






# **Seeding Energies**

Business model  
for a low-carbon growth

enel











# Business model for a low-carbon growth

## ► 2017-2019 Plan: Decarbonizing the energy mix

SDGs	Activities	Categories	2017 results	Targets
	Reduction of CO <sub>2</sub> specific emissions	<b>E</b> Environmental footprint	• 400 gCO <sub>2</sub> /kWh <sub>eq</sub> <sup>1</sup>	• < 350 gCO <sub>2</sub> /kWh <sub>eq</sub> in 2020 (-25% vs 2007)
 	Development of additional renewable capacity	<b>I</b> Industrial growth <b>E</b> Climate change	• +3.1 GW <sup>2</sup>	• ~+8 GW <sup>3</sup> (2017-19)
	Reduction of thermal capacity	<b>I</b> Industrial growth <b>E</b> Climate change	• -0.2 GW	• -10.3 GW (2017-19)
	Implementation of environmental international best practices to selected coal plants	<b>E</b> Environmental management	• ~130 mil euro	• 500 mil euro of investments for environmental retrofit (2017-20)



## ► 2018-2020 Plan: Growth across low-carbon technologies and services

SDGs	Activities	Categories	2020 targets
	Reduction of CO <sub>2</sub> specific emissions	<b>E</b> Environmental footprint	<ul style="list-style-type: none"> <li>&lt; 350 gCO<sub>2</sub>/kWh<sub>eq</sub> (-25% vs 2007)</li> </ul>
 	Development of additional renewable capacity and reduction of thermal capacity	<b>I</b> Industrial growth <b>E</b> Environmental management	<ul style="list-style-type: none"> <li>+7.8 GW renewable capacity<sup>4</sup></li> <li>-7.3 GW thermal capacity</li> </ul>
	Implementation of environmental international best practices to selected coal plants	<b>E</b> Environmental management	<ul style="list-style-type: none"> <li>500 mil euro of investments for environmental retrofit</li> </ul>
 	Electrification, storage and real-time demand response	<b>T</b> Technologies and digitalization <b>I</b> Industrial growth <b>E</b> Environmental management <b>S</b> Social inclusion	<ul style="list-style-type: none"> <li>0.6 GW storage capacity</li> <li>+5.0 GW demand response</li> </ul>
 	Roll out of fiber optic network in Italy	<b>T</b> Technologies and digitalization <b>I</b> Industrial growth <b>E</b> Environmental management <b>S</b> Social inclusion	<ul style="list-style-type: none"> <li>7.5 mil households<sup>5</sup></li> </ul>
 	<ul style="list-style-type: none"> <li>Promotion of activities in line with the UN campaign "Making Cities Resilient"</li> <li>MBA-PhD training about resilience in the countries where the Group operates</li> </ul>	<b>E</b> Environmental management <b>S</b> Social inclusion <b>G</b> Partnerships	<ul style="list-style-type: none"> <li>300 municipalities involved</li> <li>600 people involved</li> </ul>

(1) Includes managed production. The value considering only consolidated production is equal to 411 gCO<sub>2</sub>/kWh<sub>eq</sub>.

(2) Includes managed capacity. The value considering only consolidated capacity is equal to 2.8 GW.

(3) Includes managed capacity and 0.9 GW non-organic growth.

(4) Includes managed capacity.

(5) Only A and B areas.



# Business model for a low-carbon growth

See the Appendix  
Performance indicators

## The global strategy: from COP21 to COP24

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The agreement reached during the 2015 global climate change conference in Paris (**COP21**) marked a fundamental step forward in the fight against climate change. The conference resulted in a plan to control climate-altering emissions over the medium and long term, with the support of a solid regulatory governance, which has traditionally been uncertain due to continual political changes. The main aim of the agree-

ment is to limit the increase in global temperature to below 2 °C and to strive not to exceed 1.5 °C.

In November 2016, **COP22** was held in Marrakech. Participants made progress with the technical discussions on procedures to implement the Paris Agreement for post-2020 and the strength of the political commitment following the Paris Agreement was confirmed. In the short term, implementing instruments will be necessary for the continuity of the operations and to ensure stability for long-term investments. Discussions focused on the transparency of monitoring, reporting and verification procedures, and the criteria for periodic evaluation and potential updating of the objectives set by the parties.

**COP23** took place in Bonn in 2017, resuming the transparency of monitoring, reporting and verification procedures, the criteria for periodic evaluation and

potential updating of the objectives. The Conference also focused on the state-of-play on financial commitments, capacity building initiatives and international technology transfer. On the opening day of the conference, a number of large European energy companies – including Enel – appealed to the European Commission to raise the target for renewable energy consumption in Europe from 27% to 35% of the total by 2030. The European Parliament accepted this proposal in January 2018. The next global climate conference, **COP24**, will take place in Katowice, Poland, in 2018.



## Climate change: risks and opportunities

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The ever-increasing global focus on climate change requires greater awareness of the main risks and opportunities that it presents.

## Operational and regulatory risks

In the current scenario, extreme weather events, natural disasters and the failure of initiatives to mitigate and adapt to climate change expose the Group to operational and regulatory risks, especially in terms of damage to assets and infrastructures that could result in their prolonged unavailability (see the chapter “Getting to know Enel - Main risk types”).

Political uncertainty increases regulatory risk by reopening the debate on the introduction of alternative and potentially less efficient policy instruments (such as the carbon tax and European standards on CO<sub>2</sub> emissions).

To minimize these long-term risks, Enel has accelerated its decarbonization program by developing new business opportunities in the field of renewable en-

ergy, energy efficiency and new digital technologies in the end-use market. Key opportunities include: the digitalization of networks, the growth in renewable sources and the decarbonization of the energy mix, the development of new products and services for energy efficiency for consumers, and the promotion of electricity in the transport (e-mobility) and housing construction sectors.

## TCFD – Task Force on Climate-related Financial Disclosure

In 2015, on the request of the Central Bank Governors and Finance Ministers of the G20 countries, the Financial Stability Board (FSB) launched the Task Force on Climate-related Financial Disclosure (TCFD). Led by Michael Bloomberg, the Task Force aims to develop specific recommendations on voluntary disclosures on the financial impacts of climate risk. The final recommendations were published in June 2017.

Enel signed the letter of support for the implementation of the TCFD guidelines and has set up a multifunctional working group that is adopting the recommendations by working on three main themes:

- > development of long-term climate models;
- > mapping risks and opportunities related to climate change;
- > financial reporting associated with climate change.

In terms of identifying future scenarios, Enel and ICTP (The Abdus Salam International Center for Theoretical Physics) signed a two-year agreement in early 2018 to carry out the research project “Climate Change and Resilience”. The project calls for ICTP to develop a series of simulations of climate scenarios, to allow Enel to carry out analyses on the medium-long term resilience of its assets and its business (2020-2050).

## Enel's reference regulatory framework and positioning

The decision-making and regulatory processes of the European Union (EU) are shaping the current energy transition. This, in turn, has an effect on companies' business models and on the behavior of consumers and citizens, and directly impacts national legislation in the countries where the Group operates. Furthermore, given its transnational nature and current global challenges, the European legislative process is becoming increasingly

complex, requiring ever closer cooperation between the EU institutions and other stakeholders. Accordingly, Enel has decided some years ago to set up a European Affairs Function to monitor the relevant issues and represent the Group at European level in dealings with institutions, organizations, associations and other active counterparties. One specific unit is responsible for consolidating and representing the Group's position on pol-

icies relating to climate change, low-carbon policies, international regulation of the carbon market, the environment, and security of supply. The main areas of interest to the Group and the initiatives it was involved in during 2017 are described below.



### Carbon pricing policies



Although the market is increasingly interconnected in terms of technology and product circulation, the regulatory instruments adopted by individual countries are still too fragmented. The biggest challenge in this area is carbon pricing policies. Today there are many forms of regulation, such as the Emissions Trading Scheme (ETS) used in the EU, New Zealand, California, South Korea and some regions of China, as well as various types of direct taxation or hybrid solutions. Coordinating different policy instruments that also have complementary objectives (including policies on renewable energy and energy efficiency measures) is a crucial factor in identifying cost-effective policies. Establishing an emissions trading system based on a robust regulatory framework ensures certainty over long-term climate goals.

Instruments based on market mechanisms result in prices that are more consistent with macroeconomic cycles and have proven to be more cost-effective in achieving climate

targets in various geographical areas. The debate over the suitability of a "cap and trade" system or a carbon tax needs to be addressed from multiple perspectives, balancing the cost-effectiveness and feasibility of the instruments. Such a debate must also include an assessment of the areas to be covered by the system and limitations due to the current political framework. The EU's ETS<sup>1</sup> system makes it possible to exploit an existing harmonized scheme at European level which guarantees technological neutrality and uniform treatment of market operators.

In light of these considerations, the Enel Group does not support the introduction of national carbon taxes, as it would significantly distort competition within the EU single market while increasing the overall cost of achieving the desired environmental result. Environmental taxation is more suited to countries with a weaker institutional framework and sectors characterized by diverse emissions sources. In this regard, Enel welcomes the out-



come of the EU-ETS negotiations for the period 2021-2030 and sees the ETS as a key element of EU climate policy that should be strengthened by ensuring that other policies complement it and allow climate goals to be achieved, while also safeguarding the EU's competitiveness.

Signs of a long-term stable price for investments in low-carbon technologies and consistency between EU and national policies are crucial in restoring the role of the EU-ETS in driv-

ing emissions reductions.

In particular, in the response to the ETS consultation, Enel asked for structural reform of the scheme based on an ambitious climate target for 2030, flexible supply (Market Stability Reserve) and a dedicated program to support innovation (NER400 Innovation Fund).

In regions outside the EU (such as Latin America), Enel resources are increasingly covered by carbon pricing

schemes, mainly taking the form of taxes that could be transformed into “cap and trade” schemes in the medium-long term.

- 1 The European Union Emissions Trading Scheme (EU-ETS) is the main instrument adopted by the European Union, in implementation of the Kyoto Protocol, to reduce greenhouse gas emissions in energy-intensive sectors, meaning those with the highest emissions. It is a “cap and trade” system because it sets a maximum cap on the total level of emissions allowed for all entities bound by the system but allows participants to buy and sell on the market (“trade”) CO<sub>2</sub> emissions entitlements (“units”) according to their needs, within the established limit.



### Internal CO<sub>2</sub> reference price



The strategic and industrial planning process also assesses the impact of carbon prices on short-, medium- and long-term investments and decisions. However, because low-carbon growth is one of the four ESG strategic pillars, investment choices in new capacities are automatically and directly in line

with the objective of keeping the global temperature rise below 2 °C. As for the short term, the internal CO<sub>2</sub> reference price is set within the range of 6-12 euro/t, in line with the international recommendation and guidelines for the ETS. The short-term prospects reflect regulatory scenarios and market expectations

and allow the impact of the CO<sub>2</sub> price on Enel’s activities to be assessed.



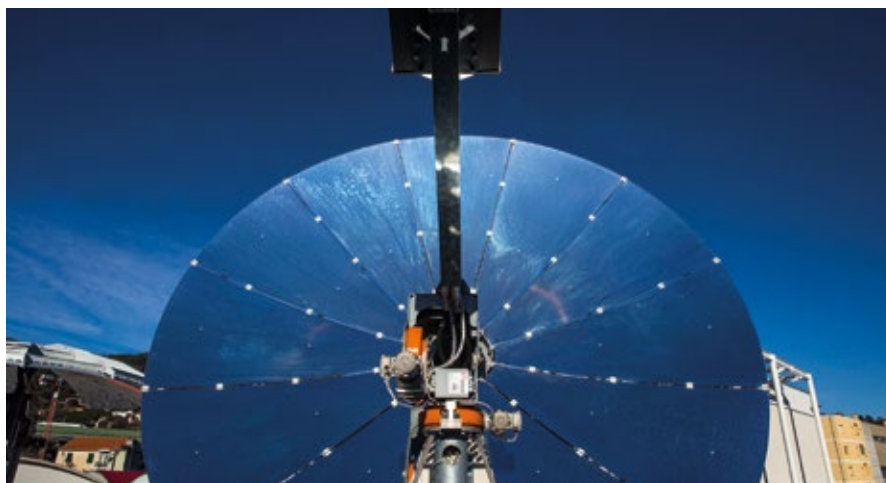
### Clean Energy Package - proposal to make Europe lead the energy transition



The Clean Energy Package is a package of legislative proposals covering the areas of renewable energy sources, energy efficiency, the electricity market, EU governance and mobility. The measures introduced by the European Commission at the end of 2016 aim to make safe, sustainable and competitive energy available to EU consumers at affordable prices. To achieve this, the Commission believes that it is necessary to radically overhaul the European energy system so that it is an integrated system based on competition and optimal use of resources, and which results in a sustainable, low-carbon and climate-friendly economy that is built to last. Energy efficiency, renewable energy, competitiveness and innovation will

play key roles. The proposals contained in the package will be approved following the standard European legislative procedure, which involves a co-decision process between the European Parliament and the Council of the European

Union. It is estimated that the process will be completed in 2018.



## Mobility Package - actions for clean, competitive and connected mobility in Europe

In 2017, the European Commission brought in a series of legislative measures ("Europe on the Move") to promote clean, competitive and connected mobility. This package is one of the European commitments under the Paris Agreement to reduce emissions, especially in the transport sector and particularly on roads. Over the last 25 years, emissions in this sector have steadily in-

creased in relation to the growth in mobility demand and represent a quarter of EU greenhouse gas emissions (road transport alone is responsible for 22%). The package is aimed at combating climate change, improving the quality of life of European citizens and ensuring that European industries create jobs, generate sustainable economic growth and drive innovation in renewable ener-

gy technologies. Unlike the Clean Energy Package, the Mobility Package is only in the early stages of the European legislative procedure.



## Energy efficiency, air quality and environmental policies and the circular economy

Energy efficiency is one of the key ways to decarbonize economic systems. Electrical technology is now widely used in many sectors (residential, services, industrial and transport) and some of it, such as heat pumps and electric vehicles, can make a substantial contribution to energy efficiency and have additional benefits. However, delivery of these benefits is often hampered by strong non-economic barriers, including: information barriers, transaction barriers and lack of awareness. Enel is engaging with institutions in this area in order to facilitate specific actions, integrating them into an incentivizing regulatory framework to encourage the spread of efficient technologies on the retail market. As already demonstrated in several countries, funding initiatives supported effectively by information campaigns could play an increasingly important role, allowing operators to promote energy efficiency technologies.

The European Union's strategy is also oriented towards achieving air quality levels that do not have a significant impact on human health and the environment. Although electricity production is going through an extensive

process of reducing greenhouse gases and pollutants and switching to renewable sources, other sectors and energy uses are lagging behind and show significant room for improvement. The energy used in transport comes almost entirely from fossil fuels. Likewise, the heating and cooling sector could be much more energy efficient and less polluting. Emissions from both sectors could be significantly reduced by increasing their electrification and exploiting the increase in the share of electricity generated from renewable sources in Europe.

Finally, the European Union has made the adoption of models in line with the principles of the circular economy a strategic priority<sup>2</sup>, as it offers an opportunity for growth and development in terms of competitiveness, innovation, environment and employment. Business models that are less tied to the use of raw materials enable the development of a cost structure that is less exposed to price volatility risk, both in terms of market dynamics and regulatory measures. Limiting environmental impact makes an important contribution to reducing both marine and terrestrial waste and air pollution, and also



contributes to curbing global warming as foreseen by the Paris Agreement. The reduction in the quantity of raw materials used and the growth of value-added services could result in a shift in the cost structure from raw materials to labor, i.e. from more automated sectors to sectors mainly involving human work, with consequent growth in employment.

<sup>2</sup> European Union 2015 "Towards a circular economy: A zero waste program for Europe."





# Action platforms and partnerships

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The Group actively participates in industry associations and organizations to promote issues related to the energy transition. Below are some examples (see also the chapter “Getting to know Enel”).

## Alliance of CEO Climate Leaders

The CEO of Enel is a member of the Alliance of CEO Climate Leaders, organized by the World Economic Forum. In 2017, Enel co-signed a declaration that supports effective climate solutions that are promoted by the business, expressing strong support for the recommendations of the TCFD.

## Carbon Pricing Leadership Coalition

Enel is a member of the Carbon Pricing Leadership Coalition (CPLC) launched in 2014 by the World Bank, with the aim of bringing together public and private players to speed up the adoption of effective carbon pricing solutions worldwide.

## “A more ambitious EU-wide renewable energy target for 2030” declaration

The “A more ambitious EU-wide renewable energy target for 2030” declaration was signed by six European companies in the energy sector: EDP, Enel, EnBW, Iberdrola, Ørsted and SSE. In this joint declaration, the signatories set a more challenging goal for renewable energy, rising from a 27% share to 35% by 2030. This goal is to be achieved through greater electrification of the transport and heating sectors, together with a redesigned electricity market for renewable energies, in line with the decarbonization targets set by the Paris Agreement.

## Electrification Alliance

The Electrification Alliance is an initiative of the leading European associations that promote the key role of electricity in the decarbonization process. In 2017, a statement was published reiterating the role of electricity and the commitment to support the reduction of climate-altering emissions, as well as the increase in investments in non-issuing technologies such as renewable energy, energy storage and smart grids, while promoting integration with the heating, cooling and transport sectors. In the early months of 2018, the Alliance focused on defining the EU’s post-2020 budget (the Multi-Annual Financial Framework - MFF) and the Mobility Package. With regard to the MFF, the Alliance has requested that public spending in the EU reflects the strategy of the Paris Agreement and is intended to support the related commitments on climate and energy in all EU countries, including the objective of carbon neutrality for infrastructures and the wider EU target for 2030 on renewable energy, as well as the electrification of consumption for smart and efficient use of energy. As for the Mobility Package, the Alliance calls for recognition of the importance of transport electrification as a key factor for achieving road-travel decarbonization in the EU and highlights the need for a more stringent commitment in that regard.

## Platform for Electro-Mobility

The Platform for Electro-Mobility is a joint initiative of companies, associations and NGOs (non-governmental organizations) committed to promoting electric mobility and to collectively developing solutions for the electrification of European transport. Enel was the first utility to participate in the platform.

## eurelectric new Industry Vision

Under Enel’s leadership, eurelectric has repositioned itself in order to accelerate the energy transition by investing in the production of clean energy and in solutions enabling the change to reduce emissions and to reach the goal of becoming carbon-neutral well before the middle of the century. Thanks to this new vision, the electrical sector reaffirms its commitment to leading the transition towards a future of the energy sector in a fully sustainable EU, creating value for customers and for society. The new Vision received the unanimous support of eurelectric members and a significant number of Managing Directors of the EU electricity companies.



## Enel's commitment to low-carbon growth

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Enel is at the forefront of the energy transition and business sustainability thanks to a strategy whose priorities are the development of renewable energy, digitalization and the fight against climate change. Enel aims to achieve the complete decarbonization of electricity production by 2050, in line with the "science-based targets" and as a way of contributing to the achievement of United Nations SDG 13.

The strategy is based on a long-term vision that translates into concrete objectives that involve all business activities:

### > **decarbonization of the energy mix**

- Enel is committed to developing the renewable potential in all the countries in which it operates, evaluating development opportunities in new countries with the aim of installing 7.8 GW of additional renewable capacity and reducing thermal capacity by 7.3 GW by 2020. This is in addition to the target of reducing CO<sub>2</sub> emissions by 25% (2020 vs 2007);

### > **development of new products and services for consumer energy efficiency**

- New active demand management systems that increase the efficiency of service to consumers by developing innovative services and cutting-edge energy technologies;

### > **promotion of electricity in the transport and housing construction sectors**

- Measures to increase the penetration of electricity (for example, electric mobility and heat pumps) reduce dependence on fossil fuels,

while relying on new digital solutions and the potential of an intelligent infrastructure to increase the efficiency of the system.

Enel is also committed to digitizing resources and processes and increasing connectivity, with a total investment of over 5 billion euro over the next three years. For more information, see the chapters: "Strategy and Sustainability Plan", "Technologies and Innovability" and "Digital-e".

In line with the Group's financial strategy, two green bonds were issued in January 2017 and January 2018 for a total value of 2.5 billion euro, as instruments to fund projects conducive to the transition to "low-carbon economy". Efforts to reduce emissions and their regulation must not have an impact on the workforce and on the various stakeholders in the transition phase ("just transition"). Enel believes that it is essential to engage in dialogue with

## Enel launches its second green bond on the European market

On January 9 2017, Enel Finance International (EFI) successfully placed on the European market its first green bond. The issue totals 1,250 million euro and provides for repayment in one instalment at maturity on September 16, 2024, as well as the payment of a fixed-rate coupon of 1%, payable annually in arrears in the month of September. The issue price has been set at 99.001% and the effective yield to maturity is equal to 1.137%. EFI committed to report information on projects financed through the proceeds of the issue. This commitment is complied with in the green bond report, included as an appendix to this Sustainability Report.

On January 9, 2018 EFI carried out a new issue, successfully placing its second green bond on the European market, once again for institutional investors and backed by a guarantee issued by Enel SpA. The issue amounts to a total of 1,250 million euro, to be repaid in a single instalment at maturity on September 16, 2026 and the payment of a fixed-rate coupon equal to 1.125%, payable annually in arrears in the month of September as from 2018. The issue price has been set at 99.184% and the effective yield at maturity is equal to 1.225%. The green bond was listed on the regulated market of the Irish Stock Exchange and on the regulated market of the Luxembourg Stock Exchange and was admitted to trading on the multilateral trading system "ExtraMOT PRO" organized and managed by Borsa Italiana.

The transaction has received subscriptions amounting to more than 3 billion euro, with the significant participation of Socially Responsible Investors ("SRI"), enabling the Enel Group to continue to diversify its investor base. The net proceeds of the issue – carried out under Enel and EFI "Euro Medium-Term Note Program" – will be used to finance and/or refinance, in whole or in part, the eligible green projects of the Enel Group identified and/or to be identified in accordance with the "Green Bond Principles" published by the International Capital Market Association (ICMA).

The transaction is consistent with:

- > the financial strategy of the Enel Group set out in the 2018-2020 Strategic Plan, which among other things envisages the refinancing of 10 billion euro through 2020, including the issue of green bonds as instruments dedicated to the financing of projects to spur the transition to the low-carbon economy;
- > the commitment made by Enel on December 11, 2017 on the Paris 2017 Climate Finance Day, together with 8 other industrial companies issuing green bonds, to continue to develop the green bond market, today one of the most dynamic segments of sustainable finance.

In this regard, it should be noted that the Enel Group has prepared and published a new Green Bond Framework, which was updated following the presentation of the 2018-2020 Strategic Plan last November, in order to facilitate transparency and the commitments made by the Group with regard to green bonds. In addition, in June 2017 the Enel Group set up a Green Bond Committee to oversee the implementation of the Green Bond Framework and the process of allocating the proceeds of green bond issues.

The new Green Bond Framework and the second party opinion prepared by the independent advisor Vigeo Eiris for this issue are available to the public on the Enel website (<http://www.enel.com/investors/fixed-income/main-programs/green-bond>).

The transaction was led by a syndicate of banks comprising Banca IMI, BNP Paribas, Crédit Agricole CIB, HSBC, ING Bank, J.P. Morgan, Mediobanca, Natixis, SMBC Nikko, Société Générale, UBI Banca and UniCredit Bank as joint-bookrunners.

the local community and to include in the circular economy model also resources that have since been rendered unproductive by technological devel-

opment. The conversion plans for 23 power plants in Italy, through the Future project, is seen as an international benchmark for the ability to gener-

ate new social and work opportunities (<https://corporate.enel.it/en/futur-e>).

## From linear economy to circular economy: the Enel model

In a world with finite resources, a linear model that provides for the extraction of raw materials, the production and consumption of goods and the generation and disposal of waste is proving to be unsustainable. In this context, the application of the principles of the circular economy may once again be a driver of change to be addressed in the Open Power vision.

In Enel's vision, circular economy is based on 5 principles that define how and where it is applied:





Enel has launched several projects that enhance a circular approach, including:

- > **Future-e:** an all-round circular economy project, starting from the closure of 23 thermal plants in order to rethink the use of each plant, transforming it into a new opportunity for the area in which it is located. This important redevelopment is managed through calls for tenders that reward the circularity of the proposals as a way to help relaunch the competitiveness and sustainability of the entire country;
- > **Circular Procurement:** an effective approach to circularity cannot be limited only to the sector covered by the Company, but must also include suppliers in its model. For this reason, Enel's Global Procurement has started a process of tracking what has been purchased in and out of its business to obtain thorough knowledge of the flows in terms of components, environmental impact and recyclability of products (see the chapter "Sustainable supply chain");
- > **Electric mobility:** using electric vehicles reduces energy consumption and eliminates local emissions. When the energy used comes from renewable sources, the impact on the environment is completely eliminated. Enel is committed to developing a true ecosystem that fosters the spread of e-mobility.

To improve the circularity of its business, Enel has developed a measurement model, **CirculAbility Model®**, based on the five pillars of circularity and aimed at providing a summary value of the circularity of products, services and assets. This model is still in testing and will make it possible to measure and compare the circularity of the various businesses in the Company, in turn increasing their effectiveness in terms of circularity and sustainability.

Sharing experiences and good practices makes it possible to enhance everyone's commitment to spreading a circular approach.

The **Alliance for Circular Economy** was created from this vision on November 29, 2017, as promoted by Enel and Intesa Sanpaolo.

The manifesto was also signed by Novamont, Costa Crociere, Salvatore Ferragamo Group, Bulgari, Fater and Eataly, thus reaffirming the vision that adopting circular economy is an opportunity for development and growth in all sectors.

Enel is also a member of the "Support to Circular Economy Financing" group of experts, which brings together members of the European Investment Bank, public and private sector, including NGOs, and whose task is to support the European Commission in the development and financing of circular economy in the different member states. In 2017, the group of experts started working on the preparation of guidelines to facilitate the funding of circular economy in the EU.

Further details on Enel's commitment to circular economy are available at the following link: <https://corporate.enel.it/en/circular-economy-sustainable-future>. The section aims to disseminate the circular principles and to describe some circular application in Enel, as well as to display a few success stories from small and medium-sized Italian companies and large companies. In this study and evaluation process, a scientific committee has been created, also involving environmental groups (Legambiente), Enea and Accenture Strategy. Please refer to pages 194-195 for targets related to circular economy.



# Development of renewable capacity and reduction of thermal capacity

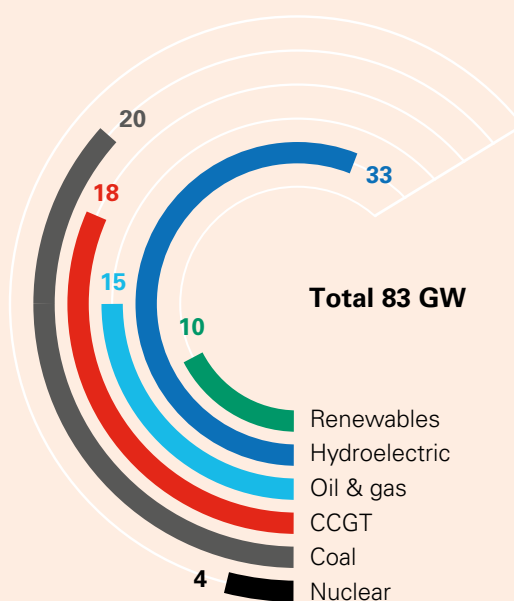
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## Net installed capacity

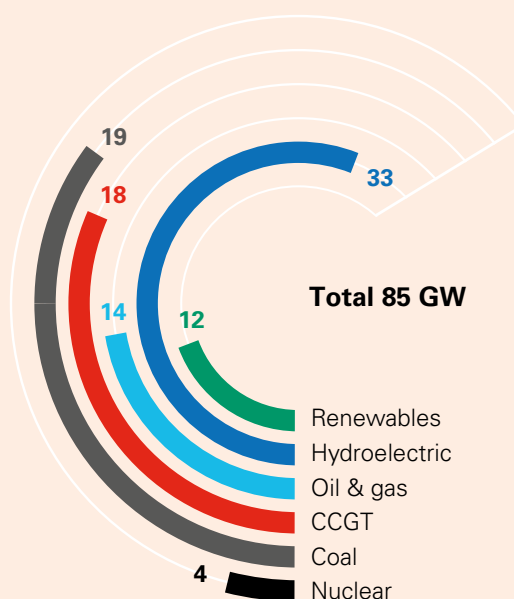
At the end of December 2017, the Group's **net installed capacity** was around 85 GW, up compared to 2016 by around 2 GW, mainly due to the entry into operation of new renewable hydroelectric, wind and solar plants in Brazil, solar plants in Peru and wind farms in the United States. The additional capacity from renewable sources (renewables and hydroelectric) amounts to about 2.8 GW in 2017. Today, the Group has, all over the world, plants powered by renewable sources for around 38 GW of installed capacity, which is about 45% of the Group's total power generation capacity.

Enel has also worked as operator in joint ventures with both the BSO model (Build, Sell and Operate) and through acquisitions of company shares. The managed capacity includes renewable plants in Italy, the United States and Canada. Considering a managed capacity of 2.6 GW, the total capacity is thus equal to around 88 GW (32% hydroelectric, 15% other renewables, 14% oil & gas, 17% CCGT, 18% coal and 4% nuclear).

Net installed capacity by source 2016 (%)



Net installed capacity by source 2017 (%)



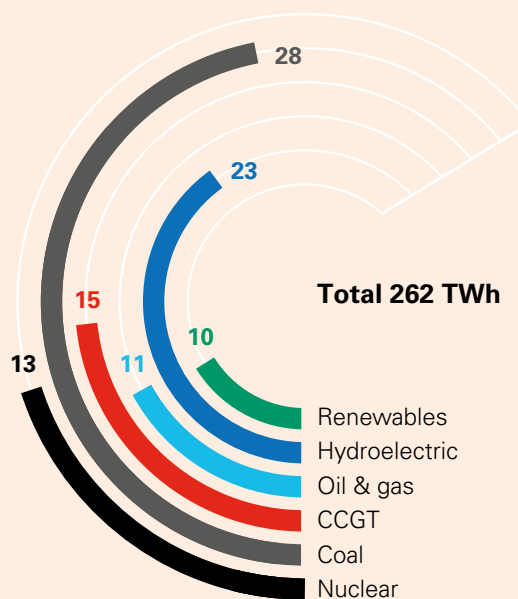
## Electricity production

As for **electricity production**, 43% of the energy produced by the Group in 2017 is zero emissions. Production in 2017, equal to about 250 TWh, decreased by about 12 TWh compared to 2016, mainly due to the removal from the Group's consolidation perimeter of plants in Slovakia (including 2 nuclear, 2 thermal and various hydroelectric plants), one plant in Belgium (CCGT) and some plants in the United States (hydroelectric, wind and geothermal).

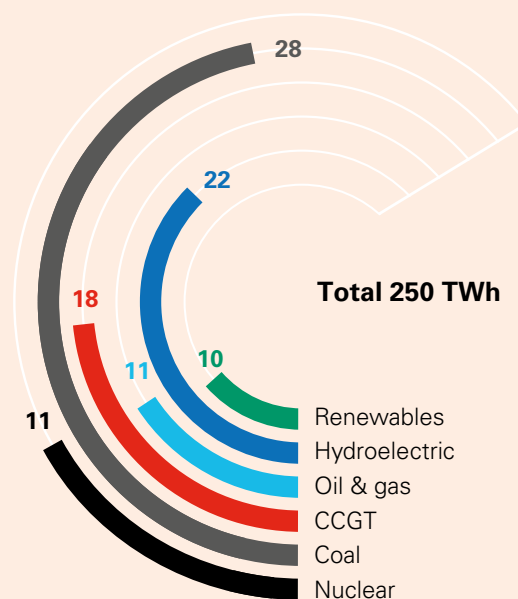
With regard to non-renewable sources, thermal production recorded a slight decrease (-0.7 TWh compared to 2016) due to the removal from consolidation of the thermal plants in Belgium and Slovakia; within this production, there was a change in the production mix compared to 2016, with an increase in the use of combined cycles (+4.1 TWh compared to 2016), which partly offset the lower coal and oil & gas production.

In the renewables sector, there was a decrease in hydroelectric production (-4.7 TWh compared to 2016) mainly due to lower water availability in Europe (Italy and Spain), as well as the aforementioned removal from the consolidation perimeter of the hydroelectric plants in Slovakia and in the United States. Production from other renewable sources, on the other hand, recorded an overall increase of 1.5% over the previous year due to higher wind and solar power production in Brazil and Chile and solar power in South Africa.

Net electricity production by source 2016 (%)



Net electricity production by source 2017 (%)



Natural events have influenced the production mix in different countries in different ways. For example, in Spain, the decrease in hydroelectric production favored greater thermal production, both from coal and combined cycle; in Colombia, on the other hand, heavy rains between January and June favored hydroelectric production.

The production facilities have produced a total of about 82 TWh from renewable sources in 2017, which represents over 32% of the energy produced by Enel during the year, thus avoiding the emission of about 52 million tons of CO<sub>2</sub> into the atmosphere. The nuclear facility has made it possible to avoid releasing an additional 19 million tons of CO<sub>2</sub>.

Considering also the managed production of around 7 TWh, the total value is around 257 TWh (22% hydroelectric, 13% other renewables, 11% oil & gas, 17% CCGT, 27% coal, 10% nuclear).



## Specific CO<sub>2</sub> emissions

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Specific CO<sub>2</sub> emissions amounted to 411 g/kWh<sub>eq</sub> in 2017, an increase of 4% compared to 2016. The increase in value is not linked to higher CO<sub>2</sub> emissions, but to a decrease in the Group's energy production due to changes in the scope of operations during 2016 and 2017, as already described in the

previous paragraphs. Considering the managed production, the value of Enel's specific emission is equal to 400 g/kWh<sub>eq</sub>.

KPI	UM	2017	2016	2017-2016	%
Specific CO <sub>2</sub> emissions from total net production <sup>1</sup>	g/kWh <sub>eq</sub>	411	395	16	4.1%

(1) Specific emissions are calculated considering the total emissions from simple and combined thermal production of electricity and heat, in proportion to the total renewable, nuclear, simple and combined thermal power and heat generation (including the contribution of heat in kWh<sub>eq</sub>).

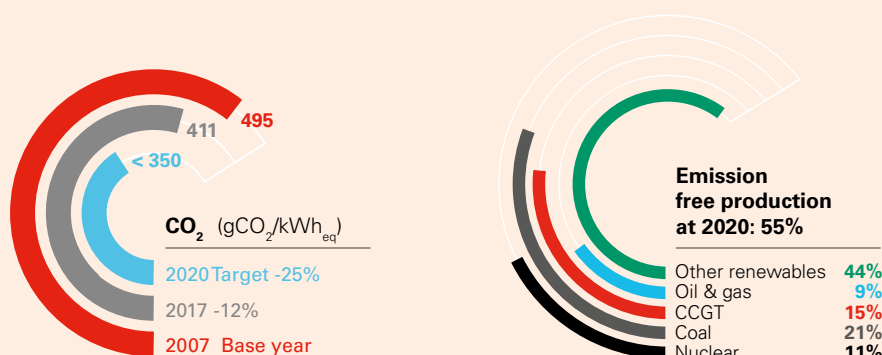


## Specific CO<sub>2</sub> emissions, reduction target and performance (gCO<sub>2</sub>/kWh<sub>eq</sub>)

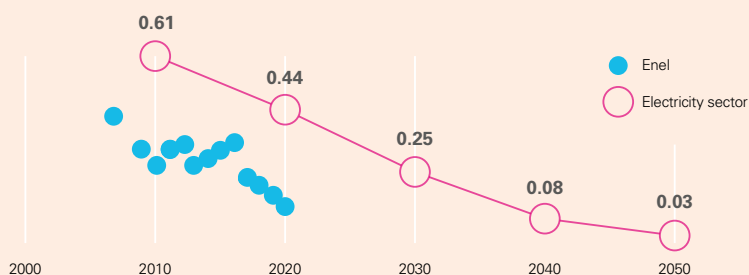
Compared to 2007, which is the base year for Enel's target to reduce specific CO<sub>2</sub> emissions by 2020, specific emissions have decreased by 12%. Considering the managed capacity, specific emissions are down a total of 14%.

The 2020 target for CO<sub>2</sub> emissions lower than 350 g/kWh<sub>eq</sub> has also been recognized as "science-based"<sup>(1)</sup>, meaning that it is on track for the achievement of global decarbonization targets.

The Group strategy for the period 2018-2020 works towards this objective, envisaging additional capacity from renewable sources of 7.8 GW (including managed capacity), which will bring total renewable capacity to 2020 to a value of 48 GW and consequently an increase in zero emission production from the current 45% to 55%.



### Sectoral Decarbonization Approach (SDA)



(1) "Science-based target" is an initiative of the Carbon Disclosure Project (CDP), UN Global Compact (UN-GC), World Resources Institute (WRI) and the WWF to stimulate companies to set greenhouse gas emission reduction targets that are in line with scientific requirements to limit the increase in the average global temperature to 2 °C by the end of the century compared to pre-industrial levels. Companies' emission targets are assessed against a decarbonization trend based on the scenarios of the International Energy Agency (IEA) and the International Panel on Climate Change set up by the UN Framework Agreement on Climate Change. The scenarios set out 14 decarbonization trends to be applied to the main sectors of the economy, including for energy generation.

## CDP Climate

An important recognition of Enel's strategy in the fight against climate change and towards a low-carbon economy has been its inclusion once again in the CDP Climate "A-list" in 2017.

CDP is an international non-profit organization for the promotion and dissemination

of information on environmental issues to investors, companies, cities, states and regions around the world, with the aim of encouraging more informed decisions about climate measures.

The Climate A-list 2017 includes 120 global groups selected from over 2,000 companies participating in the CDP program for the dissemination of information on climate change. Inclusion in the list is based on a score that assess-

es companies' awareness of climate change, methods and progress towards the adoption of measures to combat climate change. Enel is also in CDP Water and obtained important recognition in 2017, with a score of "A-".



## **Seeding Energies. The Power of Being.**

We are the energy to express the full potential of each of us.

We are the environment in which we live and the change to which we are devoted, every day.

For this we undertake to safeguard our planet and promote social development.

With passion and innovation. 365 days a year. In more than 30 countries.

We are the communities in which we work and with which we grow.

Because together we have the power to be sustainable.

