the 73.5% of total electricity production (IEA, 2018).

The evidence from the European example shows how the electricity system has great potential for the transition towards a low-carbon system since the ongoing technological developments are making the process of producing electricity through renewable sources of energy easier and more affordable day by day. At the same time, the decarbonisation of the electricity system needs to take place on a worldwide scale if the goals set in the Paris Agreement want to be achieved and, in order to do so, the transition needs to be examined and understood.

One of the most used frameworks to study transitions is the multi-level perspective (MLP) because it tries to include all the different dimensions that have a role in the transition process (Geels, 2002, 2005). This perspective conceptualises transitions as consequences of dynamic interactions between three analytical levels: niches, where the seed for radical change is planted; regime, that represents the dominant rules, actors and technologies; and landscape, that creates the bigger context where regimes and niches are embedded in (Geels, 2002).

So far, the multi-level perspective has been mainly used to analyse and study how niche innovations emerge, develop and eventually manage to penetrate the regime and start the system transition. More specifically, in the past two decades, the focus has been concentrated towards green innovations, low-carbon technologies that play an important role in the reduction of greenhouse gas emissions. In doing so, research has neglected the deep investigation of regimes and the role that they have in such transitions.

This issue is tackled by Geels (2014), who extended the multi-level perspective and stated that regime actors actively resist fundamental change using their available power. The author further theorises a framework consisting of four strategies applied by regime actors when using their power to hinder radical transitions and to maintain stability in the status quo of the system.

## 1.2 Motivation and Aim

In this study, Italy has been chosen as an interesting case to analyse. Given the strong industrial rise that the country experienced after the Second World War and the consequent high demand for electricity, the Italian electricity system has become largely dependent on fossil fuels. This high reliance on fossil sources has made the system extremely vulnerable to international developments and shocks concerning the fossil fuel sector. The dependence of the electricity system on fossil fuels in Italy peaked in 2007 when almost 85% of electricity was produced using fossil fuels, of which 86% were imported (Terna, 2018). It has become clear that there is a need for the Italian electricity system to speed up the transition towards nationally sourced alternatives to imported fossil fuels. This could lead to less dependence on imports, more stability and security of the electricity system, as well as lower electricity prices.

The most obvious alternatives are renewable energy sources (RES) that can be used for the production of electricity. Indeed, the geographical position of the Italian territory guarantees exposure to sunlight that could be exploited for electricity production through photovoltaic technologies; strong Mediterranean winds that could be exploited both on-shore and off-shore for electricity production; and the presence of plenty water supplies in the mountain chains of the Alps and Apennines, whose power can be employed in the production of electricity. Not only could these renewable sources strengthen the electricity system, but they could also have a strong impact on the reduction of carbon emissions related to electricity production in Italy. Nonetheless, history shows that the government's relations and dependence on dominant firms of the Italian electricity system, that focus their businesses on the exploitation of fossil fuels and are strong actors in the worldwide energy sector, created a path dependence on fossil fuels that forced the system in a so-called "carbon lock-in".

More specifically, this study aims at analysing the power strategies adopted by regime actors of the Italian electricity system in the decade 2008-2017. This time period has been chosen because 2008 is the year when the Italian government built the foundation for a new National Energy Strategy, adopted in 2013 and revisited in 2017, while before the system was still embedded into the National Energy Plan instituted in 1988. Furthermore, there are two factors that characterise this period of time: the 2007 financial crisis that hit the Italian economy, influencing the state's attitude towards energy; and the issues of climate change and the

implications of anthropogenic greenhouse gas emissions, that have gained importance in worldwide discussions and reached the spotlight.

Many studies have examined the Italian electricity system, but the majority focussed on technological innovations and their impact on the system. This work aims at analysing the Italian electricity system from the perspective of the regime actors, which are powerful players that can influence the system and bend the transition to meet their interests. Understanding why and how they act so is a fundamental step to make in order to understand where action should be taken to foster a sustainable transition of the electricity system. Moreover, the Italian case can be of example for other countries that find themselves in a similar situation of dependence on fossil fuels and need to transition to low-carbon alternatives.

### 1.3 Research Questions

In examining the regime actors of the Italian electricity system, the study will address the following research questions:

- *How did the Italian government and the dominant firms of the Italian electricity system affect the transition towards a low-carbon system in the decade 2008-2017?*
- *How did the government use its power to influence the Italian electricity system in periods of economic instability and high unemployment included in the decade 2008-2017?*

With the first question, the study aims at systematically analysing the dynamics that developed between the Italian government and the two dominant electricity producers, Enel and Eni. The goal is to understand how these actors changed the public discourse on energy, which strategy they used to do so and to meet whose final interests.

The second question is more specifically aimed at understanding what options for electricity production were favoured by the government in moments when the main concerns of the population were the slow economic growth and high levels of unemployment. This will also reveal if the government discussed environmental issues or if they were neglected and overshadowed by the economic concerns.

The method found to be most fitting for the accomplishment of this study is the qualitative case study since it is considered to be the most effective when trying to understand real-life social phenomena (Yin, 2014). The data analysed will be official governmental documents and articles from the main Italian newspapers, as well as corporate reports from the main energy companies and data from national and European authorities.

### 1.4 Outreach

The following study and its conclusions can be of interest to scholars and researchers that are interested in the field of energy transitions and especially on the low-carbon transition that is experiencing the Italian electricity system. Indeed, this study builds a solid base for the full

understanding of the dynamics between the actors that dominate the electricity system. Moreover, the actors that are involved in the design of energy transition strategies, such as policymakers, governmental authorities and other non-governmental organisations, can find this study interesting since it sheds a light on the reasons and strategies that in the past have hindered the radical transition to a low-carbon system.

Being a single case study, the findings are very specific to the Italian case and cannot be generalised to any other country since the circumstances concerning the history, the geographical configuration, the governance structure, the market dynamics and the technological development are specific to each different case. Nonetheless, this study on Italy can be taken as inspiration for the examination of the power strategies that regime actors of electricity systems in other countries have used to influence the transition to a low-carbon system.

## 1.5 Outline of the Study

Chapter two, the theoretical background, is dedicated to the definition of the main concepts and theories that are implied in the study of transitions, with a focus of the MLP perspective and the extension of the theory that conceptualises the role of power and politics into the MLP. In the third chapter, the qualitative case study method will be described, specifying why it is the chosen one for this study. In addition, the data that will be used will be presented. In the fourth chapter, a historical background will explain the evolution of the Italian electricity system, followed by the analysis and of the data based on the theoretical framework introduced by Geels (2014). The findings will be consequently discussed and compared to the existing literature in the fifth chapter, accompanied by suggestions for further research. In the conclusion, the research questions will be answered and a final comment on the Italian electricity system will be made.

## 2 Theoretical Background

In this chapter, the main frameworks that build the theoretical skeleton of the research will be presented. Firstly, the main concepts fundamental for the understanding of the study on socio-technical transitions will be identified and defined, followed by a brief summary of the main frameworks that deal with such transitions, of which the multi-level perspective on socio-technical transitions is the chosen one to become the backbone of this study. Indeed, the MLP, its configuration and a thorough description of its fundamental characteristics will be presented. Eventually, the framework built by Geels (2014) will be described, which incorporates the role of power and politics into the multi-level perspective. These frameworks will then be used to analyse the Italian electricity socio-technical system, its actors and their role in its sustainability transition.

### 2.1 Socio-technical Transitions and Transition Studies

At the beginning of the century, academics started to identify certain sectors, such as agri-food, transport and energy, as *socio-technical systems*. These systems consist of networks of actors, institutions and knowledge that are related and dependent on each other (Geels, 2002; Markard, Raven & Truffer, 2012). Through their interaction, the different elements constituting the socio-technical system fulfil fundamental societal functions, and in the case of the energy system, the function is the provision of services related to energy (Kern & Smith, 2008; Weber, 2003).

Over time, socio-technical systems may undergo fundamental shifts that are defined as *socio-technical transitions* (Geels, 2002; Geels & Schot, 2010). Socio-technical transitions and technological transitions differ in the fact that, besides the purely technological aspects, the first ones comprise changes that affect all the dimensions that compose the system, such as the institutional and societal structures, as well as consumers' perceptions and behaviours (Geels & Schot, 2007; Markard, Raven & Truffer, 2012). Socio-technical transitions can happen either incrementally or radically and they entail the development of innovative services, products and innovations that can become either complements or substitutes to the ones dominating the system (Markard, Raven & Truffer, 2012).

In the past two decades, socio-technical transition research has been increasingly focusing on the multi-dimensional and fundamental transformations that see socio-technical systems shift towards more sustainable approaches to production and consumption, known as *sustainability transitions* (Grin, Rotmans & Schot, 2010; Markard, Raven & Truffer, 2012).

An empirical example of socio-technical sustainability transition concerns one of the most discussed areas of study in the past two decades, meaning the transition towards sustainable agriculture (Sutherland, Wilson & Zagata, 2015). An agricultural socio-technical system comprises specific actors, depending on the scope of the system (local, regional, national, international agricultural system). Indeed, actors can span from national authorities and international organisations (e.g. National Ministries of Agriculture, European Commission, Food and Agriculture Organization) to local actors (e.g. municipalities, local environmental

organisations, civil society), from producers (e.g. singular farmers, cooperatives and multinational companies) to consumers, and eventually to research institutes and universities involved in the agricultural context. The growing concerns regarding climate change, resource depletion, land degradation, water shortages and food security are evident realities that stress the need for a transition towards more sustainable agricultural systems (Sutherland, Wilson & Zagata, 2015). Thus, sustainable transitions that can take place in the agricultural system comprise those radical changes that affect all the actors and dimensions of the socio-technical system, such as the introduction of a new approach to farming (e.g. organic farming), novel technologies (e.g. greenhouse farming and vertical farming) and policies that aim at tackling one of the issues previously listed (Darnhofer, 2015). For instance, Vlahos and Schiller (2015) studied the agricultural system in the north-west of France and described how the transition from intensive, land-deteriorating agricultural practices to a more organic, less impactful system took place.

Transition academics and researchers have developed in time several theories and frameworks that help better understand the systems' dynamics and development, among which the following four frameworks are identified as the most used when analysing the transition towards sustainable socio-technical systems: transition management, niche management, technological innovation systems and the multi-level perspective on socio-technical transitions (Markard, Raven & Truffer, 2012).

All four of these frameworks use common concepts and ideas but, eventually, each one has its own focus. Indeed, research on *technological innovation systems* focuses on the development of new, innovative technologies and their role in initiating fundamental socio-technical transitions through the influence that these have on the institutional and organizational dimensions of a system (Bergek et al., 2008; Markard & Truffer, 2008). *Transition management* is established on instrumental models which rely on the active intervention of stakeholders that have the power to influence ongoing transitions towards sustainable pathways (Loorbach, 2007; Rotmans, Kemp & van Asselt, 2001). *Strategic niche management* focuses on the creation and promotion of niches, protected spaces in which innovations can develop undisturbed by the incumbent market and therefore, at the appropriate time, can start socio-technical transitions (Kemp, Schot & Hoogma, 1998; Lovell, 2007; Schot & Geels, 2008). Lastly, the *multi-level perspective* (MLP) identifies socio-technical transitions as the result of interactions of actors, institutions and knowledge at three specific levels, namely the niches, the regime and the landscape (Geels, 2002, 2004; Geels & Schot, 2007; Smith, Voß & Grin, 2010).

Despite all frameworks contribute with fundamental aspects that enrich the field of transition studies, the MLP is the one chosen to constitute the theoretical background for this study. This decision has been made because the multi-level perspective is the framework that best tries to incorporate all the several dimensions and actors that play an essential role in socio-technical transitions and aims at conceptualising the overall dynamic patterns of such transitions (Geels, 2011).

## 2.2 The Multi-Level Perspective on Socio-Technical Transitions

The MLP uses insights and concepts coming from multiple disciplines, such as sociology of technology, evolutionary economics, history of technology and innovation studies, in order to provide a comprehensive view on the dimensions and elements comprising a socio-technical system (Geels, 2002, 2005). This multi-disciplinary, multi-dimensional approach allows for a better understanding of the interactions between actors in the technological and societal spheres that play a role in the transition process (Geels, 2012). Geels (2002, 2005) proposes the view that transitions are a consequence of the interplay between different dynamics that develop on three specific analytical levels: the micro-level of technological niches, the macro-level of socio-technical landscape, and the meso-level of socio-technical regime.

The three analytical levels and their relationships can be interpreted in a nested manner, in which the landscape gives the main context which the regime is embedded in, and in the latter are existing the niches (represented in Figure 1). Moreover, Geels (2011) states that the higher the analytical level the more stability there is, as a consequence of the interaction between elements and actors that tend to be more aligned in the regime and in the landscape.

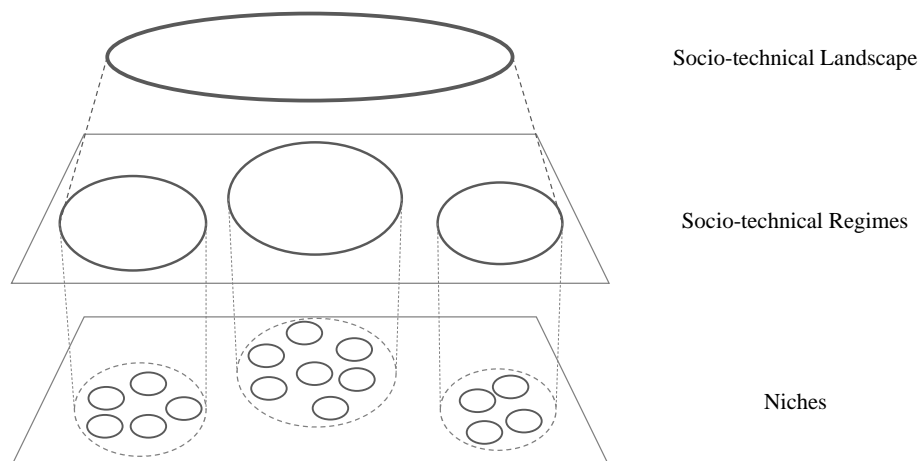


Figure 1: Nested analytical levels (adapted from Geels, 2002, p.1261)

### 2.2.1 Niches

Innovative technologies emerge and develop in niches, the micro-level of socio-technical transitions, defined by Kemp, Schot and Hoogma (1998) as isolated spaces, markets, R&D departments and application domains establishing an environment that is protected from the selection pressures of the dominant market structures. In these spaces, unbothered by any external stress, actors such as entrepreneurs, researchers and organizations have the opportunity to develop innovative technologies, experiment with them, examine their effectiveness and learn from the processes. Moreover, niches provide the space to create social networks and

connections that are essential for innovative technologies in order to enter the existing regime (Geels, 2005).

In addition, Schot and Geels (2008) have identified three processes that are necessary for niche innovations to be successful: the setting of *expectations and goals*, that creates guidance for innovative activities; the establishment of *social networks* needed for the future expansion of niche innovations; and the multi-dimensional *learning process*, that can help prevent and solve obstacles to niche development.

In conclusion, niches are considered to be a crucial element of transitions since they are the places where the essential elements for change emerge and develop (Geels, 2012).

### 2.2.2 Socio-technical Landscape

The socio-technical landscape consists of heterogeneous exogenous factors that create the structure and context in which both regime and niche actors interact (Geels, 2002). These factors include cultural values, oil prices, the environmental condition, political ideologies, broad political coalitions and supranational institutions, which can experience both slow-changing developments and shocks, such as shifts in cultural and political ideology, demographic change, macro-economic trends, wars, rising new scientific paradigms and environmental issues (Geels, 2019; Smith, Voß & Grin, 2010). According to Smith, Voß and Grin (2010), changes at the landscape level can create pressures that destabilise the dominant regime and thus generate windows of opportunity that can be exploited by niche innovations. Nevertheless, the authors stated that landscape processes can sometimes strengthen regime pathways and thus hinder the development of novel technologies. In the context of sustainability transitions, climate change is seen as the most relevant landscape process that pushes niches to develop innovative solutions to the environmental issues and influences the system and thus destabilises the regime (Geels, 2019).

### 2.2.3 Socio-technical Regime

The socio-technical regime is defined as the structure and set of heterogeneous rules that govern the behaviour of social groups that are part of a socio-technical system (Geels, 2004). These rules are rooted in the system's structure and are crucial elements that define regime actors and their behaviour (Geels, 2011). Some examples of regime rules are the knowledge base, industrial structures, common values and norms, user patterns, infrastructures, policies and technologies, all of which provide regime actors with the means for fulfilling societal functions (Geels, 2005; Smith, Voß & Grin, 2010).

According to Geels (2002, 2005), the elements comprising the regime are aligned among themselves and thus create stability in the socio-technical system, generating lock-in mechanisms that hinder any kind of radical change. The stability created by regimes is of a dynamic kind, meaning that innovations and system changes do take place but incrementally, at a slow pace and tend to follow path-dependent, predictable trajectories (Geels, 2005).



Involved in the socio-technical regime is a network of actors that include firms, engineers, users, research institutes, public authorities, policymakers and other social groups that, through their interactions and cooperation, create the already mentioned dynamic stability that characterises the systems (Geels, 2012, 2019).

#### 2.2.4 Interplay and General Dynamic

Therefore, according to the MLP, socio-technical transitions are a consequence of the interaction among the three analytical levels previously described, which generally follow a dynamic shown below. Technological innovations must initially gain momentum within the niche, through clustering with other innovations, creating social networks that can support the novel technology and make sure to have an initial consumer base, before attempting to introduce itself into an existing regime (Geels, 2002; Schot & Geels, 2008). The final goal of niche innovations is to enter a regime, which is an arduous process since existing regimes are typically path-dependent and tend to be stabilised by lock-in mechanisms that make them avoid radical change (Geels, 2012). Nonetheless, according to Geels (2002), a combination of tensions that can arise between actors at the regime level and of external pressures coming from the landscape can create so-called ‘windows of opportunity’ that represent chances for the radical innovations to penetrate the dominant regime. Therefore, these innovations have the possibility of entering the regime and competing against the existing technologies, resulting in either the stabilisation of the innovations within the regime or the failure in doing so (Smith, Voß & Grin, 2010). Moreover, successful innovations may even be able to replace existing regimes and therefore influence the whole socio-technical system and affect the external landscape (Geels, 2002).

The increasing concern regarding climate change and environmental degradation in the past decades is considered by Smith, Voß and Grin (2010, p.441) a “socio-cultural development that can be considered a landscape process”. Thus, socio-technical regimes have been challenged with destabilising pressures that create opportunities for green innovations to disrupt the equilibrium and nest the seed for systematic radical change towards low-carbon options. When focusing on electricity systems, the pressure of climate change and the need to decrease carbon emissions push niches for the development of low-carbon technological innovations for electricity production, while at the same time pressuring existing regimes and creating windows of opportunities in the socio-technical system (Geels et al., 2018).

#### 2.2.5 Existing Literature on MLP

As previously stated, the multi-level perspective is one of the most used frameworks in the study of socio-technical transitions, and especially in socio-technical sustainability transition, therefore a plethora of case studies and research papers on several fields of study have implemented the MLP.

Staying in the field of energy transitions, Bosman (2012) applied the MLP in order to thoroughly analyse the Dutch energy system, with a specific focus on regime actors. In his study, the author learned that a fundamental element hindering a sustainable transition to a low-carbon energy system is the incongruent perspective that regime actors have on the main

challenges that the energy system is facing and the most effective solutions to such challenges. As a further example, Flynn (2016) studied the diffusion of off-shore wind farms in the North Sea, identifying the obstacles that hinder the development of sustainable niche innovations.

Moving towards the mobility and transport fields of study, Moradi and Vagnoni (2018) applied the MLP to identify the mobility regime in Italy and dynamics that evolve in the transition towards a low-carbon mobility system. Alternatively, Canitez (2019) used the framework to grasp the dynamics, drivers and obstacles of the urban mobility sustainability transition in the megacity of Istanbul. Further, Roberts and Geels (2019) used the MLP to analyse the conditions that led to the transition of the UK transport system from rail to road during the past century.

Deleye, Van Poeck and Block (2019) used the framework to understand how sustainability is embedded into the Flemish higher education system, through the analysis of several factors in the three analytical levels (landscape, regime and niches) and how higher education is connected to those.

In fields related to the marine environment, Stalmokaitė and Yliskylä-Peuralahti (2019) applied the MLP to understand how more rigid environmental policies in the Baltic Sea opened up a window of opportunity for niche innovations in the shipping system. On a different note, Kelly, Ellis and Flannery (2018) used the multi-level perspective to conceptualise how governments could foster the transition to a more sustainable system of managing coastal areas in the Irish territory.

## 2.2.6 Critiques and Limitations of the MLP

Despite being one of the most comprehensive and reliable frameworks for the study of socio-technical systems' transitions, the multi-level perspective is not immune to criticism regarding its limitations.

One of the limitations of the MLP framework is that the macro-analytical level of the landscape is overlooked at. Studies of sustainability transitions mainly call attention to the shocks and factors that could potentially undermine the stability of the regime, whereas developments and dynamics happening at the landscape level could also strengthen and consolidate the stability of dominant regimes (Geels, 2011).

Berkhout, Smith and Sterling (2004) argue that the regime concept is not well defined and thus confusion and uncertainty on how to apply the concept could rise. As an example, a study on the agro-food sector could analyse the regime at the base level of produce or at the broader level of the entire system, meaning production, distribution and consumption (Geels, 2011). Thus, changes at one level could not be considered such at a different level. Nevertheless, uncertainty concerning this issue can be avoided as long as the researcher identifies and specifies the scope of the study (Geels, 2011).

In addition, Hölsgens, Lübke and Hasselkuß (2018) argue that the MLP framework is useful when analyzing dynamics, drivers and barriers of social innovations that aim at changing radically the system, while it is not satisfactory in the study of social innovations that aim at changing the system incrementally.

Furthermore, one of the most relevant limitations that were pointed out by academics is the fact that in past studies that made use of the MLP, the focus has constantly been at the niche level, analysing the dynamics among niche actors, thus neglecting the other analytical levels (Berkhout, Smith & Stirling, 2004). Smith, Stirling and Berkhout (2005) and Meadowcroft (2011) have argued that in order to better understand the dynamics of socio-technical transitions, more attention should be shifted towards the role of regime actors and how they use their power to influence transitions. Moreover, Smith, Stirling and Berkhout (2005) also critiqued that socio-technical regimes were depicted as monolithic and too homogeneous, whilst not only they are dynamic, but they also actively play a role in setting the direction of transitions pathways.

In order to address some of these concerns and criticisms, Geels (2014) shifted the focus away from the niche level towards the regime level, analysed the function that incumbent actors have in sustainability transitions and conceptualised the role that power and politics have in the achievement of low-carbon socio-technical systems.

### 2.3 Introduction of Politics and Power into the MLP

In the traditional MLP, regimes were considered to be monolithic obstacles, defined by lock-in mechanisms that cause path dependency and lead to automatic regime stability (Geels, 2002). After reviewing criticisms on the framework, Geels (2014) used understandings, concepts and theories from political economy for the purpose of introducing the role of power and politics into the multi-level perspective, taking as an example the transition of the electricity socio-technical system in the UK in the period 2003-2013. The author theorised that regime stability is a consequence of the active resistance of incumbent actors against radical transitions to low-carbon systems.

Insights from political economy help enriching the concept of regime, in which ‘policy’ is not any more simply a one-dimensional element, but now becomes a multi-dimensional concept that encompasses singular and collective actors and expands the role of power into multiple domains such as economics, culture and politics (Geels, 2014).

According to Geels (2014), policymakers and dominant firms oftentimes unite into an alliance that has the purpose of maintaining the stability of the status quo within the socio-technical systems. These alliances between actors have been called ‘techno-institutional complex’ and in the case of fossil fuel industries and their relationship with governing bodies, they have been addressed as ‘carbon lock-in’, which refers to the immobility of energy systems that mainly rely on fossil fuels (Unruh, 2000).

The alliances form because governments and incumbent firms are mutually dependent on each other. As a matter of fact, businesses depend on policymakers for instituting property rights and setting the legal framework for corporate behaviour, while governments depend on the economic growth that is reached thanks to the businesses that operate in the national economy (Fligstein, 1996; Geels, 2014). The conceptualisation of alliances that form between incumbent firms and governments help with the introduction of power and politics within the MLP since these dominant actors are the ones that own the capabilities, financial and technological

resources and they use their power to influence policies and the market for their interest (Geels, 2014).

When including power and politics within the MLP, Geels (2014) identified four specific ways in which incumbent firms and policymakers can use their power in order to withstand radical changes towards low-carbon socio-technical systems: instrumental strategies, discursive strategies, material strategies and institutional forms of power.

#### *Instrumental strategies*

Regime actors use instrumental forms of power when they exploit resources, such as money, access to media and capabilities, in the immediate interaction with other actors for reaching their goals (Geels, 2014). Avelino and Rotmans (2009, p.546) referred to instrumental power when talking about “actor-specific resources used in pursuit of self-interests”.

In the UK electricity system example, Geels (2014) identified such strategy when Prime Minister Tony Blair, after nuclear energy was presented as an undesirable carbon-free option in the 2003 Energy White Paper, used his authority to push for a resurgence of nuclear power in 2005. Moreover, the author described how in 2006 the Prime Minister even announced the construction of new nuclear power plants, not taking into consideration the opinion of the UK citizens.

#### *Discursive strategies*

Geels (2014) indicated that incumbent actors, thanks to their dominant position and their access to media outlets, can affect the main agenda through shaping both what is being discussed and how that topic is discussed. A similar definition of discursive power can be found in Avelino and Rotmans (2009) when they said that it consists of the actors’ ability to dominate the main discourse with their ideas, perspectives and beliefs. Additionally, Geels built on concepts developed by Snow and Benford (1988) and identified three specific discursive framings: diagnostic framing, prognostic framing and motivational framing.

*Diagnostic framing* is responsible for the identification and definition of the problems to be discussed, and the setting of policy goals (Geels, 2014). In his work, Geels (2014) pointed out how the framing of problems and goals changed in the UK electricity discussion: in the 2003 Energy White Paper, climate change was depicted as the major problem and the goal was to reduce emissions thanks to renewable energy; in the 2007 White Paper on energy, the main problems became energy security, unemployment and electricity prices.

*Prognostic framing* deals with the proposition of solutions to the problems previously identified (Geels, 2014). In the UK discourse, Geels (2014) stated that renewable energy was considered the primary solution to energy issues in the 2003 Energy White Paper, while in the 2007 White Paper it became a side-line solution, after nuclear energy and carbon capture and storage (CCS) technologies. Moreover, the author noted that, whenever renewable energy was considered, only large scale options were discussed, therefore favouring dominant firms, and other potential smaller solutions were side-lined.

Eventually, *motivational framing* is responsible for setting the rationale for action and determine the attitude of regime actors towards the problems and solutions. Geels (2014) stressed how, in the UK energy discussion, since the 2007 financial crisis, the public concern about climate change has decreased in favour of unemployment and energy security. He stated that not only did the media neglect the discussion on the environmental issue, but also politicians used economic problems to discredit environmental policies and renewable energy options, therefore affecting the public perception of such factors.

#### *Material strategies*

A further way in which dominant actors can defend themselves from fundamental change is through material strategies, meaning that they can take advantage of their financial and technical capabilities to consolidate certain dimensions of the socio-technical regime (Geels, 2014). Although related to corporate power, a similar concept is found in Levy and Newell (2002, p.93), when describing material strategies that aim at “sustaining corporate dominance and legitimacy in the face of challenges from social actors and economic rivals”. The authors stated that actors used material strategies, consisting of the development of technologies and infrastructures, with the final purpose of maintaining stability and the status quo.

In Geels’ (2014) study on the UK context, the author indicated that the government used the technological innovations on CCS to justify its support of fossil fuels and, with the 2007 White Paper, designated substantial subsidies for the development and construction of a CCS facility, although at the time those technologies were not efficient.

#### *Institutional power*

Lastly, thanks to the institutional power rooted in ideologies, political cultures and governance structures, regime actors can resist socio-technical transitions (Geels, 2014). For instance, Kern (2011) stated that the UK governance system based on majority allows the government to take autonomous actions without many barriers, thus having the opportunity to pursue their interests and slowing down the transition to low-carbon systems.

In his study, Geels (2014) stated that the UK market economy is liberal and thus the state has the role of neutral rule setter, while the market competition determines its dynamics. The author stressed that this illusory neutral approach actually advantages dominant regime actors since they already benefit from financial resources and favourable market rankings. In this way, incumbent firms had the power to influence the electricity system by setting electricity prices and choosing which kind of innovation could diffuse (Geels, 2014).

## 2.4 Existing Literature on the Italian Energy System

The Italian energy system has been subject of interest for several studies that have examined both the historical transitions it experienced in the past and the low-carbon transition that it is experiencing nowadays.

Gales et al. (2007), in their review on the energy transitions that European states experienced in the past two centuries, also analysed the Italian energy system. This case was further

described by Malanima (2013) when he analysed the energy transition and its relation to economic growth in Italy between 1800 and 2010. Moreover, Bartoletto and Rubio (2016) studied the Italian energy system and the related carbon emissions starting from the birth of the state in 1861 until the end of the twentieth century and compared it to the development of the Spanish energy system.

Recently, studies have been conducted on more specific factors, such as policies, technologies and actors, and their implications on the selected energy system that, depending on the scope, could be national, regional or municipal energy system.

For instance, Bellocchi et al. (2019) forecasted how the introduction of electric vehicles in the Italian territory could help to decrease carbon emissions in the country, thus leading towards a transition to a low-carbon energy system. Moreover, the authors explained how this technology could influence the optimal electricity mix, with renewable sources taking the lead as preferred options for electricity production. Further, Meneguzzo et al. (2016) forecasted a suitable pathway for Italy to experience a full transition of the electricity production from renewable sources, assessing the role of each energy source, the related technologies and the amount of extra power to be installed.

Campoccia et al. (2014), with their review of photovoltaic technology support mechanisms in the 2010s in several European countries, concluded that Italian policies were favouring the creation of large power plants at the expense of smaller renewable energy projects. On another note, Buzzacchi (2010) examined the decisional process in the Italian energy system and analysed the existing conflicts of interest among different actors, concluded that the development of renewable energy technologies was restrained by the lengthy authorization processes.

Moving towards the analysis of actors of the energy system, Caporale and De Lucia (2015) studied the process of social acceptance of on-shore wind farms, focusing on the Apulia region in Southern Italy. The authors identified how asymmetric information between consumers, producers and policymakers have a fundamental role in slowing down the transition process to a low-carbon option to electricity production.

More generally, Magnani and Osti (2016) analysed the role of civil society in the energy sustainable transition, that constitutes the context in which social innovations may rise, giving birth to energy pathways that are alternative to the dominant ones. The authors showed how the fragility and weak coordination among national, regional and local institutions slow down the development process of such innovations.

Furthermore, several studies concerned the regime level of the energy system, its actors and the existing dynamics. For instance, Sarrica, Brondi and Cottone (2014) studied the representation of the energy system in the public discourse in the twenty-first century. The authors, after having analysed parliamentary reports and press articles, came to the conclusion that policymakers and other stakeholders depicted the energy system as centralised and mainly discussed traditional large plants, neglecting smaller decentralised options for energy production. Additionally, the authors concluded that dominant regime actors did not consider

users as active players in the energy system but as passive consumers of the energy that was simply produced and delivered to them.

In a further study, Sarrica et al. (2018) stated how incoordination of energy policies at national, regional and municipal level hinder sustainability transitions. Moreover, the conclusions stressed the need to enhance public participation in energy governance and the necessity to take in consideration bottom-up inputs that could be useful for national energy strategies.

The study here conducted finds common ground with already existing works and will add the perspective of the power strategies that were used by regime actors of the Italian electricity system to influence the transition towards their preferred pathway.

## 3 Methodology and Data

This study is aimed at analysing and identifying the role that regime actors had, and how they used their power, in the energy transition towards a low-carbon system in Italy in the decade 2008-2017. This chapter will firstly define the research approach and method undertaken for the investigation of such a subject. Later on, the data used in the study will be presented. Moreover, limitations regarding both the method and the data will be considered.

### 3.1 Research Approach and Design

Since the matter of this study is of a social kind, more specifically relations between different actors, representation of events and issues in the public discourse, and power dynamics, the most fitting research approach is of a qualitative kind. Indeed, qualitative approaches are preferred when investigating and trying understanding social phenomena that involve a variety of actors embedded in a specific social context (Creswell, 2014).

In previous studies on energy transitions, several different qualitative research designs have extensively been used (Bosman, 2012; Canitez, 2019; Caporale & De Lucia, 2015; Flynn, 2016) and the one that has been chosen in order to pursue this research is the qualitative case study design, which has itself been used in many studies before (Magnani & Osti, 2016; Moradi & Vagnoni, 2018; Roberts & Geels, 2019; Stalmokaite & Yliskylä-Peuralahti, 2019).

According to Simons (2009, p.21), the case study design allows for “an in-depth exploration from multiple perspectives of the complexity and uniqueness of a particular project, policy, institution, programme or system in a ‘real life’ context”. Moreover, Simons (2009, p.21) stated that case studies are useful when the aim of the study is to create a deep understanding of a particular topic, institution or system to “generate knowledge and/or inform policy development, professional practice and civil or community action “. Therefore, the qualitative case study has been chosen as the most useful in order to obtain a deep understanding of the sustainability transition of the Italian electricity system, of the power dynamics between the different regime actors and of the ways in which these actors influence the system.

In addition, Yin (2014) argued that case studies are ideal for answering ‘why’ and ‘how’ research questions, which are more explanatory questions that deal with events that evolve over time. This further confirms that the qualitative case study is the ideal design to deal with the ‘how’ research questions that this study wants to answer.

This case study focuses on the single case of the Italian electricity system and it is developed deductively since the system will be analysed through the application of the theoretical framework proposed by Geels (2014). Nonetheless, the analysis of qualitative data grants a certain level of flexibility, which allows to inductively analyse the data with an open mind and thus not forcing to stay within the theoretical frameworks (Evers & van Staa, 2010).



## 3.2 Data and Method

Yin (2014) declared that the data sources that can be used in case study research to provide empirical evidence are various, ranging from interviews to direct observations, from documents to historical records. Thus, for the sake of this case study, the data analysed will be secondary data comprising governmental documents and newspaper articles from major daily Italian newspapers, as well as company reports of the incumbent firms Enel and Eni.

The official governmental documents are important to include in the analysis because they represent the formal stance that the Italian government was taking on the overall energy system, and more precisely on electricity production. The three primary governmental documents taken in consideration are: the Legislative Decree 112/2008, where the government laid out a short strategy for the national energy system; the National Energy Strategy 2013, the first proper strategy comprising a plan of action and goals since the 1988 National Energy Plan; the National Energy Strategy 2017, the revisited strategy with updated plans and goals.

The governmental documents were subject to content analysis in order to understand how policymakers decided to approach fossil fuels and renewable sources of energy. Moreover, a search criterion was utilised in the analysis of the documents, where the Italian key words *energ\** and *sostenibil\** (sustainable\*) were searched for.

Table 1: Primary Governmental Documents

Document	Source	Link
Legislative Decree 112/2008	Gazzetta Ufficiale della Repubblica Italiana	<a href="https://www.camera.it/parlam/leggi/decreti/08112d.htm">https://www.camera.it/parlam/leggi/decreti/08112d.htm</a>
National Energy Strategy 2013 (Strategia Energetica Nazionale SEN 2013)	Ministry of Economic Development; Ministry for the Environment, Land and Sea	<a href="https://www.sviluppoeconomico.gov.it/index.php/it/component/content/article?id=2029441:strategia-energetica-nazionale-sen">https://www.sviluppoeconomico.gov.it/index.php/it/component/content/article?id=2029441:strategia-energetica-nazionale-sen</a>
National Energy Strategy 2017 (Strategia Energetica Nazionale SEN 2017)	Ministry of Economic Development; Ministry for the Environment, Land and Sea	<a href="https://www.mise.gov.it/images/stories/documenti/Testo-integrale-SEN-2017.pdf">https://www.mise.gov.it/images/stories/documenti/Testo-integrale-SEN-2017.pdf</a>

Articles from Italian newspapers help to understand the general public discussion on energy and electricity, reporting how different issues are portrayed in the public discourse, as well as personal statements from governmental representatives made in a more informal environment that could be an interview or a public event.

The main data sources for newspaper articles are the two more read and popular daily Italian newspapers, *Corriere della Sera* and *la Repubblica*, both of which cover a wide variety of topics, as well as a renowned Italian electronic newspaper that focuses solely on energy issues, *Qualenergia*. The historical electronic databases of the newspapers were used to search for relevant articles in the time period 2008-2017, using the Italian keywords *energ\**, *sostenibil\**, *rinnovabil\**, *strategia energetica nazionale*, as well as the names of the Ministers of Economic Development that were on duty in that period, Claudio Scajola, Corrado Passera and Carlo Calenda.

Table 2: Italian Newspapers

Newspaper	Description	Link
Corriere della Sera	Daily newspaper News, politics, economics, sport	<a href="https://www.corriere.it/">https://www.corriere.it/</a>
la Repubblica	Daily newspaper Politics, economics, sport, art	<a href="https://www.repubblica.it/">https://www.repubblica.it/</a>
Qualenergia	Online newspaper focusing on energy issues	<a href="https://www.qualenergia.it/">https://www.qualenergia.it/</a>

### 3.3 Limitations

As already stated, the qualitative case study approach is the one that has already been used in several previous studies on energy transitions and thus is considered to be the most fitting for the purpose of this study. Nonetheless, these approach and methodology have limitations too.

First and foremost, the issue that results of single case studies are not generalisable since various circumstances may differ due to the specificity of each different case (Flick, 2014). In the case of this study, results derived from the analysis of the Italian electricity system cannot always be generalised because the dynamics and context of the Italian system highly depend on the governance structure, on the market structure and on the overall structure of the electricity system.

Further limitations concern the process of data collection. Indeed, as McGinn (2010) states, a case study should be built on the analysis of multiple data deriving from various sources since it is the only way to generate an understanding of the case from different perspectives. In the specific case of this study, additional data in the form of newspaper articles from other relevant Italian newspapers and specialised magazines could be collected and analysed to include different perspectives on the issue.

Moreover, the data collected and analysed could be incomplete and biased. For instance, statements of politicians or other relevant individuals reported in newspaper articles could have been edited, taken out of context or misconstrued. In addition, unknown personal connections between journalists or newspapers' managers with political parties, single politicians or energy companies could bias the way information is represented in newspapers' articles.

Lastly, a limit to the study is the narrow time period that has been chosen for the analysis. Indeed, energy transitions are lengthy processes that take place over several decades, therefore narrowing down the scope to a decade could be an issue. Thus, in order to try to capture the main past events and dynamics that led to the evolution of the Italian electricity system, a general historical background of the system is presented, although a more thorough examination of the past dynamics could reveal many other crucial events and factors.

## 4 Italian Electricity System Case Study: Analysis

This chapter of the study is dedicated to the analysis and discussion of the data available that can help understand the ways in which incumbent regime actors used their power in relation to the sustainable energy transition in Italy in the decade 2008-2017. In the first place, a background of the evolution of the Italian energy system since the end of the second world war will be presented. This first section is fundamental to set the scene, explaining the crucial phases that the Italian electricity system went through and that led to the system that exists now. Consequently, the study will focus on the decade that starts in 2008, that is the year in which the Italian government built the foundation for a new National Energy Strategy (adopted in 2013), and that ends in 2017, year in which the strategy was revisited. In addition, it is in this period that issues concerning climate change and the implications of anthropogenic emissions reached the spotlight in worldwide discussions. Thus, the available data covering the time period 2008-2017 will be examined, identifying the four forms of power strategies identified by the framework introduced by Geels (2014).

### 4.1 Historical Background of The Italian Electricity System

This first section gives a historical background on the Italian electricity system, starting from the mid-1940s and the end of the Second World War.

Although not included in the scope of this case study, it is extremely important to understand the dynamics and main events that influenced the Italian energy system. Indeed, according to Grubler (2011), energy transitions are lengthy processes that take considerable time to unfold, several decades, and are dependent on past dynamics. This historical examination gives a background that is fundamental for the understanding of the trends and dependencies that took place in the past century and led the Italian electricity system to get to the structure that it has now.

#### 4.1.1 End of the Second World War and the 1950s: Reconstruction of a Broken Electricity Sector

After the end of the Second World War, Italy was left with a severely damaged energy industry and had to rely on an energy mix that was comparable to the one of the country at the end of the 18th century: almost three-fourths of the energy produced was coming from traditional sources of energy such as hydropower, with the reintroduction of wood and animal power (Malanima, 2013).

In the decade of the 1950s, the Italian government pushed for the reconstruction of a stable energy system, able to cover the national demand and that was not highly dependent on foreign primary energy sources. The government instituted in 1953 a national body named Ente

Nazionale Idrocarburi (Eni) that was responsible for the research, innovation and management of fossil fuels on a national level.

It is in this period that the Italian economy saw a rapid growth thanks to the flourishing industrial sector and the constant growth of the service sector. In this decade, the methane extraction in the Italian territory increased exponentially and the energy system increasingly relied on electricity production from oil and its derivatives, thanks to the development of the Italian oil industry (Malanima, 2013).

#### 4.1.2 The 1960s and 1970s: Nationalisation of the Electricity System and Economic Slowdown

The 1960s started with the official nationalisation of the Italian electricity system, that took place in 1962 with the conglomeration of all Italian electricity firms into one unique authority, the Ente Nazionale per l'Energia Elettrica (Enel). Enel was made the designated responsible for the production, import, transport and distribution of electricity on the national level (Gazzetta Ufficiale, n.d.a). In the following decades, not only was the authority able to build connections with neighbouring European countries' electricity systems, but it managed to expand the electricity grid throughout the whole national territory and especially the South, which was underdeveloped and dependent on the electricity production of the North.

Simultaneous to the oil crises of the 1970s that destabilised the global energy scene, the Italian scene was also experiencing internal instability which was a consequence of the economic slowdown and increasing unemployment that came about towards the end of the 1960s (Zanetti, 1994). On top of that, the political scene was characterised by high levels of corruption, that translated into civil turmoil, workers' contestations and eventually to terroristic attacks, kidnappings and bloodbaths.

Overall, the internal and external tense situations led to a general destabilisation of the Italian electricity system, which was characterised by high electricity prices, decreasing private and public investments in the sector, decreasing energy demand caused by decreased industrial production, and higher unemployment (Romano, 2012).

#### 4.1.3 The 1980s and 1990s: End of the Nuclear Experience and Liberalisation of the Electricity Sector

After the Chernobyl nuclear disaster of 1986, the antinuclear movements gained momentum and, thanks to a national referendum that took place in the next year, the Italian population opposed the development of nuclear power plants in the national territory (Romano, 2012). As a consequence, the government ordered the complete shutdown of any working nuclear plant, stopped the construction of new ones and restrained Italian companies from investing in any foreign project related to nuclear energy.

After the end of the Italian experience with nuclear energy, a National Energy Plan (Piano Energetico Nazionale - PEN) was proposed in 1988 and introduced in 1991. In the PEN, the government urged the necessity to substitute the production of electricity from nuclear power

with the production from natural gas (Gazzetta Ufficiale, n.d.b). In 1992 the two national energy authorities, Eni and Enel, started the process of privatisation, although 51% of the shares were still owned by the state. In 1999, the legislative decree 79/1999 was issued, which officially liberalised the Italian electricity sector (Romano, 2012).

Figure 2 represents total electricity production by source from 1950 until 2017, while Figure 3 depicts the share of electricity production by source in the same period. The figures show how in 1950 all of the electricity produced in Italy derived from hydroelectric power plants. After 1950 total electricity production increased exponentially, with thermoelectric production from fossil fuels gaining relevance and becoming the major contributor to electricity production already towards the second half of the 1960s, reaching 85% of contribution to the electricity produced in 2006.

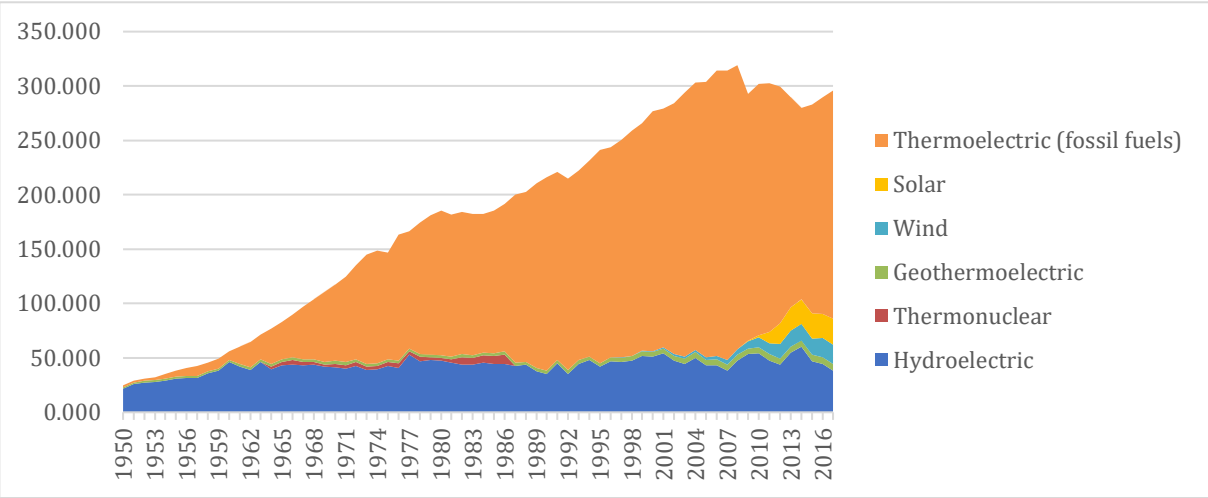


Figure 2: Total National Electricity Production by Source 1950-2017 (TWh) (data from Terna, 2018)

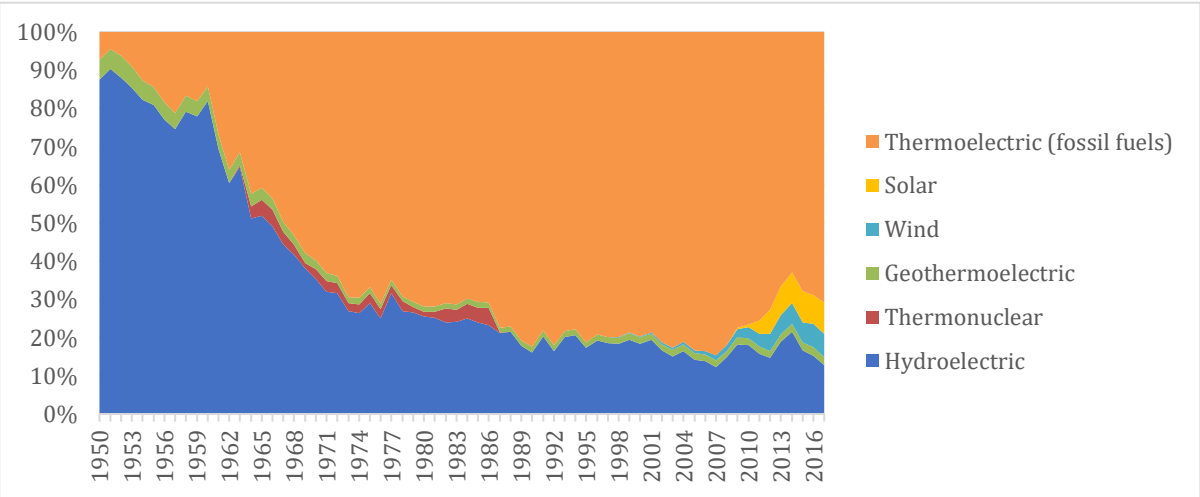


Figure 3: Shares of Total National Electricity Production by Source 1950-2017 (data from Terna, 2018)

#### 4.1.4 The 2000s: EU 2020 Goals and the New National Energy Strategies

At a European Union level, 2007 marked the year in which a specific energy policy was born, thanks to the signing of the Treaty of Lisbon that entered into force in early 2009 (Piglia & Cardinali, 2011). In this way, the Union adopted a climate and energy package that created the juridical basis and defined the following objectives for the EU to reach by 2020: the use of renewable energy for a minimum of 20% of the total demand; the increase in energy efficiency so to save 20% of EU energy consumption; the reduction in greenhouse gas emission by 20% compared to 1990 levels (European Parliament & Council of the European Union, 2009). Although the goals were set for the Union as a whole, country-specific goals were set due to the heterogeneity of each country's energy mix, availability of primary sources, development of the energy system and economic growth. For the case of Italy, 17% of energy consumption should derive from renewable sources of energy by 2020 (European Parliament & Council of the European Union, 2009).

In the Italian scene, the first decade of the new century was directed at increasing the liberalisation of the electricity sector by reducing the dominance of the two energy giants, Enel and Eni. The same period was characterised by the consolidation of dominant European energy firms on an international level, thus we see the entrance of foreign European companies in the Italian electricity market while Enel and Eni redirected their endeavours to foreign countries (Romano, 2012).

Also, it is important to stress that the European directive 2001/77/CE for renewable energy sources pushed the Italian government to create a plan of feed-in-tariffs to foster the production of electricity through RES (Gazzetta Ufficiale, n.d.c). Thanks to these feed-in-tariffs and the decreasing prices of innovative technologies, renewable power plants saw an increase of the energy production capacity installed until 2013, when the subsidies were terminated.

As a consequence of the gas emergency of 2006 and the 2007 financial crisis that hit particularly hard the Italian economy, the Government Berlusconi, through the legislative decree 112/2008, decided to revive the nuclear experience in the Italian territory in order to increase employment and decrease the price of electricity (Gazzetta Ufficiale, n.d.d). Nonetheless, this experience did not have a long life since, after the Fukushima Daiichi nuclear accident of 2011, through a national referendum the Italian population decided once again to abandon nuclear power. In addition, the year 2011 marks the establishment by the European Commission of the project Roadmap 2050, which sets the goal for the EU to reduce greenhouse gas emissions by 80% by 2050 compared to the 1990 levels (European Commission, 2011). It was in 2013 that a proper new National Energy Strategy (SEN) 2013 was proposed by the Government Monti, which incentivised the exploitation of fossil fuels present in the national territory in order to decrease the dependence of the electricity system on foreign fossil fuels (Ministero dello Sviluppo Economico, 2013).

Eventually, the increasing awareness among the population concerning climate change and the participation of Italy to treaties and agreements that fostered the transition to low-carbon economies (Paris Agreement 2015) pressured the Italian government to review and rework on the National Energy Strategy. Indeed, Government Gentiloni in 2017 proposed a new version of the National Energy Strategy (SEN 2017), which favoured natural gas and renewable energy

sources for electricity production and set a path to the decarbonisation of the Italian economy (Ministero dello Sviluppo Economico, 2017).

The strategy set the following goals for the Italian energy system in 2030: strengthen the energy supply security and reduce the electricity and gas price gap with European average; phase-out of coal by 2025; 28% of total energy consumption derived from renewable sources of energy; and 55% of total electricity consumption derived from RES (Ministero dello Sviluppo Economico, 2017).

Figure 4 depicts the total electricity production by source of energy in Italy in the period 2000-2017. With the financial crisis started in 2007, the production of electricity decreased, and slowly RES started contributing consistently to total electricity production, reaching the level of 35,4% in 2017. In the same year, electricity from renewable sources of energy contributed to 17.7% of total energy consumption, thus reaching the national goal set for 2020 in the European climate and energy package in 2009 (Terna, 2018).

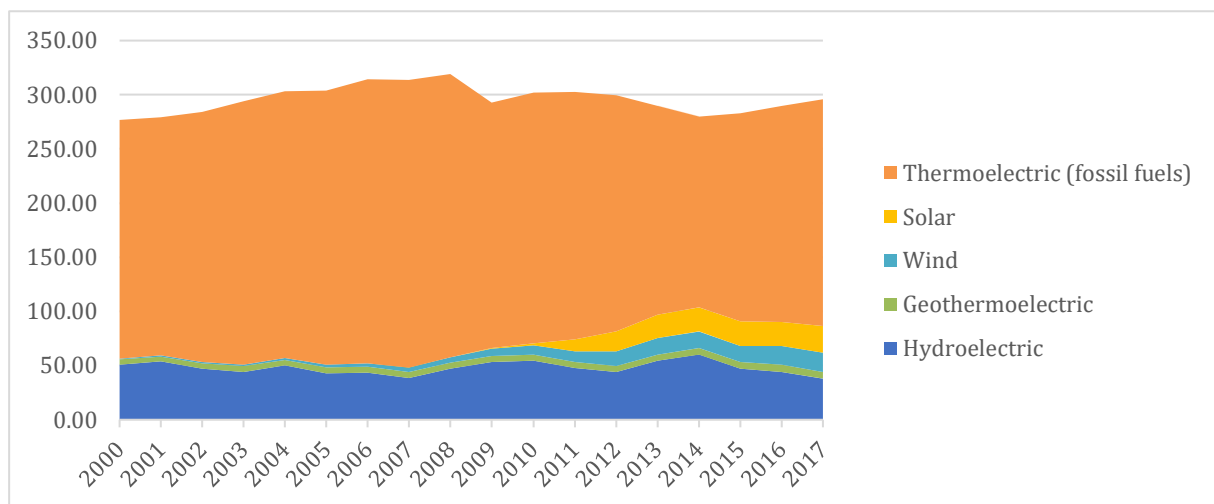


Figure 4: Total National Electricity Production by Source 2000-2017 (TWh) (data from Terna, 2018)

## 4.2 Incumbent Actors of the Italian Electricity System in the Decade 2008–2017: Power and Politics

As stated by Geels (2014), policymakers and dominant firms tend to unite into alliances that aim at the maintenance of stability within the system.

In the case of the Italian electricity system, the alliance between policymakers and incumbent firms is obvious. Indeed, the two incumbent electricity providers in Italy are Enel and Eni which, as showed in the historical background, were both companies initially created and entirely owned by the State. Since the beginning of the liberalisation process of the electricity market in 1992, both companies became private companies and were enlisted in the stock market of Milan. Nonetheless, to this day the main shareholder of both Enel and Eni is the Italian State, more specifically the Ministry of Economics and Finance owns 23,6% of Enel’s shares, and a total of 30,1% of Eni’s shares (Enel, 2019; Eni, 2019). Therefore, it is safe to state

that the Italian State and the two biggest electricity producers Enel and Eni do have common interests and therefore create an alliance with the aim of fulfilling their interests.

Moreover, it is clear that the firms and the government are dependent on one another since the government is the one that sets the laws, standards and legality that affect the firms, while the firms are fundamental for the Italian economic growth. In the case of Enel and Eni, they are both crucial firms that provide the necessary energy to service this growth.

#### 4.2.1 Instrumental Strategies

The first strategy identified by Geels (2014) that regime actors use is the *instrumental strategy*, meaning that actors use their power in the shape of authority, financial resources or media access in the immediate interaction with other actors in order to achieve their goals and interests.

A clear example depicting regime actors using power to pursue their interests is how the Italian government managed the situation concerning nuclear energy starting from the second half of the 2000s. As previously stated, consequently of the 1987 national referendum that led to the dismantling of the Italian nuclear experience, not only all nuclear reactors were shut down and dismantled but also any kind of investments in projects related to nuclear energy were suspended.

It was in 2004 that the government introduced a law (Law 239/2004) that lifted this suspension on nuclear energy initiatives (Gazzetta Ufficiale, n.d.e). As a consequence, Enel, being one of the biggest European energy companies and having conspicuous amounts of financial resources, started expanding its business into nuclear energy in foreign European countries. Indeed, in 2005 Enel bought the Slovakian major electricity producer Slovenske Elektrarne, which was utilizing four nuclear reactors, and in 2009 started the construction of two new nuclear power plants in the Slovakian territory (Enel, 2005). Moreover, in 2007 Enel started a participation with Electricité de France for the research and development of a new, more efficient generation of nuclear reactors in the French territory (Enel, 2007). In this way, Enel was able to consolidate its position as a European energy superpower and gain knowledge and capabilities concerning the production of electricity from nuclear energy.

In addition, pushed by the 2005-2008 rising prices of gas and oil caused by the disputes between Russia and Ukraine, the government (at the time led by Prime Minister Silvio Berlusconi) decided to revive the Italian nuclear experience. Indeed, the Minister of Economic Development Claudio Scajola, within the legislative decree 112/2008, presented a national strategy which accounted for the creation of ten new nuclear power plants in the Italian territory (Gazzetta Ufficiale, n.d.d). The decree promised a production of 25% of total electricity from nuclear power plants, therefore decreasing electricity prices, minimising the dependence on foreign energy and reducing overall greenhouse gas emissions. This proposition was legitimised in 2008 and Minister Scajola confirmed that the government had the authority to set the location criteria for the new nuclear plants, while “energy firms will identify the site” (Iezzi, 2009). Moreover, thanks to its technologically advanced capabilities and prosperous financial resources, Enel was ready to take advantage of the new legislative decree, as declared by Enel CEO Fulvio Conti (Corriere della Sera, 2008).



Nonetheless, the government and the new nuclear projects met strong opposition by regional authorities, civil society and environmental organisations. In fact, the majority of the regions that were chosen by the government as hosts of these new nuclear plants contested the legitimacy of the government stance, since it was prerogative of the regions to make decisions regarding the location of any kind of electricity production plants in the territory according to the legislative decree 112/1998 (Gazzetta Ufficiale, n.d.f).

After the Fukushima Daiichi accident that took place at the beginning of 2011 as a consequence of an earthquake, civil society showed increasing concerns because of the natural inclination of the Italian territory to seismic events. The Italian population demanded a national referendum, which made clear that the civil society was not supporting nuclear initiatives. The referendum results showed that 57% of total voters participated and 95% of them voted against the creation of nuclear energy plants (Toniutti, 2011). This marked the end of the nuclear Italian experience.

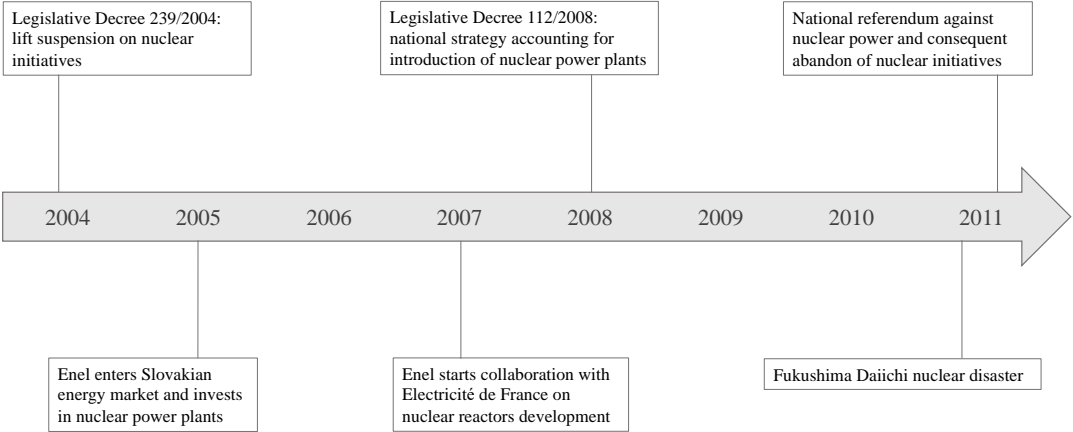


Figure 5: Timeline Nuclear Discussion in Italy (2004-2011)

In 2012, an instrumental strategy can be identified when the Minister for Economic Development Corrado Passera called for an urgent need to drill wells on-shore and along the coastline to exploit the national fossil fuel reserves (Qualenergia, 2012a). Moreover, Minister Passera stated that the main factors hindering the development of oil extraction facilities were the length and heaviness of authorisation processes, which needed to be reduced (Qualenergia, 2012b). The next year, under the presidency of Prime Minister Mario Monti, the new National Energy Strategy 2013 was created from a collaboration between the Ministry of Economic Development and the Ministry for the Environment, Land and Sea, which fostered the exploration and exploitation of national reserves of fossil fuels by incentivising such projects and lifting the bureaucratic barriers that slowed down the decision making processes (Ministero dello Sviluppo Economico, 2013). In 2014, an agreement between the state and Eni declared that the exploitation of the oil reserves in the Basilicata region would benefit the national energy interest (Regione Basilicata, 2014), and in 2015 Eni started the creation of six new oil wells in the Basilicata territory.

Environmental organisations and part of the civil society expressed their concerns with the decision of increasing the production and consumption of fossil fuels instead of focusing on the

development of renewable energy technologies (RET). Indeed, a national referendum against the extension of the exploitation of the oil reserves in the national coastline until exhaustion was announced in 2016, although it failed since only 31% of voters participated, thus not reaching the legal minimum to gain validity (la Repubblica, 2016a).

These are examples of how the Italian government used its authority and power to advantage the interests of the energy giant Enel in the case of nuclear power, and the interests of the dominant energy company Eni in the case of the exploitation of national fossil fuels.

#### 4.2.2 Discursive Strategies

As Geels (2014) stated, regime actors can resist systemic change thanks to discursive strategies that have the objective of setting the topics that are to be discussed and how these are to be discussed. The author identifies three framing dimensions: diagnostic framing; prognostic framing; and motivational framing.

##### *Diagnostic Framing*

Diagnostic framing defines the process of identification and definition of the main problems that are affecting the considered system, as well as the setting of final policy goals to overcome such problems (Geels, 2014).

In Italy, until the introduction of the SEN in 2013, the energy discussion was embedded in the National Energy Plan that was established in 1988. This national energy plan was completely anachronistic since it was created when the energy system was still nationalised, the innovative technologies concerning electricity production from renewable sources of energy were not developed, and various international agreements and treaties concerning the limitation of climate change did not already exist.

On an international level, the concerns regarding climate change and the need to safeguard the environment by cutting down carbon emissions were already hot topics at the beginning of the 2000s. Nonetheless, the energy discourse in Italy was mainly revolving around the problems of high energy prices and the low competitiveness of the Italian electricity sector well into the 2010s.

A clear example can be found in the legislative decree 112/2008, which defined the main problems to be energy security, the high dependence on the import of fossil fuels from foreign countries and the higher prices of electricity compared to the European average (Gazzetta Ufficiale, n.d.d). Minister Scajola himself stated that the most worrying issues concerning the Italian energy system and the entire economy were the dependence on Russian gas and the high prices of electricity (Pagni, 2009). In this way, the concerns regarding climate change and environmental degradation were pushed down on the side-line.

The global 2007 financial crisis hit particularly hard the Italian economy, that entered a period of recession that prolonged until the first half of the 2010s and that was characterised by high levels of unemployment, a slowdown of the industrial sector and of the whole economy in general. In this period of serious economic crisis, the government introduced the first proper National Energy Plan in 2013. In the SEN 2013, policymakers identified the most urgent issues

to be the high electricity prices, the need for a more secure energy system and the urgency to foster economic growth (Ministero dello Sviluppo Economico, 2013). Minister Passera stated that the main goals of the strategy were the minimisation of the price gap of electricity and natural gas with the European average and the development of the national energy sector, that would translate into lower dependency on foreign fossil energy sources, higher employment and overall economic growth (Cianciullo, 2013).

Nonetheless, environmental sustainability did find a place in the SEN 2013. As a matter of fact, one of the goals presented in the Strategy was the achievement of the environmental goals and the decarbonisation of the energy system defined by the EU climate and energy package, even though it was not presented as the primary goal (Ministero dello Sviluppo Economico, 2013).

It is in the 2017 version of the National Energy Strategy that policymakers gave more relevance to the problem of climate change and environmental degradation, although unsurprisingly still following the main issue of high energy prices (Ministero dello Sviluppo Economico, 2017). In fact, Minister of Economic Development Carlo Calenda declared that the goals of the strategy comprised the improvement of the Italian competitiveness through the decrease of the price gap of energy compared to the European average, the achievement of the environmental goals laid out by the European Union for 2020, and the improvement of the energy system's security (Pagni, 2017b).

Overall, the analysis shows how the Italian government, in the public discourse and in the national strategies, framed the economic issue as the most daunting problem that was affecting the Italian context, thus pushing aside the issue of climate change and hindering a low-carbon transition. This can be noticed especially in moments of economic instability and high unemployment, such as the period between 2007 and 2013. It seems instead that, after the Italian economy came out of the period of economic crisis, environmental concerns and the reduction of GHG emissions found the spotlight in the government's discourse, thus raising awareness of the need for a transition to a more sustainable system.

### *Prognostic Framing*

Prognostic framing deals with the proposition and definition of the preferred solutions to the main issues previously defined (Geels, 2014). Analysing the policies proposed by the Italian government between 2008 and 2017, it is obvious how these solutions have changed according to the interests of the incumbent actors in the electricity system.

Starting with the 2008 energy strategy, that proposed as solutions to the economic concerns the creation of nuclear power plants and the exploitation of national reserves of fossil fuels, alongside a shy promotion of initiatives to increase energy efficiency and use of renewable sources of energy (Gazzetta Ufficiale, n.d.d). Indeed, Minister Scajola depicted nuclear power as the most efficient solution that could substitute fossil fuels for 25% of the total electricity production, leading to a reduction in prices and stronger energy security for the country (Rizzo, 2008). These solutions seemed to be extremely aligned with the core businesses of the two major electricity providers in Italy at the time. On the one hand, Enel entered the nuclear power sector in 2005 with the investment in foreign projects, while on the other hand, Eni was at the time the biggest oil and gas company at a European level.

With the introduction of the SEN 2013, the main solutions pointed out by the government did not change drastically. The first mentioned solution was the increase of energy efficiency, which was said to be a fundamental step for the attainment of lowering energy prices, reducing the energy dependence on imports from foreign countries, and the abatement of carbon emissions of the sector (Ministero dello Sviluppo Economico, 2013).

A second solution presented by Minister Passera consisted in the expansion of the Italian natural gas industry through the development of infrastructure and pipelines with other European countries, the Balkans and northern African countries, making of Italy the essential Hub of natural gas that connects Mediterranean countries with continental Europe (Iezzi, 2012). According to the government, this would have not only helped for the minimising of the gas price gap but also boosted the economy through the employment of Italian workforce in the natural gas industry and the related electricity production sector (Ministero dello Sviluppo Economico, 2013).

It is fair to say that, in the SEN 2013, policymakers did depict innovative sources of electricity as a possible solution. Nonetheless, they focussed the attention towards those sources that were considered more efficient, bringing the most benefits both to the economy and the environment, namely the electricity production from geothermal plants and thermoelectric plants that employ urban waste (Ministero dello Sviluppo Economico, 2013).

In the revised strategy, the SEN 2017, policymakers gave more importance to climate change and environmental concerns and thus to solutions aiming at fostering the sustainable development of the Italian electricity system. The strategy portrayed the exploitation of renewable sources of energy as one of the main solutions to the problems identified, favouring the revamping of existing power plants, promoting their development, diffusion and better integration with the national electricity grid (Ministero dello Sviluppo Economico, 2017). The increasing reliance on electricity produced by RES is portrayed as having beneficial effects not only on electricity prices and on the environment, but also on the security of the Italian energy system, that by increasing the production of electricity from RES will expand its energy mix and reduce the dependency on foreign fossil sources (Ministero dello Sviluppo Economico, 2017).

Further, Minister Calenda stated that a solution to decreasing greenhouse gas emissions is the acceleration of the phase-out of coal for electricity production by 2025, that was before set to 2030 (Pagni, 2017a). Moreover, the SEN 2017 considered energy efficiency a relevant solution to both social and environmental issues since better efficiency translates into decreasing final electricity consumption, costs and related carbon emissions (Ministero dello Sviluppo Economico, 2017). Nonetheless, Minister Calenda stressed on the crucial role that natural gas had in the SEN 2017 as solution to the problem of energy security, substituting coal and oil for electricity production, and supposedly leading to a decrease in prices (Pagni, 2017b).

The framing of solutions is extremely connected to the problems that are identified in that same period. Initially, with the legislative decree 112/2008, the preferred solution to the economic issues was nuclear power, which would have favoured Enel's business. In the SEN 2013, the preferred solution was the further exploitation of fossil fuels, which would have favoured both

Eni and Enel. Overall, these propositions show how the government was actively resisting the radical sustainability transition of the electricity system.

Things seem to change in 2017 when renewable sources of energy found a relevant spot in the National Energy Strategy. Nonetheless, these were put side by side to natural gas, which was proposed as a cleaner, less polluting solution to heavier fossil fuels. Thus, the government appeared to be fostering an incremental transition to a low-carbon system dominated by natural gas and RES.

### *Motivational framing*

The motivational framing concerns the process of setting the rationale that lay behind the decisions taken by regime actors (Geels, 2014). This means that actors use current situations, dynamics and events happening in the general context in order to create a somewhat reasonable motivation that legitimises their actions or to discredit options that are threatening their interests. The motivational framing changes with the changing public concern, depending on the issue that is perceived as the most harmful to society and/or the economy (Geels, 2014).

As an example, after the 2007 financial crisis, the main concerns of the Italian population revolved around employment levels, economic growth and the prices of energy, while climate change and environmental degradation were overlooked at (Eurobarometer, 2008). It is in this period that Prime Minister Berlusconi used the economic struggles to discredit social and environmental issues. Indeed, he blamed the 1987 referendum against nuclear power to have hindered the security of the Italian energy system that could have been more prepared for the 2007 crisis and defined antinuclear political parties of the time as environmental “fanatics” (Fo, 2009).

Still, in 2013 Italians worried about the slow economic growth and the high unemployment levels in the country (European Commission, 2014), concerns that policymakers exploited to legitimise their decision to invest in the fossil fuel industry through the development the pipeline system connecting foreign countries and the exploitation of national fossil fuel reserves. These were depicted as trustful and efficient methods to create employment opportunities for the workforce and boosting the Italian economic growth as a whole (Ministero dello Sviluppo Economico, 2013). Moreover, Minister Passera used the economic problems to discredit electricity production from renewable sources, that were portrayed as poorly efficient solutions and an expensive burden that had to be paid for by Italian citizens (Qualenergia, 2012c).

It was after the 2015 United Nations Climate Change Conference of Paris that concerns regarding climate change and the role that greenhouse gas emissions had in the process of environmental degradation started rising among the Italian population and media outlets (European Commission, 2017). In this climate of environmental concerns, Minister Calenda stressed the need to put sustainability at the centre of the energy discussion, using this motivation to legitimise the government’s decision to invest in natural gas and renewable energy sources (Ricciardi, 2017).

Concluding, policymakers seem to ride the wave of the main issues that are concerning the population in order to legitimise the decisions that they take. In moments of economic

instability and high unemployment, Italian policymakers exploited the population's concerns in order to promote and credit their view and solutions, while at the same time discrediting alternative options such as the employment of RES for electricity production. Thus, regime actors were actively trying to avoid a radical transition to a low-carbon electricity system.

In the same way, even when environmental concerns gained momentum, Italian policymakers used the context to support their decision to develop the natural gas industry as well as renewable technologies, thus showing more support to a low-carbon transition but still highly dependent on natural gas.

### 4.2.3 Material Strategies

The third strategy identified by Geels (2014) is the material strategy, that entails regime actors using their technological skills and financial resources to consolidate the technical aspects of socio-technical regimes, usually followed by promises of great success and efficiency.

A clear example are the technical innovations that Enel could acquire thanks to the collaboration with Electricité de France in 2007, that led to the development of a new generation of nuclear reactors EPR (European Pressurized water Reactor) and the consolidation of the Italian company's know-how regarding nuclear power (Enel, 2007). This created in Italy a discourse on nuclear power that the government exploited to support its decision to renew the Italian nuclear experience.

A further example of material strategy used by the alliance government-incumbent firms can be identified in the SEN 2013. It concerns the development of new technologies regarding fossil fuel extraction and refinement, the improvement of thermoelectric fossil fuel plants, and the restoration and enlargement of existing fossil fuel distribution systems. Indeed, policymakers promised by 2020 an investment of 15 billion Euros, the creation of 25,000 job opportunities and a yearly saving on the national electricity bill of 5 billion Euros thanks to reduced imports (Ministero dello Sviluppo Economico, 2013). Moreover, further consolidation of the Italian fossil fuels industry came with the discovery and exploitation of rich natural gas reserves in the Mediterranean Sea by Eni (Eni, 2015).

The most obvious material strategies that support the development and consolidation of the fossil fuel industry are a series of subsidies directed at the consumption and/or production of fossil fuels. First of all, the subsidies granted by the law CIP6/1992 to renewable sources that also included "assimilated" sources, which include the residual sources derived from fossil fuels, making them fossil fuels too (Gazzetta Ufficiale, n.d.j). Thus, this law provided incentives to electricity production from fossil fuel waste which only in 2017 amounted to €445 million (Ministero dell'Ambiente e della Tutela del Territorio e del Mare, 2018). In total, the subsidies to the Italian energy system considered harmful to the environment because favouring the use of fossil fuels amount to €12.3 billion in 2017, as calculated by the Ministry of the Environment, Land and Sea (2018).

On the other hand, it is fair to stress the existence of subsidies that are considered to be benefitting the environment since they mainly support renewable energy technologies, amounting to €12 billion in 2017 (Ministero dell'Ambiente e della Tutela del Territorio e del

Mare, 2018). Nonetheless, 50% of these subsidies belong to those feed-in tariffs that were terminated in 2013 and are expected to be fully eliminated by 2020.

In 2016, Prime Minister Matteo Renzi declared that, thanks to the energy giants Enel and Eni, their capabilities and know-how in the field of renewable energy, Italy could reach and surpass its goals of emissions reduction and energy security (la Repubblica, 2016b). In the same year, Minister Calenda signed the decree 23/06/2016 which granted €400 millions of incentives to renewable energy projects (Gazzetta Ufficiale, n.d.i). The decree set the basic conditions that energy companies that want to make use of the incentives must fulfil, the most important of which is “financial solidity”. This clearly favoured the two energy giants since, at the time, Eni was covering the spot as the Italian company with highest revenues, while Enel Green Power (Enel’s subsidiary involved in the development and management of electricity production from renewable sources) was one of the world’s leading companies in the clean energy sector.

The analysis shows how the two dominant companies Eni and Enel used their technical capabilities to improve and thus consolidate the technical aspects of the electricity system. Indeed, helped by the conspicuous subsidies granted by the government, the dominant firms were able to consolidate the system around a general infrastructure that works with fossil fuels, composed by thermoelectric plants, drilling facilities and pipelines that run through the whole Italian territory. Moreover, in order to diversify their businesses and consequently spread the risk of future failure, these companies entered the renewable energy sector. Eni and Enel represent a threat to any other smaller company since they can rely on large amounts of capital and a privileged position in the electricity market.

#### 4.2.4 Institutional Power

As in the case of the UK analysed by Geels (2014), also Italy has a liberal energy and electricity market economy that was consolidated in 1999 with the legislative decree 79/1999 (Gazzetta Ufficiale, n.d.g). Being a liberal economy, the role of the government is to be the neutral rule setter, while the decisions on electricity prices, which kind of technology is the more used and the winners and losers in the market game are determined by market dynamics and competition. Therefore, according to this definition, the government should be an unbiased actor that takes a neutral stand in the market environment. Nonetheless, this apparent neutrality actually translated in the favouring of the firms that dominate the regime since they are the ones that own more financial resources and have a strong, consolidated position in the market (Geels, 2014). Therefore, in the Italian case, Enel and Eni are the two companies that have the most influence on the energy market. Thus, they can use their power to set energy prices, to decide which technological innovation will survive and to set the transition pathway that the electricity system will most likely go towards.

Since 1998, thanks to the legislative decree 112/1998, regional and municipal authorities in Italy hold decisional power regarding the production, transport and distribution of energy on the area pertaining their jurisdiction (Gazzetta Ufficiale, n.d.f). This fragmentation of the decisional power can sometimes be an issue if regions or municipalities decide to oppose the plans and directives emanated from the government, which holds the power to set the national energy objectives and strategies. Nonetheless, the government can use its institutional power to avoid or surpass such obstacles. An example is the already mentioned issue of the lengthy

authorisation processes regarding national fossil reserves exploitation (which has to be accepted by both municipal and regional authorities) that was pointed out by Minister Passera in 2012. Thanks to its institutional power, with the SEN 2013, the government was able to cut down on the authorisation process and overrule regional and municipal barriers to speed up the implementation of new projects (Ministero dello Sviluppo Economico, 2013). This translated in the opening of new extraction facilities and thermoelectric plants, which favoured both the energy companies running those facilities and the government, since this way the dependence of imported fossil fuels decreased.

Another institutional barrier that hinders the development and diffusion of low-carbon technologies for electricity production is the slowness of the Italian bureaucratic machine. As an example, the European directive 2009/28/CE that promoted the use of energy produced by renewable sources was legitimised in Italy two years later, with the legislative decree 28/2011 (Gazzetta Ufficiale, n.d.h).

Thus, the Italian governance structure and the Italian energy market structure gave power to the government and to the dominant energy firms to influence the transition in order to benefit their interests, while at the same time slowing down the emergence and development of RET.



## 5 Discussion

The Italian energy system has been studied from different perspectives by several researchers. Besides the historical works on past energy transitions (Bartoletto & Rubio, 2016; Gales et al., 2007; Malanima, 2013), in the past two decades, the system has been subject to several studies that examined the sustainability transitions of the Italian energy system. On the one hand, many of these studies focussed on the niche level and thus on the development and diffusion of innovative low-carbon technologies (Bellocchi et al., 2019; Meneguzzo et al., 2016). On the other hand, multiple researchers moved the attention towards the regime level and analysed the role of civil society (Caporale & De Lucia, 2015; Magnani & Osti, 2016), energy policies and the bureaucracy (Buzzacchi, 2010; Campoccia et al., 2014), and the representation of the energy system in public discourse (Sarrica et al., 2018; Sarrica, Brondi & Cottone, 2014).

This current study finds common ground with the already existing works that examine the regime level of the Italian energy system and adds the perspective of the power strategies that were used by the government and incumbent energy firms to influence the system transition but narrows the focus on the electricity system in the decade 2008-2017.

The objective is achieved by relying on the theoretical framework that was introduced by Geels (2014) who, through a case study on the UK electricity system, proposed a set of power strategies that the incumbent regime actors use in order to actively resist the radical transition to a low-carbon electricity system and achieve their goals. The author distinguishes four forms of power that resist transitions, namely instrumental, discursive, material and institutional power.

### 5.1 Discussion of the Findings

First and foremost, it is essential to stress that the Italian state to this day is the biggest shareholder of the two dominant firms of the electricity system, Enel and Eni, hence it is safe to say that, to a certain extent, they share common interests and goals. This study corroborates the findings by Geels, thus stating that the incumbent regime actors of the Italian electricity system in the decade 2008-2017 used their power to actively resist the transition towards a low-carbon system in favour of maintaining the stability of the system dependent on fossil fuels and thus to benefit their common interests.

More specifically, instrumental power has been used by Government Berlusconi when, in 2008, it allowed for the creation of nuclear power plants. Further, instrumental strategies were used by Government Monti when it pushed for the exploitation of national reserves of fossil fuels with the 2013 National Energy Strategy and signed an agreement with Eni for the creation of new extraction facilities in the Basilicata region. In the first case, the government's actions would have benefitted the energy giant Enel, which owned the knowledge and financial resources to implement nuclear projects, while in the second case Eni benefitted the most from the strategy. These findings confirm Geels' (2014) theory that regime actors use their power in the shape of authority and financial resources to achieve their goals and interests.

Further, discursive strategies can be identified in the way the different Italian governments manipulated the public discussion on energy to benefit the interests they had in common with the incumbent energy firms. During both Government Berlusconi and Government Monti, policymakers and governmental representatives used the population's concerns about economic instability and high unemployment to motivate and support their strategic decisions regarding the electricity system, which did not support renewable sources of energy but favour path-dependent solutions that Enel and Eni were experts on. Minister Passera even discredited renewable solutions, portraying them as expensive and inefficient. The findings support the theory proposed by Geels (2014), which stated that regime actors resist systemic change by setting the topic to be discussed in public discourse and by using it to maintain system stability and reach their goals. This study also complies with Sarrica, Brondi and Cottone (2014), who demonstrated how mainly large traditional electricity plants working with fossil fuels were discussed in public discourse and parliamentary reports, instead of smaller alternative options for electricity production.

Moreover, material strategies used by the energy giants consisted in the consolidation of the dependence on fossil fuels of the Italian electricity system through the development of the existing infrastructure and expansion of the extraction facilities in the national territory. These endeavours were supported by conspicuous subsidies issued by the government, which promoted the production and consumption of fossil fuels. These aspects confirm the theory stating that regime actors use their technological skills and financial resources to consolidate the technical aspects of the system (Geels, 2014).

Eventually, the liberal structure of the Italian energy market economy favours incumbent firms since they are the ones with a dominant market position and therefore have the power to influence the whole market and system. Also, the institutional configuration of the Italian governance system, which allows the government powers to decide for the energy strategy without too many external constraints, and the slowness of the bureaucratic machine ended up favouring the existent system relying on fossil fuels, at the expenses of new solutions concerning innovative RET. These findings support Geels's (2014) theory stating that the institutional power rooted in ideologies, market structure and governance structures favour dominant regime actors and allow for resisting transitions. The findings also corroborate with Buzzacchi's (2010) statement that the lengthy bureaucratic processes restrain the development of renewable technologies.

Nonetheless, the study reveals that in the mid-2010s the attitude of regime actors, and especially of the government, seemed to change. This could be caused by the dynamics in the external context, such as the always increasingly worrying consequences of climate change and the compliance of Italy to international environmental treaties. A further cause is the fact that, after the economic crisis, the prices of RET decreased considerably and thus became more interesting as solutions to expand the energy mix and rely less on imported sources.

Indeed, policymakers gave more importance to the issue of climate change with the renewed version of the National Energy Strategy issued in 2017. Not only did the SEN 2017 display climate change and environmental degradation as the most concerning problem to address, but it also set the important goals of phasing out coal, reducing emissions and considerably increasing the share of total electricity production from RES to 55% by 2030. Hence, the

government portrayed renewable sources of energy as fundamental solutions to the issues affecting the system, whereas before, in the economically unstable period between 2007 and 2013, fossil fuels were favoured at the expenses of RES.

As a consequence, the two incumbent energy firms widened their business to the renewable energy sector, both because of compliance to Italian and European legislations demanding for more integration of RES and because of the economic opportunities that the sector had to offer. As a matter of fact, nowadays Enel's subsidiary that is involved in the development and management of electricity production from RES, Enel Green Power, is one of the world's leading companies in the clean energy sector.

Nevertheless, the SEN 2017 still gave great importance to natural gas for electricity production and the energy giants remain big players in the fossil fuel market. Hence, it can be said that regime actors seem to support an incremental transition to a low-carbon electricity system, due to the fact that radical changes would destabilise the system and jeopardise the incumbent firms' position of dominance.

In conclusion, the study reveals that in the decade 2008-2017, the regime actors of the Italian electricity system, more specifically the Italian government and the incumbent firms, used their power in order to actively resist the radical transition towards a low-carbon electricity system. In particular, in moments of economic instability and high unemployment caused by the 2007 financial crisis, the government used its power to support the development of options that could bring quick solutions to the short term economic problems. These solutions included the further exploitation of fossil fuels while hindering the development of renewable solutions.

However, regime actors seemed prone to the introduction of low-carbon solutions towards the mid-2010s and thus fostered incremental changes inside the electricity system. This is because Italy has complied to international agreements that request the nation to meet environmental targets of increased adoption of renewable sources of energy and reduced GHG emissions.

The Italian government declared with the National Energy Strategy 2017 important goals of decarbonisation and development of a more sustainable electricity, and overall energy, system to fight the increasingly alarming issue that climate change is. Nonetheless, the current world economic scene is experiencing a global slowdown due to the pandemic of the new Coronavirus that hit in early 2020, which has been particularly harsh in Italy. As previously stated, when in past periods of economic crisis, the Italian government used the economic issues to support fossil solutions that would bring results in a short period of time, such as higher employment and economic growth. If the fight to reduce emissions in order to tackle the issue of climate change wants to be achieved, it is fundamental that Italian policymakers (as well as policymakers all over the world) don't change direction or intensity of the sustainability transition of the energy systems only to resolve short term issues related to economic growth.

## 5.2 Policy Implications and Future Research Suggestions

This study shows that the regime actors of the Italian electricity system have used their power to resist radical system transitions, although changes have taken place and renewable energy sources have gained relevance in the past decade. In order to reach the ambitious goals of emissions reduction set by the National Energy Strategy 2017, the EU Roadmap 2050 and the Paris Agreement, the government needs to cover an authoritative role and make decisions to actively foster a faster sustainability transition, not only of the electricity and energy systems but of all highly polluting systems such as the transport and the agro-food systems.

For instance, a fundamental step that needs to be made is the elimination of the conspicuous subsidies that to date are granted for the production and consumption of fossil fuels and devolve them to renewable sources of energy. Doing so, fossil fuels would be disincentivised while more could be invested in research, development and diffusion of low-carbon technologies. Moreover, incentives should be available not only for energy companies but also for private citizens, so that a larger share of the population could transition from being simple consumers of electricity to becoming electricity prosumers, thus producers and consumers.

Therefore, an interesting topic for further research on energy transitions is understanding how the government can effectively enable sustainability transitions. Could it be through the provision of incentives to develop green technologies? Or could it be through the voluntary destabilisation of the system to create windows of opportunity for innovations to emerge and take over the fossil fuel-dependent system? Or, further, could it be through the deliberate decision to phase out specific fossil fuel sources?

Moreover, due to the limitations of this study on scope, time and data analysed, further research should be conducted. Firstly, more data sources should be taken into consideration, such as other newspaper and media outlets that reported the energy discussion, as well as a bigger amount of parliamentary discussions, to generate a more complete understanding of the different perspectives on the topic. Additionally, more research should be done on a more extended period of time, for the purpose of creating a fuller picture of the power strategies used by the government and the incumbent firms. Eventually, further research should include other actors of the electricity system, such as the civil society and non-governmental organisations involved on the electricity sector, to understand what their role in the system is and how can they actively support a sustainability transition.

## 6 Conclusion

The most pressuring issue that the global system is facing is climate change and it is nowadays common knowledge that anthropogenic greenhouse gas emissions are major contributors to the acceleration of this process. Hence, globally there is the need to reduce emissions thanks to the transition from fossil fuel-based transport, agro and energy systems to low-carbon alternatives. It is fundamental for the electricity system to transition to more sustainable ways of production and consumption since it is the biggest contributor to emissions, producing 30.4% of total greenhouse gas emissions (IEA, 2019b).

These transitions are consequences of the dynamic interactions between three analytical levels and their actors: the niches, where the roots for change are planted; the regime, representing the dominant rules, actors and technologies; and the landscape, that is the external context to the previous levels (Geels, 2002).

In the past, the majority of the studies has focussed on the niche level, examining the emergence and development of change, while the regime level and its actors have been neglected. This study focussed on the Italian electricity system since it is highly dependent on fossil fuels, although the national energy strategy aims at reducing the total emissions and increase the share of electricity produced by more sustainable, renewable sources of energy. Moreover, the period time analysed was narrowed down to the decade 2008-2017, that was marked by the financial crisis and the rise of environmental concerns.

This study aimed at analysing the regime actors of the Italian electricity system (namely the Italian government and the two dominant energy companies Enel and Eni) to understand, in the period examined, what their role in the transition to a low-carbon system was and how they used their power to influence such transition.

The research questions that the study was built around were the following:

- *How did the Italian government and the dominant firms of the Italian electricity system affect the transition towards a low-carbon system in the decade 2008-2017?*
- *How did the government use its power to influence the Italian electricity system in periods of economic instability and high unemployment included in the decade 2008-2017?*

In order to answer these questions, qualitative data in the form of official legislative decrees, national energy strategies published by the Italian government and newspaper articles, was subject to content analysis. The analysis was structured following a framework introduced by Geels (2014) that distinguished four power strategies used by regime actors.

First, the findings show that, in the decade 2008-2017, the Italian government and the dominant firms of the Italian electricity system used their power to actively resist the radical transition towards a low-carbon electricity system. The Italian government influenced the energy discussion to legitimise its decision to maintain the electricity system on the existing path of dependence on fossil fuels. Doing so, the government was further supporting the energy firms

that were dominating the electricity system, thus hindering the emergence of low-carbon solutions to electricity production. Nonetheless, by mid-2010s, regime actors started supporting the introduction of low-carbon solutions to electricity production. This is because Italy has complied to international agreements that require the nation to meet environmental targets of increased adoption of renewable sources of energy and reduced GHG emissions.

Second, in periods of economic instability and high unemployment caused by the 2007 financial crisis, the Italian government used its power to support the development of options that could bring quick solutions to the short term economic problems, which included the further exploitation of fossil fuels, hindering the development of renewable solutions. This approach seems to have disappeared once the negative short term economic consequences of the 2007 financial crisis started to dissipate.

The trend that has been noticed of regime actors, and especially the Italian government, investing and depicting renewable sources of energy as efficient solutions to produce electricity is important since it shows that a transition towards a low-carbon system is taking place, despite it being slow and incremental. Nonetheless, if the ambitious goals of reduced emissions want to be achieved, the sustainability transition must develop at a much faster rate and across all systems that contribute to anthropogenic emissions. Thus, the government needs to take a stand and actively foster the transition of all the highly polluting systems to low-carbon alternatives.

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