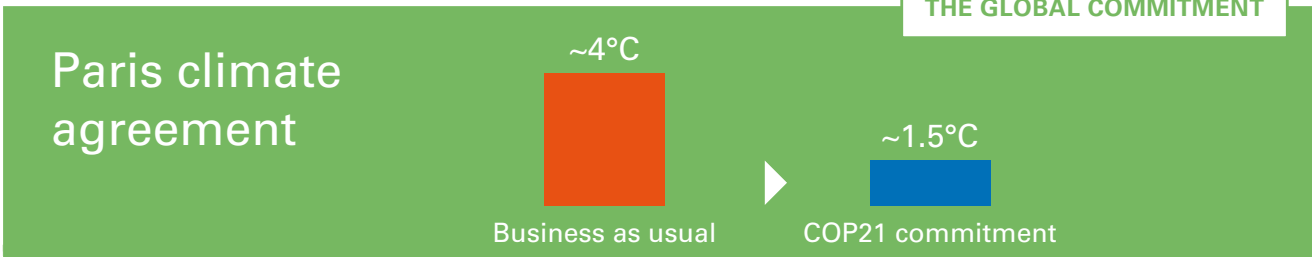


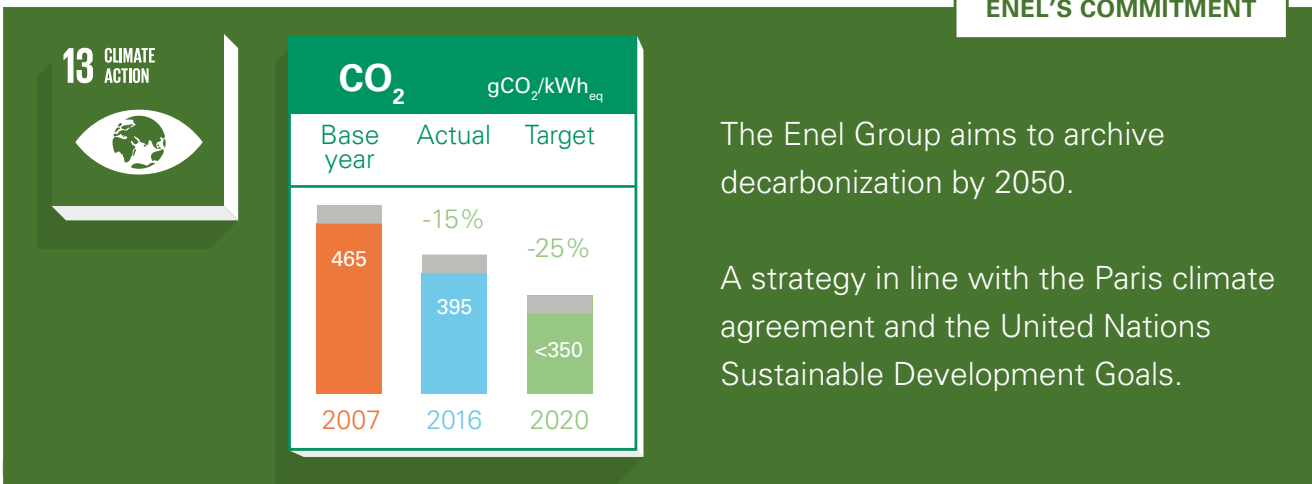
# Decarbonization of the energy mix



## THE GLOBAL COMMITMENT



## ENEL'S COMMITMENT



## ENEL'S CONTRIBUTION TO DECARBONIZATION

### GENERATION

- 25% gCO<sub>2</sub>/kWh by 2020 vs 2007
- Decarbonization by 2050
- New renewable capacity

### DISTRIBUTION

- Digitalization of the network
- Reduction in network losses
- New means of connection
- Recharging points for electric mobility

### VALUE ADDED SALES AND SERVICES

- Electric mobility
- Domotics
- Energy efficiency

Futur-e

Sustainable supply chain

Minigrids

Vehicle-to-Grid

Car Sharing

### Circular economy

In 2015 in Paris, 196 parties agreed to the United Nations Framework Convention on Climate Change (UNFCCC), the agreement which essentially aims **to limit the increase in global temperature to below 2 °C and to take action to not exceed 1.5 °C**.

The Paris Climate agreement represents a great opportunity to contribute to the transition towards a sustainable global economic model which is more respectful of the environment and can create growth in synergy with the local areas, as part of communities and diversity.

The decarbonization of the energy mix by 2050 is, therefore, a key element and is one of the four strategic ESG (Environmental, Social and Governance) pillars of Enel, together with responsible relationships with communities, the valorization of the people who work at the company, and innovation and operational efficiency.

**A strategy based on a long-term vision which translates into concrete objectives:**

- reduction of 25% by 2020 in the intensity of CO<sub>2</sub> emissions compared to the levels of 2007;
- investments in the renewables sector of 5.2 billion euro in the period 2017-2019;
- new capacity from renewable sources of around 8 GW<sup>14</sup> by 2019;
- gradual and selective reduction in thermoelectric power plants in the various countries where present;
- research and development of new low carbon technologies in the Open Power approach, involving internal and external stakeholders.

The action to combat climate change is also one of the four United Nations Sustainable Development Goals to which Enel is committed, together with that on access to energy, access to education and the contribution to the social and economic

growth of the communities in the countries where it operates. Besides the actions affecting the generation mix, Enel is active in the sectors of the energy efficiency, innovation and digitalization, relying on a transparent and robust system of governance. In particular:

- **smart networks and digitalization:** Enel has shown its leadership not only with smart meters but also in the automatic and smart management of networks by integrating innovative technologies;
- **distributed generation and isolated networks:** Enel is engaged in the field of offgrid electrification with various initiatives in Africa, Latin America and Asia;
- **increasingly efficient generation from renewables:** Enel will increasingly integrate renewables into its generation mix and will contribute to maximizing the efficiency of the individual technologies, and to developing hybrid systems, such as that at Stillwater in Nevada (USA) which integrates geothermal, photovoltaic and thermal solar technologies;
- **increase in energy efficiency through the use of electric technologies:** Enel is particularly engaged in the field of developing electric mobility, through participation in international research projects (for example, EVA+), the realization of smart charging infrastructure (for example, V2G technology), and active collaboration with key stakeholders. At the same time, as a utility which provides services to end users, Enel promotes the dissemination of efficient electric equipment and digital control and management technologies for consumption which improve consumers' response and behavior.

In this scenario, the circular economy, which combines growth and environmental sustainability, is a cross-cutting element of the decarbonization process.

<sup>14</sup> The 8 GW growth in renewable capacity is due for 6.7 GW to organic growth (including the BSO model) and the remainder to non-organic growth.

# The reference framework: COP21 and COP22

**The Paris agreement** which was reached during the 2015 global conference on climate change (**COP21**) represented an essential step in combating climate change because it established a plan to control climate-altering emissions in the medium and long term, with the support of solid and credible governance. Consequently, it can be considered as an element of stability from many viewpoints, for example on the regulatory front, which is traditionally uncertain owing to continuous changes in political scenarios. Throughout the preparation of the agreement and during COP21, Enel promoted a series of initiatives aimed at involving and mobilizing the private sector and category associations in the debate.

The new governance model aims to supervise the operation of States and to promote growing ambition in the reduction commitments through periodic monitoring of emissions and publication of the results achieved. The objectives communicated by the parties must be reviewed every five years to verify the “highest possible ambition” and will be subject to technical review in order to guarantee the transparency and environmental soundness of the policies adopted.

In terms of flexibility, the agreement introduces specific additional instruments to achieve national objectives, which will help increase the ambition of the overall action and will enable full involvement by the private sector in low-carbon investments.

The agreement provides a regulatory framework, but its success depends on how the individual States maintain their commitments and how the conditions will be created

for full involvement by business and civil society in the construction of a new sustainable development model.

**In November 2016 Marrakesh hosted COP22**, where Enel promoted some initiatives to actively contribute to the conference and to take the opportunity to demonstrate its own sustainability strategy and its low carbon profile in terms of renewable sources, energy efficiency, smart networks and rural electrification.

The importance of COP22 resides in progressing the technical discussion aimed at defining the procedures to implement the Paris agreement for the post-2020 period and in verifying the strength of the political commitment following Paris. The implementing instruments are necessary to operate in the short term and to guarantee stability for long-term investments. The discussion then focused on the transparency of the procedures for monitoring, reporting and verification and on the criteria for the regular assessment and possible revision of the objectives taken on by the parties, as well as on progress on the financial commitments, and on the initiatives for capacity building and technology transfer among the countries.

Enel, in keeping with its commitment in regard to decarbonization, supported various initiatives at COP22 and the active presence of the company’s top management at numerous conferences reiterated and reinforced Enel’s commitment to decarbonization by 2050, in line with the goal of a global reduction “well below the 2 °C” accepted in Paris.

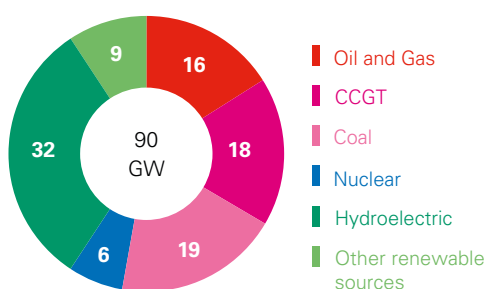
# Enel's commitment

## Net installed capacity

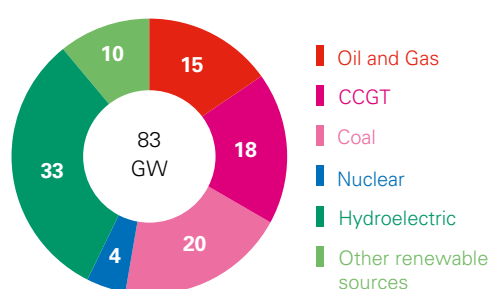
At the end of December 2016, the Group's net installed capacity was around 83 GW.

**New installed capacity from renewables** in 2016 was around 2 GW, mainly in the United States, Latin America and South Africa. Today the Group can therefore count worldwide on plants powered by renewable sources for around 36 GW of net capacity, which represent 43% of the Group's electricity generation assets.

Net installed capacity by source 2015 (%)



Net installed capacity by source 2016 (%)



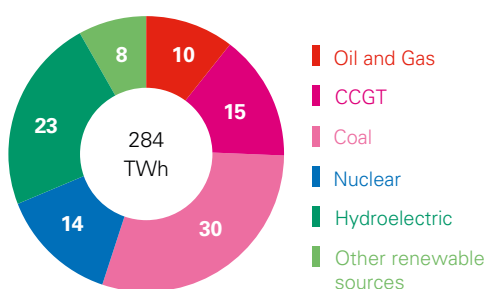
The removal from the scope of consolidation in July 2016 of Slovenské elektrárne entailed a reduction in installed capacity from thermoelectric and nuclear plants of around 2.4 GW and the removal of around 1.6 GW of installed capacity from the hydroelectric sector. In order to favor growth, a new development model was launched called "BSO" (Build, Sell and Operate), which is not so capital intensive and will further accelerate the development of Enel's broad portfolio of projects in renewable sources worldwide. The reduction in the net installed capacity on wind and geothermal plants in the United States and Canada (around 1 GW) is, for example, due to the removal from the consolidation of some power plants.

## Production

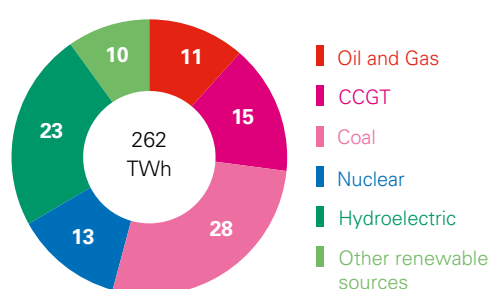
Currently 46% of Enel's power generation comes from zero emission sources.

The net energy produced by Enel in 2016, of **262 TWh**, fell by 22.2 TWh compared to the value in 2015 (-7.8%), due to the lower quantity generated in Italy (-7.6 TWh) and abroad (-14.6 TWh). In particular, the reduction in the energy produced in Italy was mainly due to the fall in demand, lower hydroelectric production and the greater unavailability of some thermoelectric power plants owing to maintenance. Abroad the reduction involved the removal from the consolidation as from the end of July of Slovenské elektrárne, the drought conditions in Latin America owing to the "El Niño" phenomenon, as well as the

Net electricity production by source 2015 (%)



Net electricity production by source 2016 (%)



greater quantities of imported energy in Spain. As for the production mix, the change was due mainly to the lower production from coal (-13.3 TWh), nuclear (-6.4 TWh) and hydroelectric (-5.9 TWh); these effects were partly offset by the higher generation from wind (+2.1 TWh) and solar (+0.5 TWh).

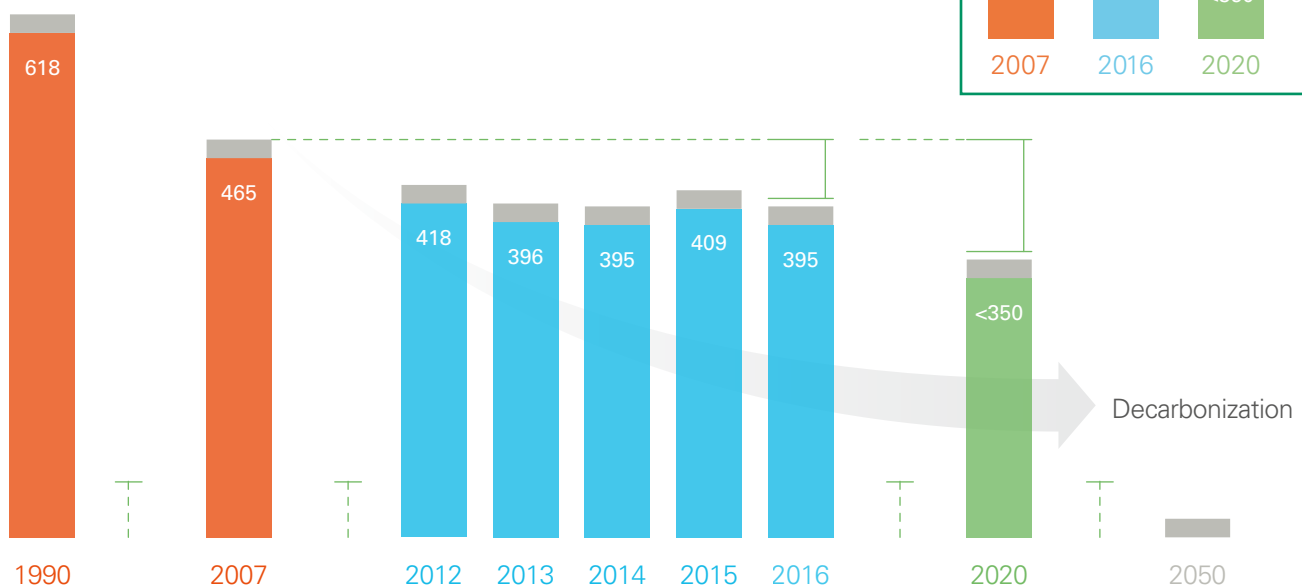
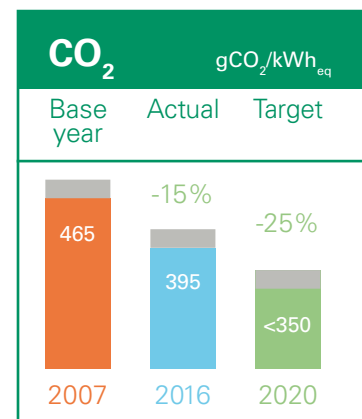
The existing power plants enabled total production of around 86 TWh from renewable sources during 2016 (which represent 33% of the net energy produced by Enel in 2016, 31% in 2015), thus avoiding the atmospheric emission of around 56 million tons of CO<sub>2</sub>. The nuclear plants enabled the avoidance of a further 28 million tons of CO<sub>2</sub>.

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

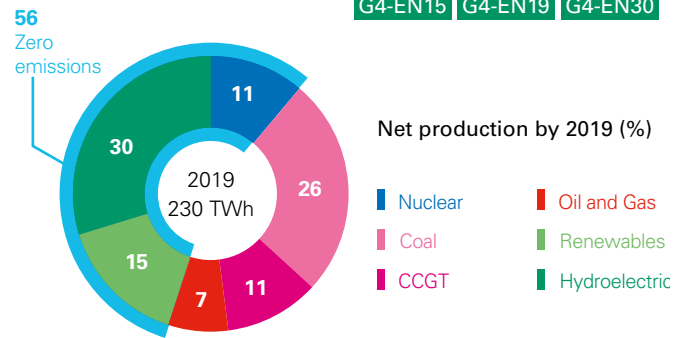
The specific CO<sub>2</sub> emissions stood at 395 g/kWh<sub>eq</sub> in 2016, down compared to the figure for 2015 by over 3%, due mainly to the reduction in thermal production from coal in Italy and Spain. Compared to 2007, the base year for the definition of Enel's reduction target to 2020 of specific CO<sub>2</sub> emissions, this value fell by 15%. Compared to 1990, the base year for the Kyoto Protocol, the specific CO<sub>2</sub> emissions (in other words those relating to the production of a single kWh) of the Enel Group fell by 36%.

Over the years the reduction target for specific CO<sub>2</sub> emissions to 2020 has increased (compared to the values in 2007), going from -18% to -25%, setting a target for that date to produce specific emissions below 350 g CO<sub>2</sub>/kWh<sub>eq</sub>.

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

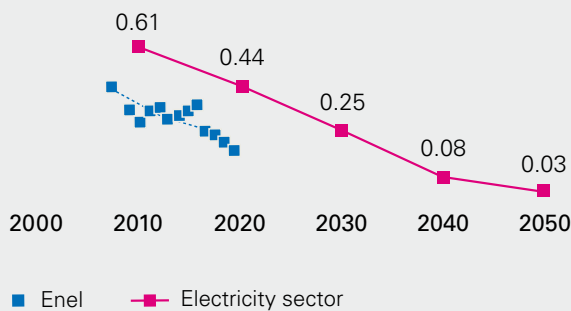


The achievement of this goal is supported by a strategy which, in reference to the medium term and in line with the Group's Strategic and Industrial Plan for 2017-2019, envisages spending on investments in the renewables sector of 5.2 billion euro and the installation of 6.7 GW of additional renewable capacity (including the BSO model) with a consequent increase in zero-emission production to 56% compared to the current 46%.



The 2020 target has been recognized as “**science-based**”, i.e. in line with achieving the decarbonization goals.

### Sectoral Decarbonization Approach (SDA)



“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 the requests of science 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 compared to 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 electricity generation. Following a review of the emission reduction data and strategy, Enel’s target to 2020, in regard to CO<sub>2</sub> Scope 1 emissions, was below the trajectory for electricity companies and consequently was approved as “science-based”. The target includes the operations to close 13 GW of generation from fossil fuels in Italy and represents a medium-term objective compared to the long-term goal of being carbon neutral by 2050.

An important recognition of Enel’s strategy in combatting climate change and moving towards a low CO<sub>2</sub> emission economy was its admission to the “A-list” of the CDP.

## Enel admitted to the A-list of the CDP



In 2016 Enel was admitted to the A-list of the CDP, the index most widely used by sustainable finance to orient investors towards companies with greater awareness of climate change issues. The A-list of the CDP index includes those companies which, from among around 2 thousand participants worldwide, stand out for the effectiveness of their strategy in taking up the opportunities and managing the risks of climate change. The score allowing admittance to the index also takes account of the completeness and the transparency of the information provided relating to greenhouse gas emissions. This year admittance to the A-list rewarded, in particular, companies such as Enel which are bound to greenhouse gas reduction targets that are compatible with the levels indicated by science, i.e. so-called “science-based” targets.

For some years Enel has also been active in the voluntary emission reductions sector aimed at those subjects (companies, institutions, end users, etc.) which intend to monitor or neutralize their carbon footprint, in other words the impact in terms of emissions of their activities (events, publications, products and services, both internal and external).

# Risks and opportunities

The increasing international attention to climate change makes it necessary to increase the level of awareness of the main risks and opportunities which arise from it with particular reference to energy transition. Combating climate change is one of the elements which guides Enel's strategy which aims at the complete decarbonization of energy generation by 2050, in line with science-based targets.

Enel has launched an innovative and ambitious project to analyze the issues connected to **resilience and adaptation to climate change**. In particular, the main objectives concern: the definition of the key climatic scenarios, the mapping of the risks and opportunities linked to climate change and the related assessments. It is a project which will involve all the business areas of the Group in the main countries where it is present.

This initiative anticipates what the task force of the Financial Stability Board (TCFD – Task Force on Climate-related Financial Disclosure), an international structure which deals with containing and protecting financial markets from systemic risks, is preparing to issue in its recommendations on the risks linked to the climate. It is a document broken down into four areas: governance, strategy, risk management and measuring targets, and will be used as a reference point by institutional investors engaged in climate change.

Climate change entails operating and regulatory risks. The uncertainty of the political framework increases the risk linked to regulatory instability, reopening the debate on the introduction of alternative and less efficient policy instruments (for example, the European carbon tax and standards on CO<sub>2</sub> emissions).

## Regulatory environment

At the European level, in order to ensure full management of the regulatory risk, Enel has further enhanced its commitment in support of the credibility and effectiveness of the Emissions Trading Scheme (ETS).

## The Emissions Trading Scheme (ETS)

The European system for trading emission quotas (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 high energy consumption sectors, in other words the industrial sectors characterized by higher emissions. It is a “cap&trade” system because it sets a cap to the total level of emissions allowed to all the subjects bound by the system, but allows participants to trade CO<sub>2</sub> emission quotas according to their needs, within the set limit.

Enel acknowledges the role of the ETS (Emissions Trading System) in providing a price signal associated with the emission of CO<sub>2</sub> and believes that the cap&trade mechanism is the most efficient to reduce emissions, especially

in industrialized economies: the definition of a target with an absolute value guarantees the effectiveness of achieving the environmental goal, while the price signal set by the market guarantees economic efficiency and the minimization of costs. Enel's strategy is in line with the provisions of the ETS. The dynamic management of the credit portfolio enables minimization of the quota purchase costs and ensures cover of the volatility risk on the carbon market. The advocacy and engagement with institutional stakeholders, category associations, non-governmental organizations and universities, which are undertaken through the European Affairs Function and the institutional Functions of the various countries, enable promotion of the Group's strategy towards ambitious climate change objectives.

## Operational environment

Besides the aforementioned project, in terms of adaptation Enel started to map the environmental risks which include the risks associated with climate change through the weighting of the vulnerability of production sites. A pilot project for the assessment of vulnerability was carried out at sites in Iberia and Latin America to identify and prioritize climatic events which may impact on the operativity of the service. The project initially, on the basis of a UNFCCC method, assessed natural phenomena, such as for example hurricanes, which can represent a threat for the Group's assets, assessing the potential associated risk and subsequently the capacity to adapt the plants to face the impacts of the phenomena analyzed. To minimize these risks in the long term Enel has accelerated its decarbonization process, developing new business opportunities in the field of renewable sources, energy efficiency and new digital technologies in the market for end uses. Among the main opportunities: the digitalization of networks, the development of new products and services for energy efficiency for consumers and the promotion of electric vehicles in the sectors of transport and residential use.

## Carbon pricing

The process of strategic and industrial planning assesses the impact of the carbon price on operations and on short-, medium- and long-term investment decisions. Decarbonization is one of the four strategic ESG (Environmental, Social and Governance) pillars and consequently the investment choices in new capacity are automatically in line with the goal of **keeping the rise in the global temperature to below 2 °C**. In this regard, Enel's strategy is focused, on the one hand, on increasing renewable capacity and, on the other, the gradual and selective reduction of the thermoelectric power plants present in various countries. For example, in Italy, the Future-e Project aims to lead this transition with the widest possible involvement of all those concerned.

With reference to the medium term, the Group's Strategic and Industrial Plan for 2017-2019 envisages investments in the renewables sector of 5.2 billion euro and further growth in renewables through the development of the "Build, Sell and Operate" (BSO) model. The Group's new renewable production capacity globally will be 6.7 GW by 2019 including both organic growth (3.5 GW) and the BSO model (3.2 GW).

As for the short term, the internal reference price of CO<sub>2</sub> is set in the range of 7-13 €/t, in keeping with the recommendation internationally and with the orientations for the ETS. The short-term prospects reflect regulatory scenarios and market expectations and enable assessment of the impact of the price of CO<sub>2</sub> on Enel's operations.