Renewables, green hydrogen and digital networks to save the climate

Enel will invest around €190 billion over ten years, leveraging the development of renewable energies, increasingly digital, flexible and resilient networks and the progressive electrification of final consumption. In order to combat climate change and create a chain of sustainable value over time it is also necessary to focus on green hydrogen, boosting innovation, economies of scale and industrialisation in order to achieve a parity of costs with polluting hydrogen within 3-5 years.

Enel mobiliterà investimenti circa per 190 miliardi di euro in dieci anni, facendo leva sullo sviluppo delle energie rinnovabili, delle reti, sempre più digitali, flessibili e resilienti e sulla progressiva elettrificazione dei consumi finali. Per combattere il cambiamento climatico e creare una filiera di valore sostenibile nel tempo, occorre inoltre puntare sull'idrogeno verde, spingendo sull'innovazione, sulle economie di scala e sull'industrializzazione, per raggiungere, nel giro di 3-5 anni, la parità dei costi con l'idrogeno inquinante.

Interview with Francesco Starace, *CEO of Enel*

After having been the focus of alternating waves of great enthusiasm and deep scepticism in recent decades, hydrogen is establishing itself as a key element for the energy transition in the policy agendas of many countries. According to a study presented by H2IT, the hydrogen sector could create a turnover of €820 billion per year and about 5.4 million new jobs in Europe by 2050. Given these facts, in your opinion what policies are needed to develop this energy vector?

Today hydrogen is a popular topic in the media and beyond. Green hydrogen represents an opportunity for utilities as the demand for renewable energy is increasing and it could provide flexibility to the network. Despite this, today it is still difficult to foresee the magnitude of the transformation that it could engender in the business of utilities and industry in general.
The production of hydrogen should not be seen as an end in itself, but rather as a tool for achieving climate neutrality. However, in order for it to become a vector of sustainable energy in the future its heavy carbon footprint must first be eliminated, and precisely for this reason it is essential to focus on the production of hydrogen from water electrolysis, with electrolysers powered by electricity from renewable sources, resulting in so-called green hydrogen. This will make possible the sustainable and competitive decarbonisation of hard-to-abate sectors such as energy-intensive industries, aviation and maritime transport.
Currently it is a very expensive technology, but we think that in the next 3-5 years – thanks to economies of scale and a focus on innovation, aggressive industrialisation and great ambition – we can achieve a parity of cost of green hydrogen with the current polluting hydrogen, provided we reduce the cost of electrolysers by a factor of six. This may seem like a lot, but in the past we have seen many industries succeed in doing this, for example batteries and solar panels. All this must be accompanied by the right policies.

Enel is one of the signatories of "Choose Renewable Hydrogen", the initiative launched in summer 2020 by WindEurope and SolarPower Europe, and is among the members of the European Clean Hydrogen Alliance. What are the priorities at a European level for developing a hydrogen supply chain and using this vector for the decarbonisation of the economy, also as part of the Green Deal and the Recovery Fund?

A rapid, ambitious deployment of renewable energies in Europe is the main enabling factor for the creation of a value chain linked to the production of green hydrogen with zero CO_2 emissions that is competitive in terms of costs and able to support the creation of new industrial opportunities.
From a regulatory point of view, the European Union (EU) should promote an international certification standard that attributes additional economic value to green hydrogen compared to hydrogen produced by fossil fuels. Creating a clear, complete terminology (taxonomy) linked to the different production processes based on both climate performance (CO_2 emissions) and the origin of the input/raw material (renewable, non-renewable) is essential to avoid ambiguity and allow end customers to make informed choices.

> "A rapid, ambitious deployment of renewable energies in Europe is the main enabling factor for the creation of a value chain linked to the production of green hydrogen„

At the same time, it is essential that the legislative framework allow market players to quickly launch projects for the development of electrolysers for the production of hydrogen, introducing initiatives to accelerate and support forward-looking business models in Europe, and allow forms of sectoral integration, that is, based on green hydrogen intended for customers operating in the hard-to-abate sectors.
The EU should also support the development of a European green hydrogen supply chain and promote R&D funding to improve the efficiency of electrolysers and increase their production capacity.

At a national level, countries should introduce a regulatory framework that recognises and promotes the hybridisation of hydrogen production units in renewable plants, allowing access to ancillary service markets (for the provision of services such as frequency regulation or secondary and tertiary reserves).

The Ministry of Economic Development has worked on a National Hydrogen Strategy to identify sectors where it believes this element can become competitive in the short term and to verify the most suitable areas of intervention to develop and implement the use of hydrogen. What are Enel's proposals and vision in this context? Can we become a hydrogen hub?

Enel shares the basic approach of the Italian National Hydrogen Strategy focused on green hydrogen, which we believe should be the only solution supported by governments as it is capable of promoting a sustainable value chain over the long term. We welcome the targets of satisfying 2% of final demand for hydrogen energy and installing 5 GW of electrolysers by 2030. We share the promotion of a high-potential integrated system model where demand and supply are concentrated locally (known as hydrogen valleys), despite the local factors that will influence the choice of the mix of models for the production, transport and storage of hydrogen. Moreover, we support a model for the development of a supply chain that can improve the security of the supply and reduce the dependence of the EU and its Member States on imported fossil fuels through the creation of local supply chains that maximise the socio-economic benefits in terms of industrial development and employment. With regard to the end uses of hydrogen, we promote a strategy that rewards only efficient uses applied to hard-to-abate sectors and substantiated by cost/benefit analyses in order to avoid capital-intensive structural investments.

At an operational level, you have launched projects in the United States and Latin America in partnership with major players, including Eni. Are there other initiatives under way, in Italy in particular?

Our goal is to increase our green hydrogen capacity to over 2 GW by 2030. Enel Green Power is engaged in the research and development of projects for the production and use of green hydrogen obtained from water electrolysis, with electrolysers powered exclusively by renewable elec-

tricity. The Group has launched a study of new business models that include the supply of green hydrogen for the decarbonisation of industrial sectors, with partnerships and projects already under development in Chile, the United States, Spain and Italy. In Italy, for example, we are working on several initiatives that include a partnership with Eni and another with Saras for the production of green hydrogen for use in refineries and biorefineries.
In parallel with these initiatives, in Catania we are developing an innovative project – a hub – to test new technologies and accelerate the development and industrial validation of all components of the green hydrogen production chain. In the development of new technologies, employing a model of partnership and open innovation allows us to shorten the learning curve and accelerate the pace for the benefit of the system and the country.

More generally, what are the main lines of Enel's strategy for the energy transition?

Enel's goal is not only to create value for the Group, but to generate sustainable growth that creates value for all: customers, companies, the environment and shareholders. With our latest 2021-2023 Strategic Plan we also unveiled our vision for the next ten years, underscoring what kind of utility we would like to become.

> "Covid-19 took us on a journey into the future, showing us a reality that we will have to deal with sooner or later,,

The issues that lie at the heart of our strategy are based on the growing role of renewable energies, the development of increasingly digital, flexible and resilient networks and the progressive electrification of final consumption. Over the next ten years we will invest around €190 billion. Over €150 billion will be invested directly by the Group through the traditional business model – so-called "ownership" – with more than 90% divided between renewable energy and networks. On the other hand, employing a stewardship model to catalyse third-party investments, 50% of the total will be allocated to renewables and the other half will be divided among fibre optics, transport electrification and flexibility.
A changed energy mix in 2040, the result of the growing development of renewables, will make digital networks the backbone of the new energy world. This will go hand in hand with the implementation of storage systems to improve the flexibility of the electricity system and an increasing focus on electrification, especially of public and private transport, with the consequent need for a charging infrastructure plan that meets the needs of users. It will be critical to harmonise the development of all these technologies as it is essential that they proceed in lockstep, because one cannot grow without the other.

Prominent proponents of the energy sector have raised an alarm about the possible decline in investments for the energy transition due to the pandemic. Do you believe that this emergency will somehow slow or even halt the development and implementation of decarbonisation policies?

Covid-19 took us on a journey into the future, showing us a reality that we will have to deal with sooner or later. We are now seeing what it means to emit less CO_2 and we are even more aware of the great importance of having resilient networks. We have direct experience that it is possible to decarbonise the energy sector without particular management difficulties, and when the pandemic is over no one will be able to say that this is not possible. The way had already been mapped out and we had already started down the path, a path that leads to a safer society because it depends less on fossil fuels and is more compatible with the planet, with better air quality and which contributes to combating climate change. The pandemic has given us a greater awareness of the importance and cost effectiveness of decarbonising the economy, and it is no coincidence that precisely during the year we have just gone through several

countries made a stronger commitment to this path. For example, we saw China, Japan, South Korea and South Africa all make commitments to reduce their emissions in the coming years, and the United States also announced its return to the Paris Agreement. Even the financial community – especially given the climate of general uncertainty that we are experiencing – is looking for stable investments, and consequently is increasingly aware of the importance of sustainability for the creation of lasting economic value in the medium to long term. In his annual letter to CEOs, companies and clients, Larry Fink, CEO of BlackRock, pointed out that 2020 was a historic year for sustainable investments, with a momentum that grew globally despite the thinking of many who posited that Covid-19 could slow this trend. This demonstrates that the world is inevitably moving in this direction, and to get out of the economic and social crisis and at the same time combat the climate emergency governments are implementing recovery plans that are sustainable, innovative, resilient and that also take into account social equity.

For many years you were CEO of Enel Green Power, an international leader in renewable sources. In your opinion, what strengths should be leveraged and what critical issues should be overcome in order to achieve the European objective of climate neutrality by 2050, or in other words to eliminate CO_2 emissions?

The energy transition that we are experiencing is being concentrated into a reduced time space and therefore is perceived by all. Moreover, at this particular moment it is being further accelerated by turbulent changes involving not only the energy sector, with oil & gas companies having to reinvent their businesses and utilities that can benefit from the transition, but also other industries such as the automotive sector with the production of electric cars. The development of renewable energies has proved extremely resilient to the challenges posed by the Covid-19 crisis. The pandemic has slowed the economy and energy consumption, but this does not apply to renewable sources, which are the only ones that have seen record growth. In 2020 renewables accounted for almost 90% of the increase in total installed energy capacity worldwide, reaching a record level of almost 200 GW (for example, about 18,000 MW of photovoltaic capacity were installed in Europe). This was driven by the fact that, in addition to their obvious benefit to the environment, renewable sources are economically more competitive than fossil fuels.

But where are we with regard to European objectives?

Unfortunately we are well below the growth levels needed to achieve them. If you stop and think about ESG policies (Environmental, Social and Governance), you realise how important the environment is and that the Green Deal is therefore the right way forward. You also realise that society – namely unemployment, job creation and cultural change – is important, but what really needs to happen is a change in governance. This isn't just an Italian problem, indeed it extends to all of Europe, and it doesn't concern the generation of ideas, the design of works or the need to find funds, but rather the ability to make projects actually happen. If you look at the historical trend of installing new renewable capacity at a European level, you can see that in the years 2009-2019 about 190 GW were installed, of which most were installed in the early years of the decade, with an average of about 18 GW/year in the latter five years. Over the next 10 years it will be necessary to install an additional capacity of about 300 GW (with an average installed capacity of about 28 GW/year) – an increase of at least 50% in line with the targets set by the National Energy and Climate Plans (NECPs) of the individual States – but which will need to be further revised with the increase of the emission reduction target to 55% by 2030 (compared to 1990 levels).

> "The simplification of authorisation procedures and the acceleration of investments are two key aspects„

The NRRPs (National Resilience and Recovery Plans) can play a fundamental role in the realisation of investments in decarbonisation, networks and for the electrification of final consumption, decisive levers for the Green Deal and NECPs. In order to allow them to reach their full potential, we must focus on two key aspects: simplification of authorisation procedures with the goal of streamlining and speeding up the processes and steps currently required to obtain permits for the construction and operation of plants, and acceleration of investments focused on sustainability and decarbonisation, including through simplified procedures for the authorisation of renewable plants.