LUISS BUSINESS CASES

Elettricità Futura: the challenge for integration, innovation and sustainability in the electric industry

Matteo Caroli
Luiss Guido Carli

Claudia Pongelli
Luiss Guido Carli

Alfredo Valentino
Luiss Guido Carli

TEACHING CASES 2020

ISBN 978-88-6105-529-2

LUISS

Introduction

Elettricità Futura represents more than 700 companies within the Italian electric industry. Overall these companies employ over 40,000 people and hold more than 76,000 MW of installed and conventional electric power and about 1,150,000 km of lines. Over 70% of electricity consumed in Italy is supplied by companies affiliated to Elettricità Futura (hereafter labeled as associates).
Elettricità Futura associates electric producers both from renewable and conventional sources as well as distributors and service providers. Its mission is to support the creation of an efficient electric market and to meet the challenges of the future. Indeed, de-carbonization and energy efficiency require the development of renewable sources, the full use of high efficiency generation plants, the provision of adequate services, the development of the distribution system and the electrification of the final uses of energy. Although this organization is relatively new, it has roots in the history of the development of the Italian electric industry which has been experiencing radical changes in recent years.
It was founded on 27 April 2017 from the merge between Assoelettrica and Assorinnovabili. Until then these two organizations were representing two very distant worlds as Assoelettrica was joining mainly large thermal producers whereas Assorinnovabili was linking a multitude of small producers of various types of renewable energy. Due to its ability to represent the heterogeneous Italian electric industry within a unique organization, Elettricità Futura has rapidly gained a strong institutional importance in Italy. However, the path towards the integration is anything but easy and the challenge for the future is to keep this unity over time as well as fostering the changes occurring in the industry. The case is organized as follows. With the aim to track the main characteristics of the context wherein Elettricità Futura has to operate, the first part describes the transformation that the electric industry in Italy experienced in the last twenty years. In the second part the case of Elettricità Futura is outlined.

FIRST PART

The transformation of electric industry in Italy

1. From the Enel monopoly to market liberalization

Over the last two decades Europe was characterized by a liberalization process in the electric market. State-owned and vertically integrated monopolies progressively turned into liberalized markets based on competition. This liberalization process was conceived to introduce competition into electric generation and end-users' supply with an indiscriminate access to the electric network as well as to increase the efficiency (i.e. achieve lower prices) and make the market more transparent. The original aim was the creation of a unique European electric market, thereby increasing benefits for the final consumers. Started with the European Commission directive on electricity 96/92/CE, this process has been long and difficult due to deep differences among EU members.

In Italy, the abovementioned directive was applied with the legislative decree n. 79 of 1999, widely known as the Bersani decree. As its first article states: "the activities of production, import, export, purchase and sale of electricity are free in compliance with the expected public service obligations. (...) transmission and dispatching activities are reserved to the *Gestore della Rete di Trasmissione Nazionale*. (...) Distribution activities are licensed by the Ministero dell'Industria, Commercio ed Artigianato". By introducing competition in the electric market and unbundling its production, transmission, distribution, and sale activities, the Bersani decree has sanctioned the end of the State-owned monopoly held by Enel until then, with considerable impacts on the evolution of the Italian electric industry. The main changes introduced by the Bersani decree can be briefly summarized as follow.

With respect to power generation, to reduce Enel's leading role the Bersani decree established that no firm can have more than 50% of total installed power. This forced Enel to sell at least 15,000 of its production capacities. Accordingly, Enel transferred part of its production capacity to three new *GenCos* (i.e. Generation Companies) which have been sold later to Italian and foreign investors. The largest of them was Eurogen Spa which was then acquired by a pool of both industrial (Edison, AEM Milano, AEM Torino and Atel) and banking (Unicredit, Interbanca and Royal Bank of Scotland) investors in 2002 and incorporated in Edipower Spa. The second GenCo – named Elettrogen Spa – was sold to a consortium composed by the Spanish electric operator Endesa and ASM Brescia in 2001. Finally, the third GenCO – Interpower Spa – was acquired by another consortium led by Energia Italiana, Electrabel and Acea in 2003.

Further, the Bersani decree stated the licensing of distribution to local utilities, therefore pushing Enel to sell part of its distribution network in big cities. In Italy the distribution is still strongly concentrated in the hands of Enel group through the controlled firm *e-distribuzione* which holds 80% of the market share.

According to the law n. 290/03, the management and full control of the transmission network and dispatching were given to Terna Spa: 72,900 Kilometres of high voltage and very high voltage electric lines (the first European operator per kilometre of line). Terna currently operates in a natural monopoly and its mission as public service is to secure the transmission and dispatching of electricity throughout Italy.

2. The evolution of the key players in the industry

The liberalization process was a real big bang for the Italian electric market as well as for the previously State-owned monopoly, Enel, with strong changes in its mission and corporate restructuring. The unbundling of its value chain combined with the privatization and the decision to be listed pushed Enel to completely redefine its strategic trajectories. Immediately after the liberalization in the early 2000s, Enel decided to start a correlate diversification strategy with the aim to become a *multi-utility* both in Italy and abroad. Enel invested in gas and water industries and this strategy was motivated by two main drivers: to develop market synergies and to exploit its distinctive competences and competitive advantage in similar markets. Moreover, in those years mobile telecommunication (TLC) industry was in its golden age with a really dynamic market and business opportunities for newcomers, thereby motivating Enel to entry with the acquisition of Wind/Infostrada in 2001. In a few years Enel got 24 million of clients in TLC, that is more than in its core market. However, it was only a transition phase which ended with the complete sale of Wind/Infostrada in 2005. Indeed, Enel understood rapidly that the scattering of resources, competences and efforts which diversification had implied was not the best strategy to reach leadership positions in Italy and especially abroad. Accordingly, in the following years Enel's strategy has been highly focused on the core business - electric production and distribution - with the consequent disinvestment of non-core businesses and an increasing attention towards internationalization. Between 2005 and 2007, Enel enhanced its international presence with many acquisitions in Eastern Europe: the turning point was in 2007 with the acquisition of Endesa, the first Spanish electric company. Through such acquisition Enel got a leadership position in Spain, overcoming institutional and protectionist barriers. Also, the acquisition of Endesa opened the door for key markets in South America. Concurrently, Enel was also giving a strong emphasis on renewables sources of energy with the launch and listing of its new venture Enel Green Power (installed capacity around 400 GW). At the end of 2017, it was controlling about 1,200 operative plants all over the world with investments especially in hydropower, photovoltaic, and wind power.

At the same time, the liberalization had influenced the evolution of the entire Italian electric industry, encouraging the entry of international players as well as new players through the restructuring of their original activities (Exhibit 1). In 2012, Edison - the oldest Italian electric firm with 130 years of history on his back- was acquired by EDF, the French global leader. In 2017, Edison produced around 20 TWh of electricity, about the 7% of the Italian total electric production, and the 16% was from renewables (especially hydropower). In the next years, Edison's strategy aims to increase the production from renewables; to promote the production from combined-cycle gas facilities; and to enhance the number of customers. During the same period, GDF-Suez - now known as Engie - penetrated the Italian market as well. Today, Engie holds an installed electric capacity of 3.6 GW and it is increasing production from renewables through Engie Rinnovabili.

Looking at Italian companies, Eni has always had a key role in the electric industry. For a long time, it has been the second electric producer from cogeneration in Italy due to its petrochemical plants.

Nowadays, Enipower - i.e. a subsidiary wholly owned by ENI – holds five thermoelectric plants and one co-generation plant. It is at the fifth place in the Italian ranking for production capacity. By a growing commitment towards the use of gas and by producing low carbon impact hydrocarbons as well as promoting the development of renewable energies, Eni is contributing actively to the energy transition and the accomplishment of the de-carbonisation target in Italy. Eni has created a specific division named *Energy Solutions* with the aim "of improving the access to energy in the countries where it operates and making maximum effort to reduce direct emissions of CO2[1]". More specifically: "We have a clear decarbonization strategy that is based on 4 main drivers: the reduction of direct GHG emissions, in all our activities, a low-cost and low-carbon portfolio, the development of projects in the field of renewables, and investment in R&D, that is a fundamental element for achieving maximum efficiency in the decarbonisation process[2]" states Claudio Descalzi as current CEO of ENI. In this line, the 2018-2021 strategy plan includes an investment of 1.2 billion of Euros aimed at installing 1 GW of renewable energy. Moreover, in 2017 Eni enhanced its presence in the retail and business electric market with *Eni gas e luce* i.e. a new wholly owned subsidiary which integrates the supply of electricity, gas and energy efficiency.

In addition, among the so called *second tier* players, Sorgenia plays a leading role. Although it has went through troubled times, currently it is a notable example of how the financial industry is interested in the energy industry. Sorgenia is now considered as the first Italian non-incumbent firm in the open market of energy and operates in each segment of the energy supply value chain. In 2017 Sorgenia produced 2.2% of the total Italian production of energy, 50% more compared to the previous year. Its business model is characterized by the integration between production and sale of energy with a strong emphasis on *digital identity*. In the last few years, Sorgenia has substantially invested in information technologies with the aim of managing all the relationships with customers through the web channel and being recognized as a *digital energy company*. Moreover, Sorgenia has planned to enhance its production from renewable sources raising the current 110 TWh to more than 180 TWh by 2030.

Then, in the electric market there is also a group of big multi-utilities which operate both at national and regional level. They are named A2A, Hera, Acea and Iren. Especially A2A is the third for dispatching capacity in Italy after Enel and GSE (Gestore dei Servizi Elettrici) and it is characterized by a business model focused on high integration of production (especially from renewables), distribution and trading.

Moreover, there are other companies that have redesigned their business model and production activities completely. They now play a significant role in the renewable energy sector. Two notable examples are Erg and Falck, which have shown extraordinary resilience and innovation capabilities in recent years. More precisely, Erg turned from a major oil company to a prominent renewable producer. This transition started in 2008 with 3.5 billion of disinvestments (of oil activities) and con-

1. Cfr.: https://www.eni.com/it_IT/attivita/new-energy-solutions.page
2. https://www.eni.com/it_IT/attivita/new-energy-solutions.page

sequent new investments of 4.3 billion in the production of renewable energy and gas. Today, it is the first renewable producers in Italy with an installed capacity of more than 1,800 MW and one of the top producers in Europe with 1.7 MW distributed to Germany, UK, Poland, other Eastern Europe countries. Differently, Falck was a key player in the steel sector. However, due to the steel crisis and changes in the market, its core activity gradually moved to the generation of energy from renewable sources. This transformation ended in 2010 with the establishment of Falck Renewables. In 2017, it had 913 MW of installed capacity and more than 2,000 GWh of electricity produced.

3. The growing focus on renewables

The global trends and the key role of the European Union energy targets

For more than two decades, the power industry has been transformed deeply by multiple well-entrenched trends. Such trends include: the change of the fuel mix; advanced technologies in production and use of electricity; lower power prices; higher renewable energy demand, and greater commitment by local government towards climate change. More precisely, the energy transition focuses on two main pillars: energy efficiency and renewable energy. Although addressing climate change remains a key antecedent, it brings a wide set of benefits exceeding the simply carbon emission reduction and including - among the others - a more affordable access to electricity, improving human health, energy security and a major diversification of energy supply. In this direction, the share of electricity generation from renewable sources all over the world grew up to 12.1% in 2017 (it was from 5.2% in 2007)[3]. Renewable power capacity is increasing globally more than capacity deriving from all fossil fuels. In 2016, renewables accounted for about 62% of net additions to global power generating capacity.

By the end of 2016, China was generating more than one-quarter of the global renewable power capacity, about 258 GW (excluding hydropower), underlining its leading role followed by the United States, Brazil, Germany and Canada. The United States generated 145 GW with a total investment in renewable energy around 40.5 billion of dollars (6% less than 2015). Europe invested about the same amount (40.9 billions) with considerable contractions in United Kingdom (-65%) and Germany (-35%). In 2016, European investments in renewables counted about 17% on the total, while six year ago they were around 50%. India is another giant in the renewable production with a capacity around 47 GW. Developing economies – i.e. China, Brazil and India- have the lead over developed economies in terms of dollar investments in renewable energy, accounting for 63% in 2017 up from 54% in 2016 (for more details see Exhibits 2 and 3).

In this scenario, the European Union (EU) has been playing a pivotal role in fostering renewable energy, especially through the introduction of long-term energy targets and related policy measures. The turning point was the Renewable Energy Directive in 2009 which set a binding target of 20% final energy generation from renewables to be reached by 2020. To meet such target the 2020 Cli-

3. Source: "Global trends in renewable energy investment 2018" – UN Environment Programme.

mate and Energy Package was introduced. This package set three key additional targets: 20% cut in greenhouse gas emissions (from 1990 levels); 20% improvement in energy efficiency; 10% of installed electric capacity in the level of electricity interconnection.
Later - in October 2014 - European countries agreed on a new 2030 Climate and Energy Framework with more ambitious targets for the period between 2020 and 2030. The new set of energy and climate targets goes from at least a 27% share of renewable energy consumption to a 40% cut in greenhouse gas emissions compared to 1990 levels, and a 15% improvement in the level of electricity interconnection. The aim of this new strategy is to send a strong signal to the market, thereby increasing the amount of private investment in new pipelines, electricity network and low-carbon technology.
In November 2016, the European Commission presented the *Clean Energy for All Europeans* package that contains a regulatory framework to support the transition towards sustainable energy and the creation of a European market. This document shows three key guidelines: to focus mainly on energy efficiency; to achieve a global leadership position in renewable energy; to provide fair solutions to customers. The Renewable Energy Directive (RED) is part of such package and defines a clear regulatory framework to reduce uncertainty for investors and to encourage a market-based development of renewables. In June 2018, the Council, the Parliament and the EU Commission reached an agreement on the new RED – named RED II – with the aim to update the regulatory framework to 2030. RED II further raises the target of the share of renewable energy consumption from 27% to 32%.
The share of energy consumption from renewables is constantly increasing in Europe due to the abovementioned measures and is currently close to meet the first 20% target within 2020. Renewables represent the 77% of the new power capacity with a considerable saving (around 16 billion of Euro) in fossil fuel import and consequently a reduction in supply security issues.

The Italian context

The attention of Italian firms on renewables has been growing increasingly over the last decade. As early as 2015, more than 17% of final energy consumption was deriving from renewable sources, thereby achieving the EU 2020 national target already (Exhibit 4). In 2016, Italy was in sixth place globally and second in Europe for the installed generation capacity from renewables (excluding hydroelectric power), with a value of about 34 GW. The overall capacity, also including hydroelectric, rises to about 52GW. This growth process was first supported by a large wave of regulatory incentives which provided many either directly or indirectly advantages. However, incentives have been progressively reduced in the last few years. Currently, although still characterized by a vast number of small players, the renewable sector has been getting increasingly concentrated. In 2017, the major twenty operators for installed power from renewables were covering about 54% of the total capacity from renewables in Italy. Nevertheless, the concentration is very different depending on the types of producers: within the wind power subsample, the top 10 companies had 62% of the power; on the contrary, within the photovoltaic subsample, the top 10 reached about 26% of the total.

Among the major European thermoelectric producers, Enel was the first to understand the need and the opportunity for a strategic change towards renewables; a couple of years ago, The Guardian – a famous British newspaper – named it as *the first green energy giant.* Enel's commitment towards renewables was not limited to install renewable production plants; as mentioned before, it also launched a new venture focused on renewables totally. This new venture labeled as Enel Green Power was founded during the market liberalization process, but it remained on stand by for several years until in 2010 it was listed with a clear mission: to become a leading player worldwide in the green energy production. About the company's strategy Francesco Starace - the CEO of Enel Green Power at that time – claimed: "Enel Green Power did not aim to grow in Italy by exploiting the incentives available; it would have been an easy option, but it was not our focus. First, because we wanted to challenge ourselves in countries where there was a high demand for electricity in order to acquire technological and managerial skills quickly; second, we did not want to hinder new venture to come up in the Italian market by creating a sort of monopoly again". Moreover, the Company was born with an international approach as it was in charge for all the renewable energy production plants that the ENEL Group had both in Italy and abroad as well as the entire management team had extensive international experience. From the beginning of its *new life*, Enel Green Power conceived its growth strategy and its investments on a global scale. Over the years, it has increased its geographical and technological range operating on five continents and settling more than 1,200 plants with a mix of generation types including the main renewable sources: solar, wind, hydropower, geothermal and biomass power plants. The company currently produces energy from renewable sources in Europe, Latin America, Mexico and in various Central American countries; it holds 4.2 MW in the United States; it is present also in Canada, South Africa and India. Finally, it has several projects in various African countries as well as in Russia, Australia, Singapore and Indonesia. The increase in production capacity has been constant and even exponential in certain stages: between 2009 and 2014, it has tripled; in 2016 it doubled compared to the previous year; and in 2017 the record of 27 new projects completed in eight different countries was reached, for a total of 600 additional MW. It has been a pioneer in renewables and now it has reached a position of global leadership, with more than 40 GW of managed capacity in 2017. Technological and geographic diversification are the main pillars of the company's strategy. Moreover, it has integrated sustainability in its strategic vision fully with the aim to implement a *Creating Shared Value* approach within local communities.

The declared commitment is to continue growth. In fact, in the 2020 strategic plan of the ENEL Group approximately 56% of growth investments are focused on renewables (over 8 billion euro) with the aim to increase the total capacity of an additional 8 GW. And it was not just a matter of quantity: Enel Green Power has a key position among the green energy suppliers of Google, Facebook, Microsoft, Amazon, Nestlè, Coca Cola, and Danone. These - as some of the biggest electric consumers worldwide - must achieve maximum efficiency in the use of energy and at the same time consider as a priority to improve the environmental impact of their production. Therefore, knowing how to satisfy such kind of customers means for Enel Green Power being among the best in the field

globally. Furthermore, Enel Green Power intends to play a key role also in favoring the radical change that is occurring within the Italian electric industry. It aims at helping Italy to accomplish the 2030 targets. In this direction, Francesco Starace - as CEO of Enel Group – has claimed recently: "We will allocate 5.3 billion Euro in the next three years, 90% of which will be used for the digitization of technological assets (grids and plants), and 10% for corporate processes, systems and culture. This is how we will make the passage to modern renewable energy, that is, not incentivized, to come back and invest in Italy[4]". Accordingly, Enel has launched new investments to support its activities in hydropower, geothermal, wind power and photovoltaic with the aim to increase its installed base in Italy. Its commitment towards Italy has two important impacts: on the one side, Enel can improve operational excellence, innovation and sustainability through its international experience in the renewable energy sector; on the other, it plays a supporting role for Italian small and medium-sized firms.

As mentioned before, other notable example of large company in Italy with an increasing commitment towards renewables is Erg, formerly well known for the oil production. Indeed, Erg strategic path is characterized to a full conversion of production to renewables. In less than ten years, the company has exceeded 1,800 MW of installed wind power capacity (first in Italy), in addition to 527 MW of installed capacity from hydroelectric and 89 MW from photovoltaic. This evolution has been possible by balancing very well the dismission of the oil assets with the investments either for the realization of new projects or for the acquisitions of assets; among these, it was especially important the acquisition of all the hydroelectric plants in Italy owned by E.On when the latter decided to disinvest in Italy. Its business model is characterized by a careful diversification of production from renewables, with a central role of wind power. It also holds a significant presence in gas to ensure stability of its supply to the network. Erg also establishes joint ventures and alliances frequently to exploit opportunities abroad, thereby reducing the overall risk for the company. This approach seems to be very productive. The company has been paying large dividends continuously for eleven years and in 2017 it has reached the objectives of the plan one year in advance.

There have been also other companies who embarked on the generation of renewable energy much before the wave of regulatory incentives. Asja is one of them as its first renewable production plants dates to 1995. In 2016 its total production was 5.3 GW, with activities in Italy, Brazil and China. There are also the large multi-utilities companies, such as A2A which set a target of about 250 MW of capacity from renewables in its plan to 2021. Its strategy is to focus on medium and small photovoltaics in two directions. On the one hand, the massive application for the *domestic* user in urban areas where there are no serious urban restrictions and large numbers of potential customers; in Brescia, for example, five neighborhoods have already been selected with the requisites suitable for the installation of photovoltaic capacity. On the other hand, the implementation of leading projects, such as the creation of 10MW *rooftop* for self-consumption located at the Milan Trade Fair.

4. Cfr.: https://www.enelgreenpower.com/media/news/d/2017/12/renewable-energies-enel-italian-revolution

All in all, the renewable sector in Italy is strongly heterogeneous as composed by one giant, a bunch of medium sized companies and a myriad of small players. Nevertheless, its heterogeneity is not only a matter of size. Indeed, renewable producers in Italy can be distinguished also along their focus on traditions versus innovation. More precisely, although its importance is progressively decreasing, a large part of green energy in Italy is still focused on hydropower. As its entry in Italy dates to 70s, hydropower can be considered as an *ante litteram* typology of renewable source. Indeed, among the other typologies of renewable sources, hydropower is characterized by lower innovation and can be defined as the most traditional source within the innovative ways to produce energy. Conversely, wind power, biomass and photovoltaic require highly sophisticated technologies and complex structures as well as more specialized skills.

For the next few years the emphasis on renewables is subjected to increase in Italy more and more. Investments in thermal plants will be cancelled and displaced progressively by those based on renewable sources. Despite the reduction in regulatory incentives, renewable producers will grow thanks to their higher focus on efficiency. Indeed, the strong growth of investments in renewables and technological innovation has favored a progressive reduction of energy generation costs (LCOE - levelized cost of energy). As an example, the average value of the LCOE in EU countries with respect to the wind power was equal to 44.2 € / MWh, 2.5% lower than the previous year. In Italy this reduction was even almost 11%. Similarly, also photovoltaic exhibits a reduced LCOE in 2017 compared to 2016. Green electricity is not only more efficient than before but also less expensive compared fossil fuels. For instance, in 2017 the LCOE in US was $ 54 per MWh for photovoltaic and $ 51 for onshore wind power, compared to $ 174 for nuclear power and $ 66 for coal.

As a consequence of such general tendency, in Italy the number of operating hours of thermal plants is decreasing drasticall[5] . Between 2012 and 2016, a cut of 15 GW of thermoelectric capacity has occurred already; indeed, the disposal is a convenient option to avoid the increasing costs of operation and maintenance, especially for older plants. Thermal production will remain relevant at least in the medium term in order to assure the required stability and flexibility to the whole electric system. Hopefully, this role will be played mainly by CCGT (combined cycle gas turbine) which is currently the thermal technology with the least environmental impact. Hence, thermal producers will have to change their business model: from major energy generators they have to turn into providers of flexibility and complementarity for renewable producers. In fact, renewables producers are not ready yet to guarantee the energy security alone.

Overall, Italian companies – which have shown an extraordinary resilience also in troubled time – have now to make a step forward in the next future. Competitive advantage and economic margins will depend in the future on the ability to interact with networks effectively and stabilize the market share. This requires sophisticated *energy management* skills and an adequate production structure in terms of size and technological mix (various types of renewables and gas). Indeed, the Italian excellence in renewables will be determined not only by the amount of installed power and brought to consump-

5. Source: Terna

tion, but also by the considerable diversification of the sources employed. Whereas they were previously mainly specialized on one type of renewable source, today companies have to diversify to benefit from potential synergies in the plant location (e.g. wind power and photovoltaic) and to better supply the network. In addition to this, it will be necessary to create and sell high value-added services in a context characterized by an *extended* use of electricity as energy carrier and energy efficiency. Also, the implementation of a regulatory framework will be essential for new investments to ensure certainty about timing and conditions for their implementation. "We are ready to invest heavily in Italy, as long as the rules are clear, and the bureaucracy is efficient; otherwise we will keep on focusing on opportunities abroad", says Antonello Cammisecra, current CEO of Enel Green Power.

4. Italian electric industry key strengths and challenges

Italy has an excellent mix of energy sources with a considerable positive environmental impact. Renewables play a central role in such mix with the predominance of hydroelectric (historically it was generating most of the Italian electricity until the beginning of the '60s). Photovoltaic mainly and wind power also are increasing their centrality as a result of the boom of investments especially between 2010 and 2015 followed by biomass, geothermal and recently bioenergy (for a more detailed description of renewable mix in Italy see Exhibit 5). Recently, Italy has been experiencing a virtuous *fuel switching* with the constantly reduction of production from carbon and the increase from gas and renewables. More precisely, according to the 2018 GSE[6] Report, despite the high presence of renewables, gas is the first most used source to produce electricity i.e. 42% of the Italian energy mix, followed by 37% by renewables and 14% by carbon.

Another strength of the Italian energy system is the distribution network. Enel has played a central role in the digitalization and the renewal of the Italian distribution system with a continuous involvement in the technological innovation. Since 2005, the Italian distribution network has been completely renewed in line with the highest international standards. Between 2004 and 2009, more than 6 billion of Euros have been invested in power grid reinforcements (high, medium and low voltage). However, Enel is still investing considerably in: realizing integrated solutions to improve protections, power controls, resilience and hosting capacity; self-healing real-time systems, and open meters (i.e. the third generation of smart meters). The quality of the Italian distribution network is evident by the number of non-planned interruptions that is lower than in the other main European countries. In terms of waste of minutes per year Italy achieves stable and better results respect to the other European countries except for Germany (see Exhibit 6). In terms of tariffs for energy distribution, Italy is the cheapest country in Europe (see Exhibit 7).

Finally, the overall energy efficiency makes Italy stand out. According to the 2018 International Energy Efficiency Scoreboard, Italy is the first (together with Germany) for energy efficiency within the 25 most energy intensive countries in the world. Energy intensity in Italy is 20% lower than the average in other UE countries (see Exhibit 8). Specifically, Italy exhibits good results in manufacturing and

6. Cfr. https://www.gse.it/servizi-per-te/fuel-mix-determinazione-del-mix-energetico-per-gli-anni-2016-2017

transport sectors, while the relative worst performance is related to constructions. Italy is among the leading countries in EU with respect to some energy efficiency indicators such as, for example, energy consumption in relation to GDP, cost per kilometer per passenger for transports. After all energy efficiency is part of the DNA of the Italian firms which are used to save, re-use and recycle. However, new opportunities to improve energy efficiency comes from multiutilities companies that - playing as *system integrators* - can lead the energy transition in urban and rural areas. The challenge includes to install small and medium-sized photovoltaic plants in buildings, revamping the old thermal power stations, promoting cogeneration and developing district heating and cooling systems.

Notwithstanding such relevant strengths, the great transformations occurring internationally engender some big challenges for the electric industry as a whole.

The electric industry plays a crucial role in reaching the ambitious climate policy targets fixed by the international institutions. Given the urgency and the magnitude of the climate change challenge, countries have started a phase out of electric production from carbon sources. In an ideal scenario, global energy-related carbon dioxide emissions should be reduced by 70% within 2050 and phase out completely by 2060. These targets are really challenging especially due to the intensive use of electricity from thermal in such sectors. However, countries are managing this transition gradually, thereby investing strongly in renewables and reducing in parallel the production of electricity from fossil fuel. The *de-carbonization process* requires large investments and sophisticated skills to convert thermal plants into green energy production sites. Older thermal plants will be either dismissed (if its conversion is too costly in terms of operation and maintenance) or devoted to complement and guarantee flexibility to a wider system based on renewables. Therefore, thermal plants are losing their primary role and are now considered as a sort of back-up for the system where necessary.

Business models need a change also considering the increasing role of *digitalization* as an enabling technology to reach decentralization and efficiency. More precisely, digitalization works along three main trajectories: first, the transformation of production and distribution architecture through decentralization and small plants; second, the potential involvement of the final buyer in the energy value chain; third, the growing efficiency in managing energy plants in order to improve the control and to facilitate maintenance as well as security. Some examples include the digital integrated platforms used for managing energy plants or having a real time monitoring on their performances; the use of drones for security and maintenance; the employment of smart energy grids).

Digitalization influences the final market of electricity too. Now, final buyers are able to interact with the distribution network or with producers directly to optimize the purchase of electricity or even to exchange it. The new digital technologies applied to the energy network (together with the widespread energy production systems described below) underpin the so-called *demand response system*: the end users are involved directly in the energy network stabilization both by reducing the energy demand spikes through price stimuli and by providing balancing energy.

Despite these technological innovations, renewables alone are not able to guarantee the energy security. Some studies show that the growing production of electricity from renewables will be able to meet energy requirements, but not its *adequacy* (defined as the capacity of the energy system to satisfy the energy needs in the medium and long term, meeting the requirements of quality, oper-

ability and capacity reserve margins) and *security* (defined as the capacity of the energy system to address short-term functioning changes).
Last but not least. the growing expansion of renewables has favored the diffusion of a new productive framework based on plants characterized by a smaller size and closer to the end users. This framework takes the name of *widespread energy production systems* and requires a considerable renewal effort in the distribution network. This process challenges the current network and its management approach. In this direction, countries are investing in smart energy grids, in new efficient storage systems, in equipment capable of performing voltage regulation functions, and in advanced systems of communication, monitoring, and management.
The abovementioned challenges are forcing companies to revise their business models rapidly. In particular, the value proposition has to provide the clients, firms as well as private consumers, with the opportunity to access to smart use of electricity. This means for example services and technology to maximize the efficiency, reduce costs, re-sell surplus, to contribute to the reduction of pollution. Companies have also to get advantage of digital technologies to increase production efficiency and improve the interaction with the clients, involving them in the value chain.
Two strategic options will also be more and more relevant to the companies to grow:

1. *Electric- related diversification* into businesses characterized by lower investments and lower legal restrictions, thereby implying a lower degree of risk as well as better environmental impact. Indeed, electric producers have the opportunity to use the energy generated also in other businesses such as urban mobility, public transport and air conditioning. As an example, recently A2A has created a network of almost 400 charging digital stations in Milan which combine recharge service to car rental as well as other related commercial offers. Something very similar has been realized by Edison either. In the same line, a new business unit in Enel – labeled as Enel X – is devoted to offer electricity with a high content of innovation and digitalization. This span out from more established businesses like public lighting and charging stations to more futuristic businesses (e.g. video analysis systems for security; collection and analysis of big data; innovative solutions for domestic electric self-production; development of micro-network easy to transport and install).
2. *Internationalization* into Europe and emerging markets such as some countries in Latin America and Africa. Over the last fifteen years internationalization has been representing a big chance for the electric industry in Italy[7]. In 2008, international investments were about 36% of the total, amounting around 2,000 MW; since then (only excluding a decrease in 2009) they have progressively grown, reaching almost 11,000 MW in 2017, equal to 82% of the total new investments related to 79 projects, for an estimated value of € 9.7 billion. Almost half of these projects were greenfield investments and accounted for over 70% of the value and 60% of the new installed power. Acquisitions have been relatively less frequent (around 20%); the strategic agreements (equity-based) amounted to 25%. Overall international activities do not involve large groups only as around 30% of transactions have been performed by independent producers.

7. Data sources: IREX Annual Report 2018

SECOND PART

The birth of Elettricità Futura, its opportunities and challenges

1. Assoelettrica and Assorinnovabili: two different worlds in search of a common ground

In 1946 the first association of private electric companies in Italy was founded with the name of Unapace. Many years later – in 2002 - this organization was renamed Assoelettrica – the National Association of electrical companies. In parallel, in 1987 an association of producers and service providers for renewable energy was created with the name Assorinnovabili.
Since their foundation Assoelettrica and Assorinnovabili were representing two very distant worlds. On the one hand, in Assoelettrica there were traditional producers (about 70) and most of them large or even very large. These companies had made huge investments in thermal production during the first decade of the century and - as traditional producers - they were used to manage a quite stable market as well as they were focused on established technologies. On the other hand, about 600 of small renewables producers were linked to Assorinnovabili. On average each company was holding a couple of plants with a power of about 5 MW, around 11 million turnover and 20 employees. Although most of the associates were focused on photovoltaic energy, Assorinnovabili was a very heterogeneous organization as linking producers of various types of renewable energy (i.e. hydropower, wind power, biomass). Accordingly, this inherent heterogeneity was adding some extent of complexity and putting under the same umbrella different needs (e.g. it was on long debate the different landscape impact and land use by wind and photovoltaic plants).
Assoelettrica and Assorinnovabili' goals were very different too. For Assoelettrica the key issue was to react both to the decrease in the demand for thermal energy and the explosion of the renewables business. Instead, for Assorinnovabili it was pivotal to preserve the mechanism of incentives, especially from attacks by manufacturers and consumer associations; there was also the obstacle of local bureaucracies as the complexity of the authorization procedures for the installations was a crucial problem.
The existing distance between the two worlds represented by Assoelettrica and Assorinnovabili was a big concern within the electric industry. "The electric industry is split in two like an apple. One party offers its energy on the market and another reaches the consumers due to rules that ensure priority and mandatory dispatching. [...] such a configuration generates conflicts and diseconomies that put the structure of the Italian electric system at risk", said the president of Assoelettrica in 2012.
Thermal producers we used to a leading role in the Italian economy and were considering renewables producers as a bundle of small and *alternative* players. On the opposite, renewables producers were thinking at thermal producers as something old-fashioned that it was time to overcome. Furthermore, most of them had a strong environmentalist belief: traditional producers were threating the planet with high levels of pollution and had to be stopped.
However, a new phase started around 2015 thanks to the first signs of economic recovery and the increasing attention given to renewables also by thermal producers. More precisely, traditional producers were starting to divert thermal production towards the renewables business and at the same time renewables producers were looking for a certain level of rationalization and stabilization. Within this context, Assoelettrica e Assorinnovabili started to get closer.

The need to build a unique system blending the two worlds was insinuating the Italian electric industry and a new feeling was arising. "The productive and institutional context has been changed compared to just a few years ago. A new phase has begun in which it is becoming necessary to design new market mechanisms and it is time to do it together", says Agostino Re Rebaudengo who was Presidency of Assorinnovabili at that time and led the merge with Assoelettrica on its side. For renewable producers, it really did not make sense to consider traditional producers as antagonists anymore; indeed, it was now in their interest that thermoelectric production found the best conditions to fulfill its function as *guarantor* of the supply. Potential blackouts were representing a damage for the entire industry and especially for those committed to convey the idea that the electric industry should have been more and more focused on renewables.
Therefore, the pillars to build a unique association as a merge of Assoelettrica and Assorinnovabili were settled already. Enel played a pivotal role in this context. Indeed, as the leading company in the Italian energy industry, it supported the integration path actively. Notwithstanding, Enel was very trustworthy in this role due to its recent strategic decisions.
In May 2016, Simone Mori - the Director of European Affairs of Enel - was elected president of Assoelettrica with the task to carry out the merger. The new president did not waste his time: "A few weeks after my appointment, I have talked to Re Rebaudengo; together we prepared a memorandum of understanding in which, among other things, we decided to get to the merger within one year", remembers Simone Mori. Less than one year later, on 17th April 2017, Elettricità Futura was born and Simone Mori was appointed as its president.
The merger between the Assoelettrica and Assorinnovabili is very relevant in the Italian context for several reasons. It has legitimized the authority of the new organization in the eyes of the Government, politicians and stakeholders. Elettricità Futura has been perceived immediately as the *control room* to develop shared and consistent proposals which all the operators within the industry were desiring. Moreover, given the possibility to represent the entire electric industry and due to the high technical skills involved, the new organization has the opportunity to be a highly trustworthy interlocutor with Government and Authorities. Therefore, it can guarantee to the Government and the Institutions a united and qualified interlocutor in the common work for the sustainable development of the industry.
The case of Elettricità Futura is quite unique as there are not in Europe - and to our best knowledge even globally - other organizations that aggregate the majority of private actors (all the significant ones) operating in every part of the electric system under a common vision and a shared strategy. The existence of Elettricità Futura guarantees that the electric industry as a whole will mature a common vision of the energy transition and that its various components will operate in a unitary and synergistic way for its implementation. Further, the organization holds all the conditions to be also an eco-system where different actors can work together in the development of technological, managerial and legal knowledge useful for the challenges underway.

2. The process towards the integration: three key challenges to win

The merger between Assoelettrica and Assorinnovabili has been rapid - as it took less than one year - but the process towards the integration is far from easy. Indeed, Simone Mori has a lot of issues to address as the newly appointed President. Among the others, he is struggling with three core concerns: first, ensuring a good fit between the two worlds within the newly established organization; second, guaranteeing an effective support to changes occurring in the industry. These concerns represent the crucial challenges he has to cope with.

The first challenge: how to integrate different associations into Elettricità Futura

Elettricità Futura joins together under the same association a wide number of different types of firms in terms backgrounds, size and interests. How to guarantee a good fit among such heterogeneous associates is a key preliminary issue for Simone Mori. He is worried that differences within the organization would divide the associates and hinder a shared sense of belonging. In his opinion, if not properly addressed, such differences would impede Elettricità Futura to pursue shared goals and provide results in the interest of all the associates. Therefore, he is convinced on the need to manage those differences carefully with the aim to foster communication and cooperation among companies as well as ensuring that each associate feels its interests are well represented within the association.

Accordingly, he is paying a lot of attention on governance issues to guarantee a good balance between the different interests. The newly appointed President has to make decisions on the governance very carefully as they are not easy to change subsequently and the need to define them properly is of outmost importance when a variegate set of interests are on stake. Indeed, governance decisions ultimately concern the distribution of value across organization's various stakeholders. Therefore, it may happen that certain coalitions of stakeholders will exert more power and influence on strategic organizational choices than others. And besides, the presence of heterogeneous associates in Elettricità Futura does not rule out dominant logics to come out. Moreover, future changes may further be complicated by the perception that attempts to integrate new logics into governance strategies pose threats to core elements of organizational culture, values and identity[8].

How to allocate voting rights in Elettricità Futura is a preliminary critical aspect to give urgent attention to. Indeed, the two founding organizations – i.e. Assoelettrica and Assorinnovabili – were used to very different approaches to this question. More precisely, in Assoelettrica voting rights were distributed according to the entity of the fees - in turn resulting into the weight of the company in terms of employees and turnover - while in Assorinnovabili the logic was one head one voting right. As a consequence, associates deriving from Assoelettrica and from Assorinnovabili have now very different expectations on that. Finding a middle course is presenting a lot of difficulties. Indeed, Simone

8. W. Ocasio, & N. Radoynovska, "Strategy and commitments to institutional logics: Organizational heterogeneity in business models and governance", 2016, *Strategic Organization*, vol. 14, pp. 287-309.

Mori has to design a governance system that may give – either directly or indirectly – voice to all the associates and at the same time guaranteeing timely decision-making as well as reducing the room for internal conflicts.
"It is necessary to keep on focusing on shared goals; although we may have different interests on specific topics, we need to be constructive and balance all the different interests", says Lucia Bormida, Vice President of Erg and Vice President of Elettricità Futura[9]. In the effort to find a good fit between existing differences, Simone Mori is aware that the inherent heterogeneity between thermal producers and renewables is not the only area of potential conflicts. Elettricità Futura mirrors the variegate group of players in the Italian electric industry made of (1) thermal producers, (2) renewable producer, (3) infrastructures (i.e. companies which transport third parties' electricity on the transmission and distribution networks); (4) retailers (i.e. companies which buy wholesale electricity to sell to end-users); (5) widespread energy and energy efficiency (i.e. self-producers from renewable sources with installed capacity lower than 5MW and service providers companies). Different types of associates have their own and potentially conflicting preferences. It is also worth noting that the great variety of associates is also a matter of size. Despite a dozen of large companies and some financial players, Elettricità Futura is formed by a myriad of small and medium-sized firms.
Although adding a considerable amount of complexity to the organization, Simone Mori is convinced that differences must be considered as a unique advantage rather than a drawback. The inherent heterogeneity of Elettricità Futura generates opportunities for the creation of unique organization's characteristics. For example, among the tangible benefits resulting from such pluralism, the organization can choose from a menu of available and to some extent complementary skills. Indeed, Elettricità Futura is equipped with a highly diversified electric portfolio. Simone Mori believes that staying together may bring key advantages to all parties involved. On the one hand, it is clear to thermal producers that the development of the industry in the next future is based on investments and technological innovation in renewables and energy efficiency; on the other, it is also clear to renewable producers that thermal production will still have a long-lasting role to guarantee the necessary safety to the electric system. This issue also appears imperative in relation to the accomplishment of the upcoming target of total de-carbonization of electric production in Italy. "To phase out from coal and at the same time guaranteeing the safety of the electric system, at competitive costs and on time, a good balance between renewables and combined cycle gas production is essential. Cooperation between the different types of producers involved should be encouraged", claims Marco Margheri – Director of Institutional Relations and Sustainability in Edison – as Vice President of Elettricità Futura. However, Simone Mori knows it is only one example of the multiple advantages that the integration can bring to associates. Further, he is convinced that it is not possible to motivate the various associates to move in a unique direction until such advantages are not well defined and shared within the organization.

9. Currently the four Vice Presidents are: Lucia Bormida (ERG Group); Valerio Camerano (A2A Spa); Agostino Re Rebaudengo (Asja Ambiente Italia Spa) and Marco Margheri (Edison).

The second challenge: fostering cohesion and common vision

Elettricità Futura has got legitimacy quickly as its aim is to represent the entire electricity system: renewables and thermoelectric; small, large and largest producers; Italian and foreign producers; as well as infrastructure-level players, retailers and even financial actors. The challenge for Elettricità Futura is both to maintain and foster the cohesion and a common vision between such heterogeneous associates over time. Again, Simone Mori knows very well this challenge: "The world of production, distribution and sale of electricity must be unitary and propose shared interventions and remedies. It is in everyone's interests: companies, consumers and the regulatory authorities".
However, differences between renewables and thermoelectric producers are not the only source of potential conflicts. The presence of a huge number of small players and some very big companies in the Italian electric industry represents a relevant additional factor of complexity for Elettricità Futura. Indeed, small players are focused on renewable production almost exclusively due to dimensional constraints; since the wave of incentives has stopped, their earnings are decreasing progressively as well. On the contrary, larger companies are evermore integrating they offer with distribution, energy efficiency and value-added services which are generating higher levels of earnings. Further, differences among associates are visible also with respect to their goals. For instance, although they have in common the commitment towards environmental issues, renewable producers aim at selling energy (MW/h) as much as possible whereas service companies aim at reducing the energy consumption to reach higher efficiency.
Elettricità Futura is faced with such a situation among its associates and has to propose strategic trajectories which include market opportunities also for smaller players. This issue is clearer looking at the sale market of electricity. Size and competitiveness are two main criteria to participate effectively in the electricity auctions. Smaller players are struggling with such criteria and ask for support mechanisms as well as subsidies/incentives to compete with larger companies on equal terms. In this line, Agostino re Rebaudengo has made it clear: "Our new organization has to detect synergies to make the promising service market accessible to small and medium sized renewable-focus firms too". All in all, Simone Mori is aware of the need to guarantee fair and equal market opportunities both to smaller and larger associates. He believes the action can be twofold: by favouring industry-level aggregations and the involvement of financial actors, the consolidation of the industry must be supported on one hand; the development of innovations that promote effective market access even to relatively small operators must be enhanced on the other. With this respect Enrico Falk has suggested: "Storage technology is crucial to boost renewables production; Elettricità Futura should encourage both largest companies and the Government to make investments in this direction". Purchase Power Agreements (PPA) - or other long-term agreements - and *widespread electricity production systems* might represent two other potential solutions which Simone Mori should consider carefully.

The third challenge: fostering changes occurring in the Italian electric industry

The 2030 Energy Strategy and the Clean Energy Package from the European Commission fix ambitious targets to help the EU in achieving a more competitive, secure, and sustainable energy system. EU members are asked to increase strongly their investments in renewable sources as well as the consumption of renewable energy.
To meet these targets, Italy has started a gradual decarbonization process, with the complete phase-out in the 2025. The aim is to cut the greenhouse emission by 39% within 2030, and by 63% within 2050 compared to the levels in 1990. In this direction, the 2017 SEN (i.e. Strategia Energetica Nazionale) established initially that 55% of the total consumption of electricity should come from renewable sources within 2030. Then, after the last European directive, such target has been raised to 65%.
Nevertheless, the accomplishment of this target is not a smooth sailing. To reach the goal, an average of 5 GW of renewable energy must be installed every year from 2018 to 2030 in Italy. Hence, new investments in renewable capacity are needed. However, as said before, in the last years, the production of electricity from renewables is getting slower. According to the 2018 GSE[10] Report, despite the high presence of renewables, gas is the first most used source to produce electricity i.e. 42% of the Italian energy mix, followed by 37% by renewables and 14% by carbon.
However, the evidence to-date suggests that the current production is only 800 MW per year. Italy needs a shock immediately! That's the challenge for Elettricità Futura in favouring and encouraging the complex transition towards renewable energy and meeting the targets established by SEN. In addition, the Italian institutional instability and the lack of financial incentives make such role even harder.
Additional complexity also comes from the bureaucracy related to the use of the land (especially for photovoltaic) and the safeguard of the landscape (especially for wind power). This strongly influences the localization of plants as the timing to get authorization from local authorities may vary greatly and therefore the plant's affordability too.
Simone Mori is convinced that a strong push on energy efficiency is needed and to reach this aim it will not be enough to keep on relying on small renewables producers. It is time to plan as strategy in the long term that could favour wider renewables plants such as offshore wind power, concentrated solar power, revamping of the largest hydroelectric structures. Also, energy self-consumption should be further encouraged. He believes there is an overlooked opportunity stemming from micro urban agglomerations, consortia and industrial clusters. Moreover, other opportunities may come from new technologies and digitalization.
The stakes are high: according to the newest report by Elettricità Futura[11], more than 50 billion Euros will be invested within 2030 with a consequent growth in occupation estimated in over 51 thousand

10. Cfr. https://www.gse.it/servizi-per-te/fuel-mix-determinazione-del-mix-energetico-per-gli-anni-2016-2017.
11. Cfr. *Elemens: una nuova era per le rinnovabili elettriche – i benefici e i costi della roadmap tracciata dalla direttiva REDII al 2030.* Elettricità Futura, luglio 2018

new jobs (both in management and maintenance), and others 77 thousand in the construction of new plants. Moreover, the value added will be around 11 billion, a third of which to the benefit of the State and local authorities through tax revenues. Thereby, this new era of investments is in everyone's best interest: local authorities and government, citizens, enterprises as well as environment. All in all, Simone Mori knows very well that the current situation is problematic and urge to define a clear strategy for Elettricità Futura. Time is running out. He has to come up with some good proposals with the ultimate aim to find shared paths for the next future.

COMPANIES	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
ENEL	34,9	31,7	30,1	27,8	26,2	25,1	25,1	25,1	27,0	25,7
ENI	9,3	9,7	8,6	9,6	9,8	9,3	9,4	8,5	8,2	8,6
EDISON	13,1	13,5	11,8	10,9	10,7	8,3	7,1	5,9	6,0	6,4
GDF SUEZ *	1,8	1,5	1,5	1,6		3,1	3,5	2,9	2,7	3,2
CZECH GAS HOLDING										3,1
A2A			2,5	3,9	3,8	3,5	3,1	3,1	3,0	3,0
IREN							2,2	3,1	2,4	2,9
EDIPOWER	8,3	8,1	7,8	6,8		4,8	3,8	2,2	2,1	2,4
AXPO GROUP				2,2	2,2		2,8			2,4
ERG	1,7	1,6			2,5	2,5	2,8	3,1	2,4	2,1
E.ON	9,1	8,1	6,9	6,5	5,5	5,2	4,3	4,5	3,6	
TIRRENO POWER	4,0	3,9	4,2	3,5	3,6	3,7	3,1	2,7	1,8	
AEM MILANO	1,6	1,6								
OTHER PRODUCERS**	15,9	20,5	25	24,8	28,8	33,4	35,7	39,0	40,9	40,3

*BEFORE 2009 NAMED AS ELECTRAB
**SORGENIA IS INCLUDED IN THIS CATEGORY

EXHIBIT 1: The main players in the Italian electric industry - % of the electric production per each player on the total electric production in Italy
(Source: Elaboration on data provided by ARERA (Autorità di Regolazione per Energia e Ambiente)

	INVESTMENTS	GROWTH
SOLAR	161	18%
WIND	107	-12%
BIOMASS	5	-14%
SMALL HYDRO	3	-36%
BIOFUELS	2	-3%
GEOTHERMAL	2	-34%
MARINE	0.2	-14%

EXHIBIT 2: Global new investments in renewable energy by sector, 2017, and growth on 2016, $BN Investments Growth
(Source: UN Environment, Bloomberg New Energy Finance)

EXHIBIT 3: Global new investments in renewable energy by region, 2004-2016, $BN
(Source: UN Environment, Bloomberg New Energy Finance)

	2020	2030
GREENHOUSE GAS EMISSIONS	-20%	-40%
SHARE OF RENEWABLE ENERGY ON TOTAL ENERGY	20%	≥27%*
ENERGY EFFICIENCY	+20%	≥30%
INTERCONNECTIONS ON TOTAL INSTALLED ELECTRIC CAPACITY	10%	15%
*IN JUNE 2018 RED II FURTHER RAISED THIS TARGET TO 32%		

EXHIBIT 4: EU Energy Targets 2020 and 2030 (compared to 1990)
(Source: Third Report on the State of the Energy Union – European Commission (2017))

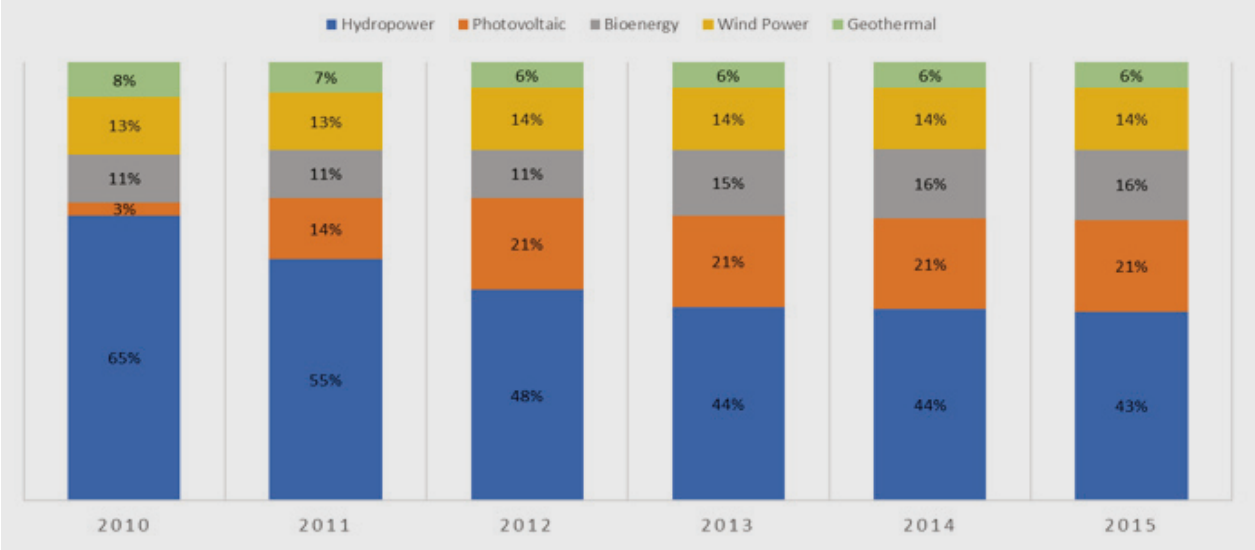

EXHIBIT 5: Mix of renewable energy sources in Italy (2010-2015) – % on the the total renewable production per year
(Source: Analysis on data from Eurostat and SEN 2017)

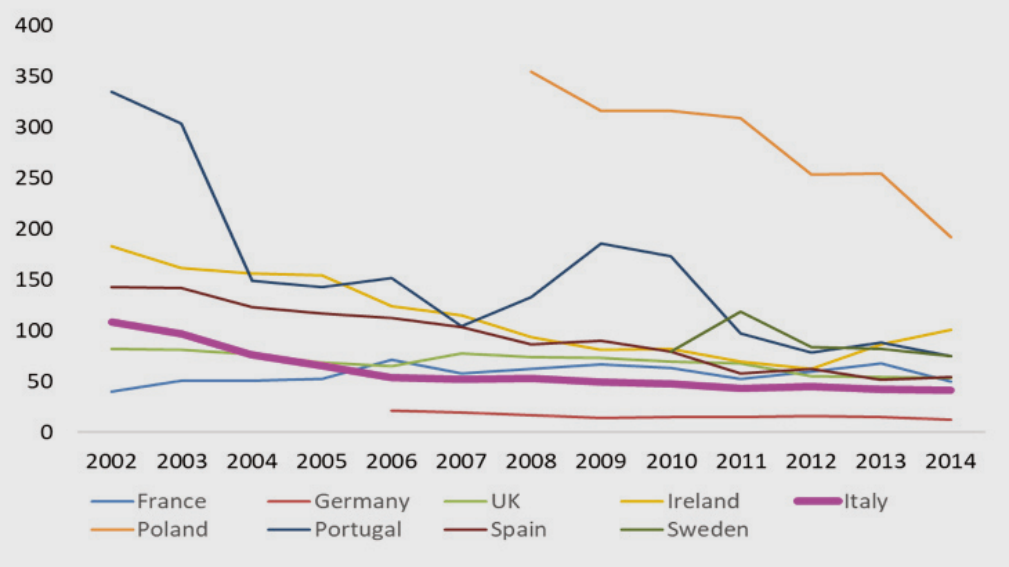

EXHIBIT 6: Non-planned interruptions of the electricity distribution – waste of minutes per year
(Source: CEER 6° benchmarking report on quality of supply)

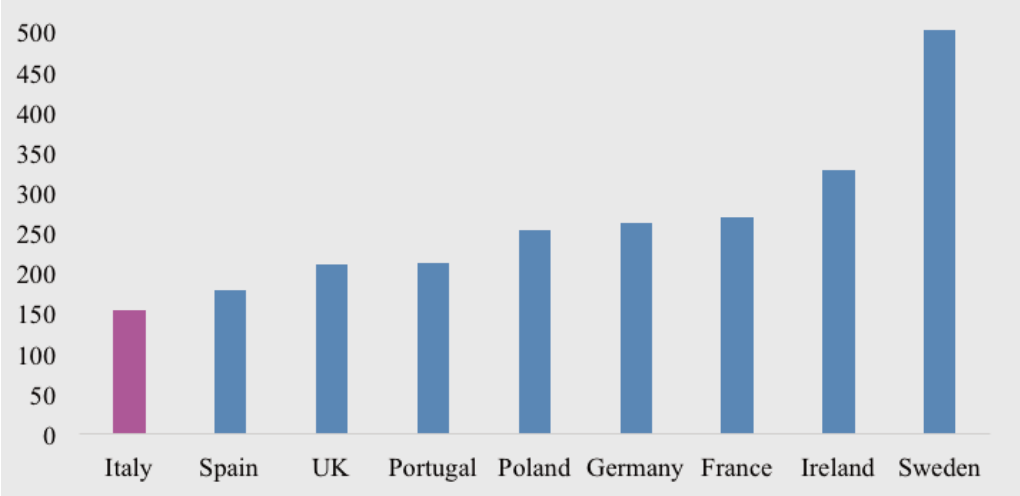

EXHIBIT 7: Distribution Revenues per client (€/client)
(Source: European Commission Study on distribution tariffs design)

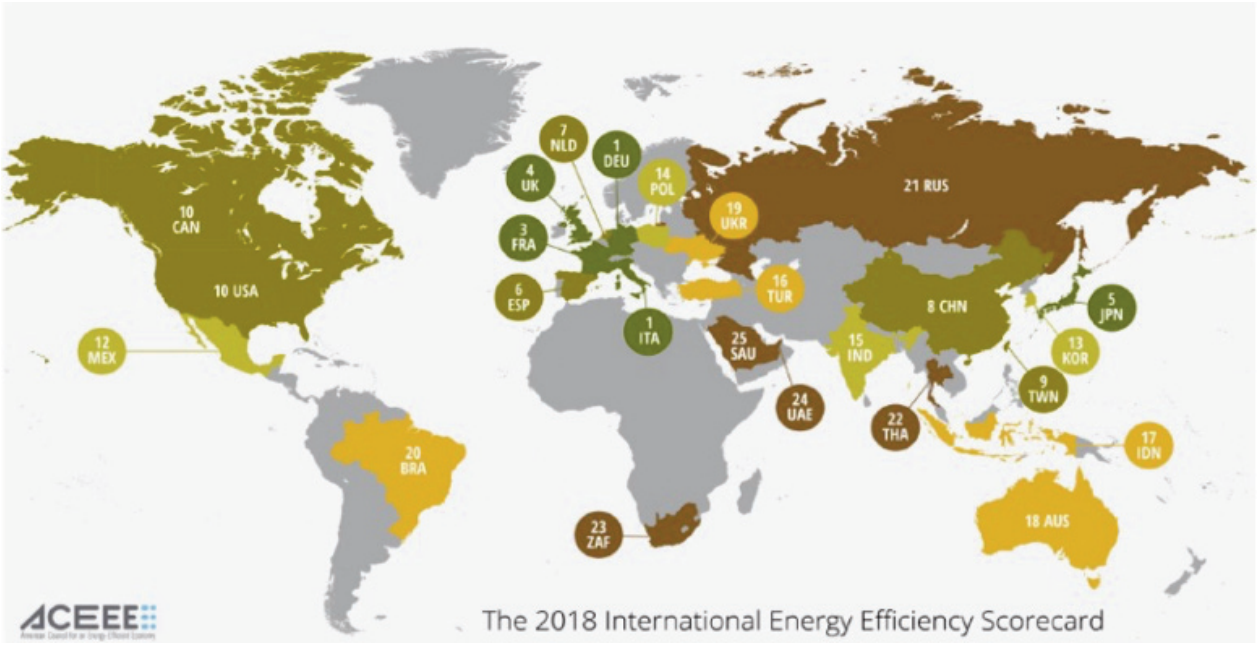

EXHIBIT 8: Energy efficiency
(Source: American Council for an Energy-Efficiency Economy)