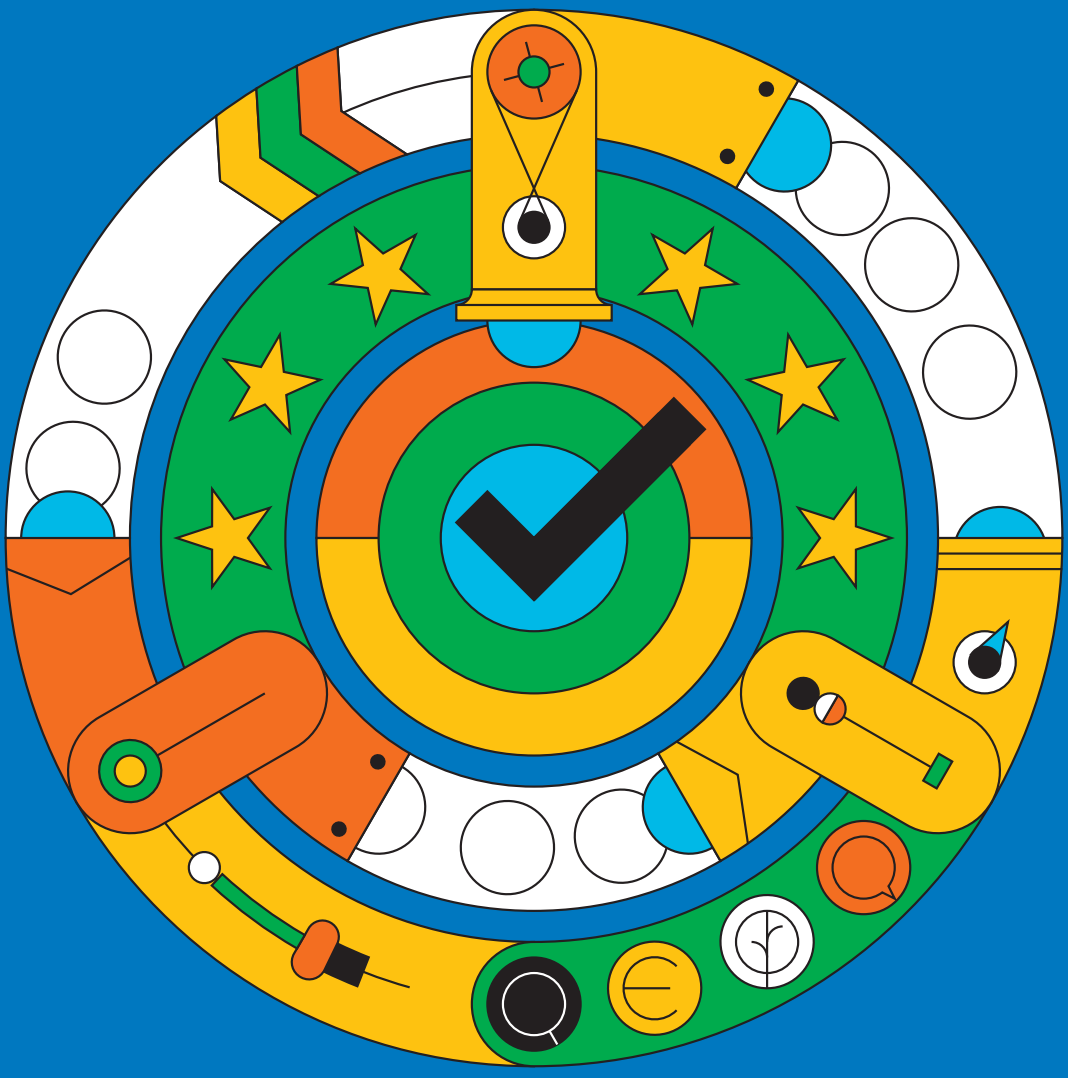
European Governance of the Energy Transition

Enabling Investments



The European House Ambrosetti

enel Foundation

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The contents of this study refer exclusively to the analysis and research carried out by The European House – Ambrosetti and Enel Foundation and represent their opinion which may not coincide with the opinions and viewpoints of the individuals interviewed and involved in the initiative.

Preface

Francesco Starace
Chief Executive Officer
and General Manager,
Enel

The world is facing a set of unprecedented challenges and the COVID-19 crisis has made the urgency with which they need to be addressed more evident than ever. The need to tackle climate change together with the abrupt acceleration of changes in social relations, consumption patterns and management of essential value chains that are reshaping the way we live all confirm the importance of an energy transition process that is fast and effective, but also fair and inclusive. Consequently, the recovery plans adopted all around the world have unanimously stressed the importance of enhancing the green component of the post-pandemic return to "normal".

The European Union is leading this challenge with its climate and energy transition action, aimed at full decarbonization by 2050. This ambitious yet realistic target was set by von der Leyen's European Commission from the very outset of its mandate, when the Green Deal was unveiled as one of the pillars of the European vision for the future.
The COVID-19 crisis, along with the worsening of the global climate threat, has added emphasis to this approach, as confirmed by the Next Generation EU, the most ambitious plan ever devised by the EU, putting decarbonization and green transformation policies at the core of Europe's recovery.
The EU decision to boost the 2030 GHG reduction target from 40% to 55% (compared to 1990 levels), accompanied by the recent release of the "Fit for 55" package, confirms that Europe is putting decarbonization front and center in the construction of the Future Europe.
This is, of course, a challenge and, at the same time, the biggest opportunity that Europe has had in recent history. Lately, we have been investigating the benefits of the transition to a green economy at an environmental, social and economic level.
Two years ago, the study "*Just E-volution 2030*" underlined how by 2030, thanks to the transition towards a decarbonized energy system, the economic value of the electricity sector could grow in Europe from 113 to 145 billion Euros (from 14 to 23 billion Euros in Italy), while additional employment could range between approximately 997,000 and 1.4 million jobs (98,000 to 173,000 in Italy).
Last year, the "*Circular Europe*" study showed that the Circular Econ-

omy model, though still in its infancy, has already brought to the EU a tremendous economic impact, accounting in 2018 for an amount between 296 and 376 billion Euros of GDP, (in Italy between 27 and 29 billion Euros, equivalent to 1-2% of current GDP) and creating between 2.4 and 2.5 million jobs (190,000 and 220,000 in Italy).

This year's study "*European Governance of the Energy Transition*" estimates, on one hand, that closing the 3,564 billion Euros investment gap needed to reach the 2030 target in Europe (186 billion Euros in Italy) could have a cumulative impact on GDP of 8,126 billion Euros (424 billion Euros in Italy). On the other hand, it underlines that, at the current pace, Europe would meet the new 2030 renewable energy objective set by the "Fit for 55" only by 2043. It would be too late. It is clear that Europe's capability of implementing the necessary investments needs to step up dramatically if we want to reap this opportunity.

This is the reason why we have focused our attention on the most neglected pillar of the Environmental, Social and Governance (ESG) triad. Governance is a central factor in enabling investments and ensuring a fast and effective energy transition.

The study shows that the governance of the European energy and climate policies – a very complex domain – needs to be improved at different levels, from global to European and from national to local, in order to promote a timely and smooth decarbonization effort.

This necessity was already clear to the European Commission back in 2018, when – as part of the Energy Union initiative, and in implementing the (then) new 2030 targets – it released its first "governance" directive aimed at defining clearer institutional processes to guide Member States' actions and to align them with the energy and climate domain trajectories set by Brussels. Nevertheless, more must be done.

The study highlights a number of bottlenecks potentially limiting the effectiveness of the efforts towards decarbonization agreed at the EU and national level and proposes a list of suggestions to overcome these issues.

Fixing such inefficiencies is of course important at the EU level, but is also absolutely essential at the national and local ones, since the implementation of the climate and energy transition policies is largely run by national, regional and local institutions, interacting (and too often confronting) with local stakeholders.

The research underlines that the frameworks of the current governance system (in terms of institutional responsibilities, duties, relations and processes) do not fit the ambition and the opportunity Europe has in the transition and the magnitude of the effort that we need to make in the years to come.

Governance inefficiency leads to very concrete negative consequenc-

es. For example, the slow pace and uncertainty of the authorization procedure for renewable plants in Italy stifles the available pipeline of authorized projects that can bid in renewables auctions. As an example, essentially because of a lack of authorized projects, in a single renewable energy bid in Italy in 2021, a capacity of just 74MW was successfully allocated, while the biggest chunk – more than 1,500MW – was not allocated. This means that in a single auction, Italy lost a potential investment valued between 1.4 and 1.8 billion Euros.

Addressing the governance bottlenecks is therefore a fundamental step in the decarbonization process for all the sectors involved, from renewables to grids, from buildings to transport and industry. It is an essential condition to transform the European ambitions into reality. Aiming to achieve this goal will help us cope with the biggest challenge – and seize the greatest opportunity – of our time. Europe, and especially Italy, will come out stronger and certainly in a leading position globally ●

Valerio De Molli
Managing Partner
and CEO, The European
House — Ambrosetti

"We now have a shared sense of purpose. We have a shared sense of direction. We know where we want to go and what we need to do to get there. We know that our current fossil fuel economy has reached its limits. And we know that we have to move on to a new model – one that is powered by innovation, that has clean energy, that is moving towards a circular economy".

Ursula von der Leyen

The European Union and its Member States are now undergoing a major reconstruction and recovery. The changes which in the last two years have shaken the foundations of our reference scenario, have further underlined the need to build a resilient economic system, oriented to the transition to more sustainable models.

This is Europe's energy transition moment: an opportunity to change how the entire energy sector is perceived and managed. It has the potential to become the driver to develop a grand vision for the future. European institutions have firmly acknowledged this potential. The European effort has been confirmed and further boosted by the recent "Fit for 55" package, setting Europe's energy transition on a very ambitious path, as outlined in the quote above.

Europe needs greater efforts to implement this change, since at the current pace it will not be able to reach the targets in the set timeframe. Indeed, continuing at the current rate, Europe would reach the new 2030 -55% target on GHG only in 2051, 21 years later. As for renewables, Europe will fall short by more than 13 percentage points compared to the new 2030 40% target, reaching it only in 2043. Considering energy efficiency, at the current level of improvement, Europe will reach the estimated 2030 +36% target only in 2053.

Italy's performance in this scenario is even worse. In the coming months Italy will have to revise upwards the 2030 targets of its National Energy and Climate Plan, aligning it with the European Commission's new and more ambitious vision. The European House-Ambrosetti and Enel Foundation working teams have estimated the new targets that Italy should set for 2030 to be in line with the "Fit for 55" package: -43% GHG emissions, 37.9% renewables and +46.4% energy efficiency improvements. However, assessing Italy's current performance in achieving these targets, a delay of 29 years on average emerges compared to 19 years in Europe.

These delays can be linked to a gap in the deployment of investments associated with the energy transition. The European Union needs to de-

ploy 3,564 billion Euros in additional investments along the value chain to reach the 2030 objectives. In Italy, the energy transition requires 186 billion Euros in additional investments (referred to the pre-"Fit for 55" framework). Europe and Italy have a "once in a generation" opportunity to fill this investment gap, which is represented by the Next Generation EU and Italy's National Plan for Recovery and Resilience.

The optimisation of the Europe's and Italy's governance of the energy transition is therefore crucial to realize these investments and reap all the related benefits. We have calculated the electricity investment multiplier, which is equal to 2.28. This means that if Europe were to deploy the amount corresponding to the gap, it would be able to activate more than 8 trillion Euros of GDP in the next 10 years, while 424 billion Euros in Italy.

Moreover, according to the study "*Just E-volution 2030*", published in 2019 by The European House – Ambrosetti and Enel Foundation, the energy transition brought about by electrification has a positive impact on employment. It has been estimated that employment in the electric technologies sector in the EU27+UK could reach 6.8 million jobs in 2030, a 30% increase over 2017, with a net employment gain of 1.4 million jobs. In Italy, the forecast net gain in employment in the electric technologies sector could reach 173,000 units in 2030.

Governing the energy transition and making it more efficient is therefore a prerequisite not only to preserve the earth's sustainability but also to seize this important opportunity for value creation and employment.

Therefore, the study has elaborated 7 key proposals to overcome the current shortcomings of the energy transition governance in Europe and in Italy, considering also their external and international dimension, and to put the continent on a more accelerated path towards energy transition and a sustainable future.

This ambitious study would not have been possible without the concerted efforts of the top management of Enel and Enel Foundation, starting with Francesco Starace, Carlo Papa and Simone Mori, together with their teams, in exploring an issue at the forefront of debate today, and without the invaluable contribution of the Scientific Committee – Stefano Manservisi (Professor and Member of the International Independent Task Force on Creative Climate Action, Sciences Po – Paris School for International Affairs; Former Director-General for International Cooperation and Development, European Commission), Jose Delbeke (EIB Climate Chair, School of Transnational Governance, European University Institute EUI; Visiting Professor KU Leuven; former Director General for Climate Action, European Commission) and Vera Songwe (Under Secretary General, United Nations; Executive Secretary, Economic Commission for Africa ECA) – and the

International Energy Agency – Fatih Birol (Executive Director) and Paolo Frankl (Head of Renewable Energy Division) – to whom go my deepest thanks.
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Remarks by the Scientific Committee

Fatih Birol
Executive Director,
International
Energy Agency

→ There is an undeniable need for urgent action and extraordinary cooperation to reach long-term net-zero greenhouse gas (GHG) emissions goals. The COVID-19 pandemic delivered a major shock to the world economy, resulting in an unprecedented 5.8% decrease in CO_2 emissions in 2020. But, since then, global energy-related CO_2 emissions have rebounded along with renewed economic growth and are set to have their second largest ever annual increase in 2021, according to data from the International Energy Agency (IEA).

Back in March 2020, the IEA argued that governments must put clean energy investments and sustainability at the centre of their economic recovery efforts to place global emissions on a steady downward path. Sadly, that unique opportunity to make 2019 the year in which global emissions reached their peak is passing us by. Our recent Sustainable Recovery Tracker shows that only 2% of government recovery spending to date has gone to clean energy transition. There is still a big gap between rhetoric and concrete policy action.

The IEA has been working hard to support the UK government's COP26 Presidency and make it the success the world needs. I was delighted to co-host the IEA-COP26 Net Zero Summit with President Alok Sharma in March 2021, where top energy and climate leaders from more than 40 countries highlighted the global momentum behind clean energy transition. In May, the IEA published our "Net Zero by 2050" roadmap for the global energy sector, to help governments identify the concrete steps and actions needed to live up to their decarbonisation pledges.

This is precisely why I welcome the "Fit for 55" package of legislative proposals presented by the European Commission in July 2021. The package offers medium-term policy measures aimed at delivering the transformational changes needed across Europe's economy, society and industry to reach net zero by 2050. But attaining a fair and sustainable transition needs more than just legislation. It needs collective action that's open to all, whether innovators or investors, companies or cities, consumers, households or individuals.

This study, "*European Governance of the Energy Transition*", highlights the efforts still needed to reach this goal. The study takes an in-depth look at the current governance of the energy transition in Europe, examining legislative processes, the stakeholders involved and their interactions. It delves into the main issues related to governance and their impact on supply, infrastructure and demand, also highlighting the decisive role of Member States in implementing the EU Directives.

The report stresses that energy transition delivers numerous economic, social and environmental benefits. To tackle existing challenges and take full advantage of the opportunities offered by the transition, the study identifies seven policy proposals, at both the European and Italian level.
The world faces a huge challenge to transform the notion of Net Zero by 2050 from an outside possibility to a reality. Institutions have no time to lose in acting decisively to accelerate much-needed clean energy transitions ●

Jos Delbeke
EIB Climate Chair,
School of Transnational Governance, European University Institute – EUI;
Visiting Professor KU Leuven;
former Director-General for Climate Action, European Commission

→ This study could not have come at a better moment. In June 2021 the EU Commission proposed its "Fit for 55" package, which represents a combination of targets, carbon pricing, energy and pollution standards. Reducing greenhouse gas emissions by 55% compared to 1990, increasing renewable energy to 40%, and improving energy efficiency by 36%, all by 2030, is indeed a challenging combination but nevertheless possible to achieve.
One major reason is that it needs to be put into the historical context of access to new major sources of funding. The package represents a huge investment programme, full of economic opportunities for those who are prepared to seize them. The EU connects the energy and climate governance of Member States with its budget and the new Next Generation EU facility. Italy is expected to be a major - if not the biggest - recipient of the latter, provided investments are well planned and connected with a range of required regulatory changes, i.e. in the area of permitting procedures.
New low-carbon and sustainable investments will be triggered in the fields of energy, transport, buildings, infrastructure, and industry. This will allow Italy to contribute and benefit from the major low-carbon energy transition that the EU, and soon the world at large, is going through. The EU will also introduce important regulatory changes, such as the phasing out of the internal combustion engine in cars and the significant levels of carbon prices currently being applied in the energy and industry sectors, and shortly also on transport and heating fuels.
By realising the policy proposals of this study, Italy will be able to assume a European and global leadership and seize the major economic opportunities the climate-neutral future brings, in line with the goals of the Paris Agreement ●

Stefano Manservisi
Professor and Member of the International Independent Task Force on Creative Climate Action, Sciences Po – Paris School for International Affairs; Former Director General for international Cooperation and Development, European Commission

→ The world is facing major transformations. Climate change represents the key challenge of our time, a global challenge that goes beyond national borders and impacts all our lives. The increase in global GHG emissions caused by human activities is reflected in the rapid increase in global temperatures of recent years. Indeed, even if there has been a slight improvement over the past 10 years, the world is not doing enough to keep the temperature increase below 1.5°C. In addition to this unfortunate but very well known evidence, the COVID-19 pandemic has increased awareness about ongoing trends and further highlighted the vulnerability of our system, forcing us to rethink our economy and society.

In order to achieve decarbonisation, the traditional paradigm of energy production and usage based on fossil fuels must be superseded. Energy transition is an ambitious challenge facing the whole world, Europe and all its Member States. In this context, the European Union has played a leading international role in the fight against climate change since the 1990s, adopting policies and defining highly ambitious objectives regarding the reduction of greenhouse gas emissions, the share of renewable sources in final energy consumption and energy efficiency improvements.

On 14th July 2021 the European Commission announced the "Fit for 55" package which targets a 55% reduction in net greenhouse gas emissions compared to 1990 levels, renewing and making Europe's commitment to decarbonisation and energy transition more ambitious. Such ambition for the next decade aims to put the EU on a balanced path to achieving climate neutrality by 2050. The "Fit for 55" package consists of 13 policy proposals, 5 of which represent new initiatives. Among the most innovative and ambitious measures are the extension of the ETS and the introduction of carbon pricing mechanisms.

The Carbon Border Adjustment Mechanism is a particularly important topic as it changes the equilibrium of international relations with respect to carbon intensive sectors and products. As far as this topic is concerned, the European Union is acting as a first mover, but its efforts would not be enough if they are not supported by other important partners around the world. The Carbon Border Adjustment Mechanism should not be seen as a protectionist measure, rather as an opportunity to foster international agreements, particularly in the industrial sector. In this scenario, strengthening relations between the European Union and non-EU partners (in particular Africa and the United States) is of primary importance in order to enhance the competences of countries with respect to energy technologies and foster cooperation and the technology transfer.

With the new "Fit for 55" package, but also with the unique historical

opportunity for decarbonisation represented by the Next Generation EU, the governance of the Energy Transition becomes even more relevant than before. The European Union and its Member States face even more ambitious challenges in the coming years and have more resources at their disposal than ever before. At this stage it is of paramount importance that all actors involved in the international, European and national governance of the energy transition work in a coordinated and efficient way so that this era can truly be a turning point for a sustainable future.

As such, not only is the "*European Governance of the Energy Transition*" study perfectly timed, it also has the unique merit of addressing the credibility of the complex system designed to implement it. It aims to understand Europe's governance of the sectors involved in the energy transition process along the entire value chain, offering a critical analysis of how important ambitious targets can be realised in practice in a given context. From this point of view, it represents an original contribution for assessing a complex ecosystem where multilayer institutional competences, economic interests and the plurality of actors involved are required to find a new balance. The study therefore offers an opportunity to identify the obstacles that must be overcome in order to take advantage of the full potential of the energy transition, as well as the challenges the European Union and its Member States will have to address

Vera Songwe
United Nations
Under-Secretary-General
and Executive Secretary,
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for Africa

→ The United Nations Secretary-General has rightly described the physical science basis report of the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) as "code red for humanity". The report states unequivocally that anthropogenic – i.e., human-induced – emissions are responsible for climate change, which continues to wreak havoc on communities, economies, and the environment as indicated by the recent extreme weather events around the world.

In terms of the economic impacts of climate change, African countries are losing significant amounts of their GDP – on average 5 percent – and are spending between 2 and 9 percent of their budgets, unplanned, to respond to extreme weather events. These are resources that are being diverted from planned spending in key sectors such as health and education. And the compounding of the COVID-19 pandemic has made matters worse for our countries – reducing fiscal space and creating severe liquidity challenges, which in turn limits their ability to invest in green recovery and climate resilience for jobs and prosperity.

Given that two-thirds or so of all greenhouse gas emissions are related to energy, getting the global clean energy transition right, but just, is critical if we are to keep climate change under control. This requires sound governance and targeted investments. It is therefore timely that the Enel Foundation and The European House – Ambrosetti embarked on this important research and report on "*European Governance of the Energy Transition*".

The research identifies electrification as a critical focus for decarbonisation and defines an effective governance model for a sustainable energy transition that promotes the deployment of transformative investments in Europe. It also provides policy recommendations to manage an efficient governance for the energy transition. The findings of this important work are relevant beyond Europe. This is particularly so for Africa – key, political, economic and energy partner of the EU – which will require power sector investments in the order of 425 billion Euros by 2030, and well over 1.7 trillion Euros by 2050 to quickly close the continent's huge energy access deficit and respond to climate change. Our SDG7 Initiative – based on three pillars of sustainability, governance, and finance - aims to support African countries in this effort. On the governance pillar, we are very pleased to be working with some of our Member States and RES4Africa Foundation to assess the policy and regulatory landscape in countries to identify and address key barriers to private sector investments in generation, as well as in transmission and distribution. We will take insights from this report as we continue our country reviews, where we are already seeing good progress with energy sector governance in countries such as Angola, Ghana, Morocco, and Rwanda.

The EU is one of Africa's nearest neighbours and biggest trading partners, with over 31% of Africa's exports being to Europe, and both regions having common interests in boosting trade, as well as in tackling climate change, and promoting global security and attainment of the SDGs. The potential for cooperation on the energy transition and climate action is huge, given Africa's abundant clean energy resources and that fact that Africa remains the last bastion for transformative clean energy investments globally, with only 2 percent of global investments in clean energy over the past decade having been in Africa. This cooperation must take into consideration Africa's development and energy transition needs, particularly with regard to the implementation of the EU's Green Deal and "Fit for 55" climate action package.

It has been a great pleasure for me to serve as an advisory board member for this very important research project by Enel Foundation and The European House – Ambrosetti. I take this opportunity to congratulate the team that worked on the research.

As we go to COP26, let us remember that the devastating confluence of the COVID-19 pandemic and the climate crises is probably our last clarion call to work together in a strong multilateral framework to step up action and put in place the right governance and investment frameworks for a global energy transition for climate action. And we must do so while recognizing the special circumstances of African countries

The Study's Key Findings

1

→ The next 10 years will be crucial to keeping global warming below 1.5 degrees, and Europe aims to be the global leader of the energy transition, meeting ambitious goals (such as the "Fit for 55" package) with a strong push to relaunch the economy based on green technologies (Next Generation EU)

Climate change represents the key challenge of our time, a global endeavour that goes beyond national borders and directly impacts the life of each of us. As stated in the UN-IPCC report published in August 2021, any of the changes across the whole of Earth's climate system are unprecedented, and some of the shifts are in motion now, while some - such as continued sea level rise – are already 'irreversible' for centuries to millennia ahead. The document shows that emissions of greenhouse gases from human activities are today responsible for approximately 1.1°C of warming compared to 1850-1900 period, and finds that averaged over the next 20 years, global temperature is expected to reach or exceed 1.5°C of heating. Indeed, according to estimates by the Copernicus Climate Change Service, global temperature change will reach the critical threshold in **2034** if the warming trend continues as in the last 30 years.

Since the '90s, the European Union has played a **leading role at international level** in the fight against climate change, adopting policies and defining very ambitious goals for reducing greenhouse gases, increasing the share of renewable resources in final energy consumption and improving energy efficiency. During the State of the Union address on 17th September 2020, the European Commission revised its target to net greenhouse gas emissions **reduction of at least 55%** compared to 1990 levels by 2030, boosting the previously set 40% target. Such an ambition for the next decade aims to put the EU on a balanced path to achieving climate neutrality by 2050. The commitment has been renewed and confirmed by the "Fit for 55" package announced on 14th July 2021. The package consists of 13 policies that, besides setting new targets, represent a comprehensive approach to all the sectors involved in the energy transition.

Since the European Commission has raised the level of ambition for the energy transition, Europe has an **unprecedented opportunity** to deploy the appropriate investments for this purpose. In response to the COVID-19 emergency, the European Council's approved the Next Generation EU on 21st July 2020, just four months after the declaration of global pandemic

by the World Health Organization on 11th March 2020. The core of the European strategy for recovery is **Next Generation EU**, a **750 billion Euros** multi-year plan that aims to create a more connected, sustainable and resilient Europe. Indeed, **around 30%** of the total allocated resources from Next Generation EU and the 2021-2027 long-term budget (around **500 billion Euros**) is geared towards climate-related projects.

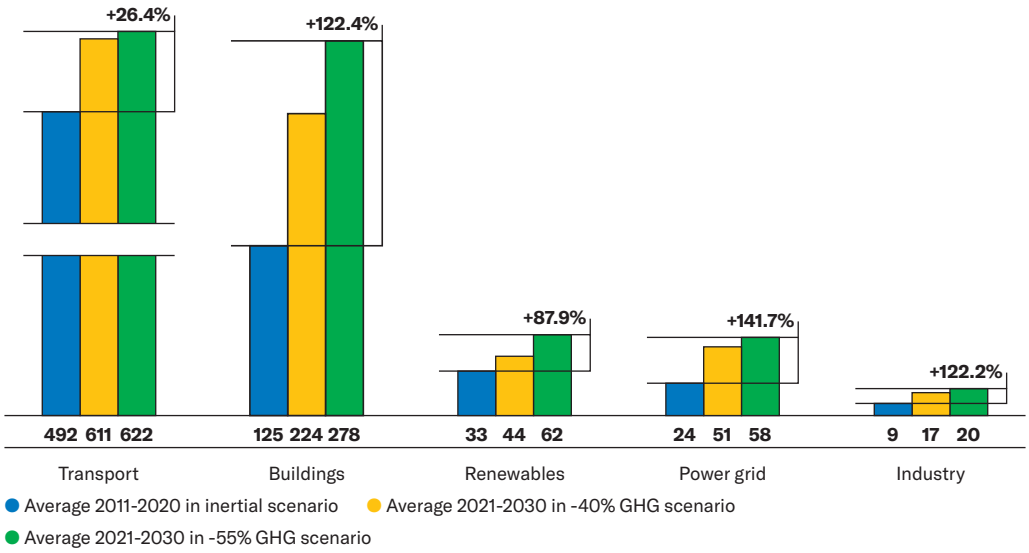
Italy is the main beneficiary of Next Generation EU. According to the version submitted to the European Commission in April 2021, the Italian Recovery and Resilience Plan (**PNRR**) amounts to a total of about **235 billion Euros**. As far as energy transition is concerned, the PNRR resources provide important opportunities to support investments in the key sectors identified. Mission 2, the "**green revolution**" is the one receiving the largest amount of financing, equal to about 59 billion Euros, **30% of the total**.

2

→ Filling the energy investment gap (3,564 billion Euros in the EU, 186 billion Euros in Italy) needed to reach the 2030 goals could activate, over the next 10 years, a cumulated GDP of over 8 trillion Euros in the EU and over 400 billion in Italy

The European Commission has estimated significant additional investments between 2020 and 2030 to reach the more ambitious target of -55% GHG emissions. The **power grid** sector is receiving the highest percentage increase in average annual 2021-2030 investments, going from 24 billion Euros on average in the period 2011-2020 to 58 billion Euros on average in the period 2021-2030 in the -55% GHG scenario (+141.7%). The **transport sector** has on average invested the most each year over the period 2011-2020 (492 billion Euros), but still needs an increase in annual investment of +26.4% in the next 10 years according to the -55% GHG scenario. Overall, the investment gap between the inertial scenario (average 2011-2020) and the -55% GHG scenario by 2030 across the energy system as a whole exceeds **3,500 billion Euros**.

● **FIG I** → **Average annual historical investments, -40% GHG scenario investments and -55% GHG scenario investments in decarbonisation in EU27, 2011-2030** (billion Euros)



Source → The European House – Ambrosetti and Enel Foundation, prepared using European Commission data, 2021.

In Italy, the Integrated National Energy and Climate Plan (PNIEC) estimates **186 billion Euros of additional investments** in energy transition with respect to the current policy scenario over the period 2017-2030, with the **buildings and renewables** sectors requiring greater additional investments to reach the 2030 PNIEC policy targets, 99 and 38 billion Euros respectively.

The deployment of investments in the sectors involved in the energy transition process analysed, thanks also to resources provided by the Next Generation EU and the Italian PNRR, would generate a number of benefits both in Europe and in Italy.

In order to evaluate the economic benefit, the GDP multiplier of the electricity sector has been calculated, leveraging on the results presented in The European House – Ambrosetti's and Enel's study "Empowering Europe's Investability" published in 2016. The analysis conducted reveals that for each Euro invested in the electricity sector, the total impact on the economy is **2.28 Euros** of GDP (with a direct impact in the electricity sector of 1.19 and indirect and induced effect of 1.09). Thus, if the European Union and Italy were to succeed in unlocking the investment gap, they could generate a direct, indirect and induced benefit to their economies equal to **8,126 billion Euros** and **424 billion Euros** respectively.

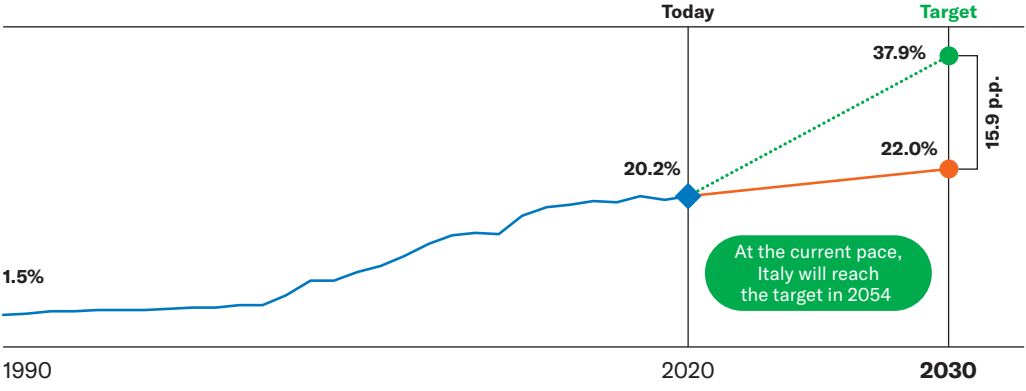
3

→ At the current pace, Europe and Italy will risk failing to meet the 2030 decarbonisation targets, lagging behind on average by 19 and 29 years respectively, and missing a unique opportunity to reap the full environmental, social and economic benefits of the energy transition

Despite the increasingly ambitious EU vision, at the current trend, Europe would reach the new 2030 -55% **GHG** target only in **2051**, with a delay of 21 years. With regard to the achievement of the other targets for **renewables** (40%) and **energy efficiency** (+36%), Europe also shows a significant delay: at the current pace it will achieve them in **2043** and **2053** respectively.

In Italy, the 2030 PNIEC still needs to be revised[1] according to the new proposed "Fit for 55" package. By estimating the new targets that Italy could set in the new version of the PNIEC, the following targets can be considered for the country: -43% GHG emissions, 37.9% of renewables and 46.4% of energy efficiency improvements. Assessing Italy's current performance in achieving these targets, however, a delay of 29 years on average emerges compared to 19 years in Europe, with a delay of **24 years for RES**.

● **FIG II** → **Share of renewables (RES) in final energy consumption in Italy, 1990-2030** (% values)



● Historical trend ● Inertial trend*

● Trend needed to reach the estimated policy target related to the -55% GHG target at 2030

*The updated targets for Italy has been estimated by projecting the same percentage increase estimated at European level. Inertial trends have been calculated by projecting CAGR (Compound Annual Growth Rate) of different time spans according to the indicator considered: from 2015 to 2019 in the renewables analysis, in order to take into account the market maturity of renewable products. For 2020, estimates from ENEA have been taken into account. For 2021 onwards, it has been assumed that the same 2015-2019 trend holds.

Source → The European House – Ambrosetti and Enel Foundation on European Environment Agency, Eurostat and PNIEC, 2021.

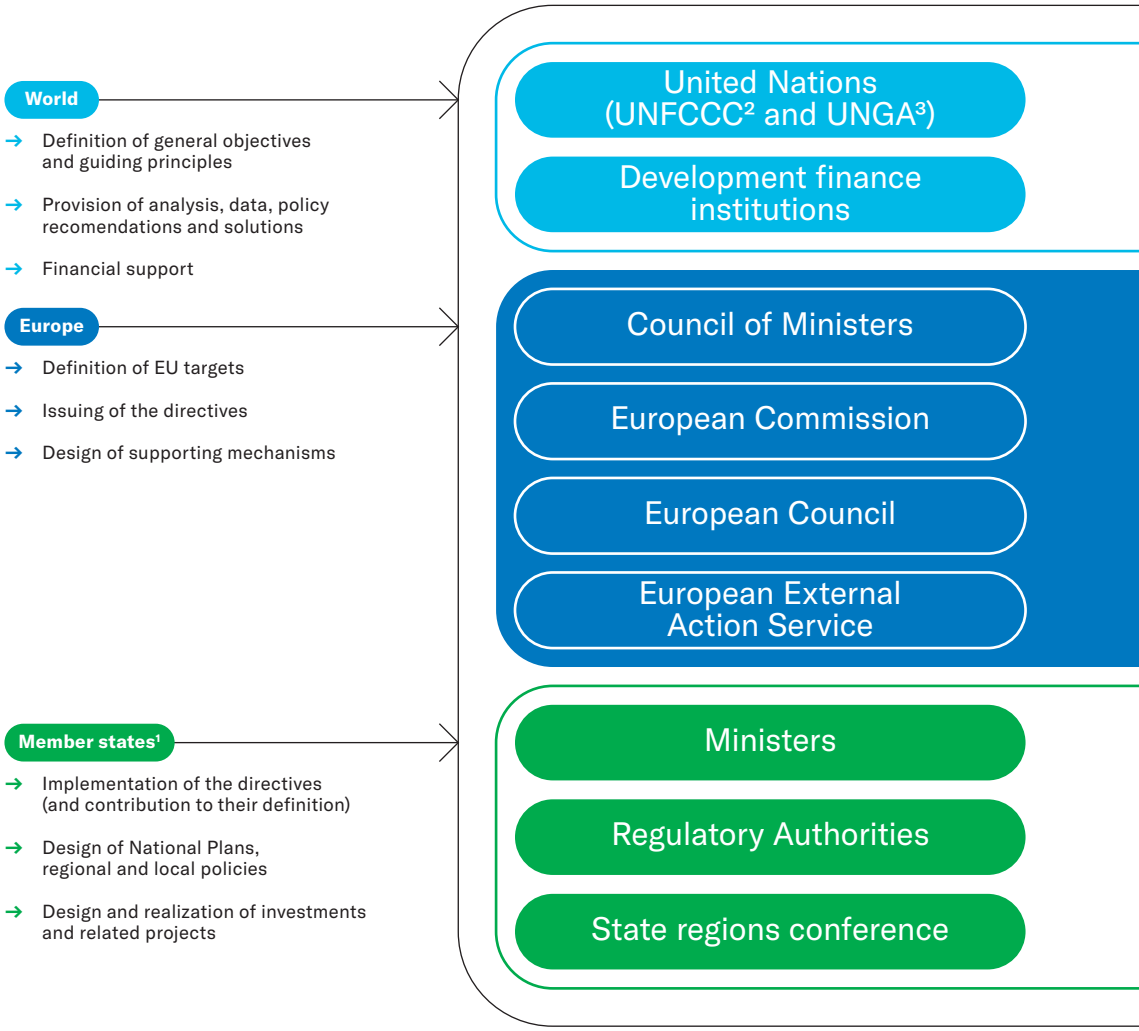
1 At the moment of writing this report (August 2021).

4

→ The slow pace is due in part to shortcomings in the governance of the energy transition, which must be tackled (as it has already started to be done in some areas) at an EU, Member State and local level

In the present study, the **governance of the energy transition** has been defined as the set of roles, rules, procedures and tools (at legislative, implementation and monitoring level) concerning the management of the energy transition that aims at reaching strategic and operational targets:

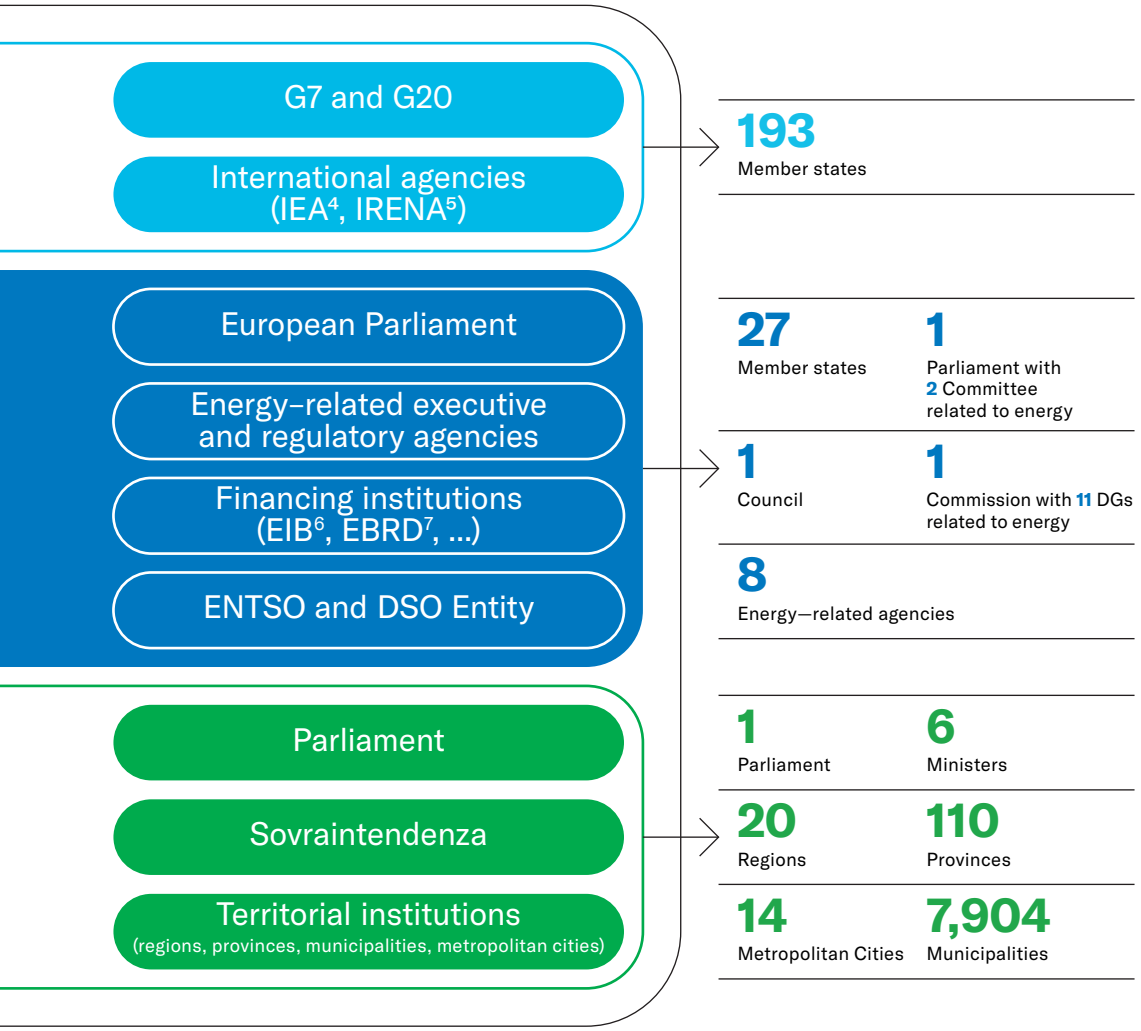
● **FIG III** → **Actors involved in energy transition governance**



Source → The European House — Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

- Setting **climate, energy and environmental targets** and effectively and efficiently achieving them.
- Maximising **synergies between all the sectors and actors involved**, including EU institutions and Member States and non-EU countries.
- Facilitating the effective and efficient deployment of the necessary **investments**.
- Ensuring **smooth processes and procedures** and setting up accountability, control and enforcement provisions, ensuring that actions are put in place and results achieved.

The **governance of the energy transition** is a highly intertwined mechanism involving several actors at the global, European, national and local level with differentiated roles and assignments.



1 → The focus of the study is on Italy. 2 → United Nations Framework Convention on Climate Change.
3 → United Nations General Assembly. 4 → International Energy Agency. 5 → International Renewable Energy Agency.
6 → European Investment Bank. 7 → European Bank for Reconstruction and Development.

The current European energy transition governance is affected by **three main issues**.

1. Firstly, **energy** is a **shared competence** between Member States and the EU: both can legislate on this matter and adopt legally binding acts. This does, however, mean that the legal framework of specific sectors, the mechanisms to measure the achievement of targets and the standards related to that sector and relevant for the achievement of targets are not alwyas homogeneous. In addition to the lack of homogeneity, shared responsibility for energy often leaves gaps in regulations and guidelines, as in the case of investments in distribution and transmission grids.

2. The second issue is related to the **need to implement a new "indirect" enforcement**. From a system based on binding EU-wide targets and non-binding Member State targets (with the exception of GHG reduction, binding also at Member State level) matched with an indirect enforcement system, through the Recovery Plan the EU is progressively turning to a system where the Member States are responsible for making good use of the huge resources provided by the Commission. This requires urgent and coordinated action by Member States to lay out and implement one of the biggest investment programmes in history, assuring timely coordination of various public and private actors, while at the same time addressing the inefficiency of the current system.

3. The last issue is connected to the **need to strengthen the new mechanism for managing policy targets**. The current mechanism for managing policy targets and transpositions into National Plans is still based on a pre-Recovery Plan vision, which has led to some inefficiencies. The RES and energy efficiency targets set out in the "2030 Climate and Energy Framework" are not binding at Member State level, but only at the level of the EU as a whole, while the target for GHG emissions is also directly binding for Member States. As a consequence, EU targets are **not adequately addressed by all Member States** and their results are very uneven and unsatisfactory. Member State targets - and actions to attain them - must be quickly aligned with the opportunity offered by the available resources of the Recovery Plan.

In **Italy**, energy governance is affected by five issues limiting a successful energy transition.

1. In Italy, there is a high degree of **fragmentation of competences between different actors at different levels** of governance and between the central government and local institutions (regions, metropolitan cities, provinces and municipalities). Each of the actors involved has a different area of responsibility, and the existence of veto powers (as in the case of the Italian Ministry of Cultural Heritage within the authorisation process for RES plants) or more in general of discretional and negotiating powers, strongly limits the effectiveness and efficiency of the process.

2. Competences related to the various dimensions of energy transition are assigned to different **territorial actors** (regions, metropolitan cities, provinces and municipalities) which apply their regulations, resulting in territorial differences and **non-uniform application of**

national laws at local level. This causes further uncertainty on the procedures and gives rise to potential discretionary behaviour by the competent authorities.

3. Multi-level governance, regional differences and lack of effective commitment to the energy transition by local authorities also lead to the issue of **social acceptability** and **poor involvement** of local communities.

4. The **role of technical administrative public bodies** also deserves particular attention. Technical administrative public bodies play a key role in ensuring the **efficient and quick deployment of the investments** needed for the energy transition. However, they present inefficiencies mainly due to understaffing, unmet skills requirements, lack of appropriate professional figures for RES authorisation processes and to the complicated regulatory frameworks within which they must operate.

5. Finally, there is **fragmentation in sectoral policy design**. This situation is evident, for instance, in the incoherence of the legislative framework and the absence of long-term targets for energy efficiency as well as in the fragmented cooperation mechanism in place between local authorities on the one hand, and Distribution System Operators (DSO) and Charge Point Operators (CPO), on the other, for the development of charging infrastructure.

As in the EU case, the five issues of governance at the Italian level entail practical consequences for each sector analysed. For example, the **permitting procedures for renewable energy sources** are inefficient and this causes overly long authorisation times and heavy uncertainty on timing and outcome of the authorisation process (despite the rule approved in the EU "Clean Energy Package", RED II, that provides for a maximum of two years to obtain the authorisation for the installation of renewable plants). As a consequence, the pipeline of authorised renewable projects is simply not enough to meet the Italian decarbonisation targets.

5

→ To accelerate the EU and Italian energy transition and address the governance outstanding issues, seven proposals has been identified

The energy transition entails several economic, social and environmental benefits. Nevertheless, to take full advantage of the opportunities offered by the transition, some outstanding governance issues must be addressed. To this end, **7 proposals** have been identified to tackle the existing challenges. The proposals have been grouped into two different levels according to the sphere of action: European (internal and external dimension) and Italian.

● **FIG IV** → **Proposals to foster the energy transition at European (internal and external dimension) and Italian level**

At European Union level

EU — Internal dimension

1. Implementing a **stronger form of cooperation** in the governance of the energy transition, officially recognising its critical role
2. Adopting a **regional approach** to enhance EU market integration

EU — External dimension

3. Encouraging internationally the **Carbon Border Adjustment Mechanism** (CBAM)
4. Promoting more effective mechanisms to ensure that **Nationally Determined Contributions** are **consistent** with the objectives of the **Paris Agreement**

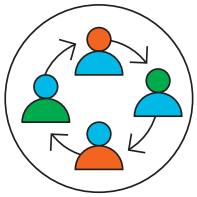
At National level

IT — Focus on Italy

5. Simplifying the **authorisation procedures for RES plants** and favouring energy efficiency interventions
6. Creating a **homogeneous and standardized mechanism of interaction** between local authorities on the one hand, and Distribution System Operators and Charge Point Operators on the other
7. Promoting a full integration of **districts** and **clusters of companies** at local level, **ecosystems of innovation** and **energy communities** with the national distribution grid

Source → The European House – Prepared by Ambrosetti and Enel Foundation, 2021.

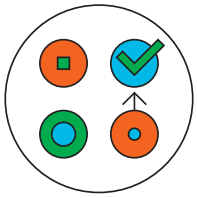
Proposal 1



→ Implementing a **stronger form of cooperation** in the governance of the energy transition, officially recognising its critical role.

- Envisage closer **cooperation and coordination between Member States and EU institutions** leveraging on the "new" role of the EU Commission in the monitoring phase of the Resilience and Recovery Plans, which has led to an evolution of the need for enforcement mechanisms towards reward systems that maximise benefits and EU common interest.
- Formally appraise the relevance and contribution of the **private** sector in policy making.
- Guarantee that the enforcement of the upcoming new **State Aid** framework incentivises investments in energy transition, ensuring that the Next Generation EU funds are spent.
- Enrich the current mechanism of national parliamentary participation in the definition of European treaties and legislation by introducing a "**Green Card**" to national parliaments so they can proactively step up and ask the EU to take action to improve energy transition policies.

Proposal 2

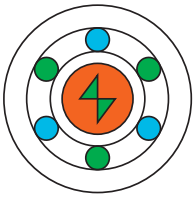


→ Adopting a **regional approach** to enhance EU market integration.

- Create **regional hubs** among neighbouring Member States (still in compliance with the Single Market and in accordance with the concept of regional cooperation included in the Regulation on the Governance of the Energy Union) by:
  - Creating common standards, ensuring coordination to ease successive scale up to European level.
  - Favouring a greater role of cities and direct reporting to the Commission.
  - Institutionalising forms of cooperation between neighbouring countries or regional hubs.
- Member States and regional hubs should consider new **market designs** for the massive deployment of renewable energy sources, while regional approaches could be envisaged for the deployment of new market products for the integration of renewables in the electricity system.
- It is important to emphasise that the regional approach is intended as a "**building block**" for broader European integration, aligned to high standards of ambition.

EUROPEAN LEVEL – EXTERNAL DIMENSION

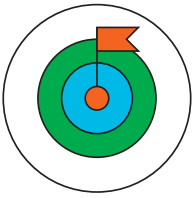
Proposal 3



→ Encouraging internationally the **Carbon Border Adjustment Mechanism** (CBAM).

- **Strengthen the current EU ETS competitiveness safeguards**, in coordination with the Carbon Border Adjustment Mechanism recently proposed by the European Commission, and initially ensure the funding of innovative projects and new sustainable industrial solutions.
- Support **global agreements in the industrial sectors** to accelerate technology innovation.
- **Redistribute revenues** generated by decarbonisation policies (such as carbon pricing) in the form of:
  - Economic support to **keep costs** of cleaner energy carriers to end users reasonably **low** also through a redistribution of the tax burden.
  - **Lump-sum transfers** on a per-head basis or rebates on VAT/taxes on electricity in order to reduce inequality.
- Introduce a **European financing programme** to support the **decarbonisation of the ETS industry** through the **deployment of zero carbon technology** to accompany it on the path to net-zero emissions.

Proposal 4

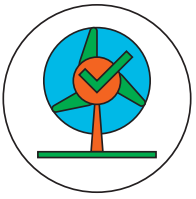


→ Promoting more effective mechanisms to ensure that **Nationally Determined Contributions** are consistent with the objectives of the Paris Agreement.

- Foresee mechanisms for **mentoring and knowledge sharing** among the most advanced countries in energy transition fields.
- Introduce **mechanisms to highlight the economic, industrial and social benefits** - in addition to climate benefits - associated with higher levels of ambition and more effective decarbonisation and transition policies.
- Promote **closer involvement of stakeholders** at all levels, both public and private.
- Support the creation of adequate **tools** (focused on technological collaboration and transfer) for energy transition in developing countries, starting from interconnections with and within the African continent.

NATIONAL LEVEL (FOCUS ON ITALY)

Proposal 5

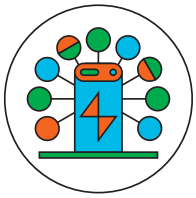


→ Simplifying the **authorisation procedures for RES plants** and favouring energy efficiency interventions.

- Recognize the status of **national public interest** to the "development of renewables" and **rethink veto powers**.
- Make the authorisation procedures for RES more efficient, by:
  - Standardising and digitalising procedures at national and local level.
  - Setting the conditions to respect legally binding deadlines and accelerating permit issuance times.
  - Reducing the number of entities involved to streamline the process.

- Establishing a national observatory to monitor the state of the art of energy transition on some key parameters (e.g. permitting status) at local level.
- Increase the **commitment of local bodies** and make the involvement of social stakeholders in the authorisation process effective.
- Create a **single repository and interface** for all Italian stakeholders to access detailed mapping of all existing incentives for energy transition interventions as well as of project permitting status and the achievement of decarbonisation targets.
- Increase the **human capital** and ensure **upskilling and reskilling** of public personnel working on the energy transition, starting with Ministries and public bodies.

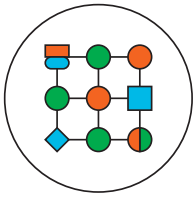
Proposal 6



→ Creating a **homogeneous and standardized mechanism of interaction** between local authorities on the one hand, and Distribution System Operators and Charge Point Operators on the other, in order to facilitate the development of the charging infrastructure.

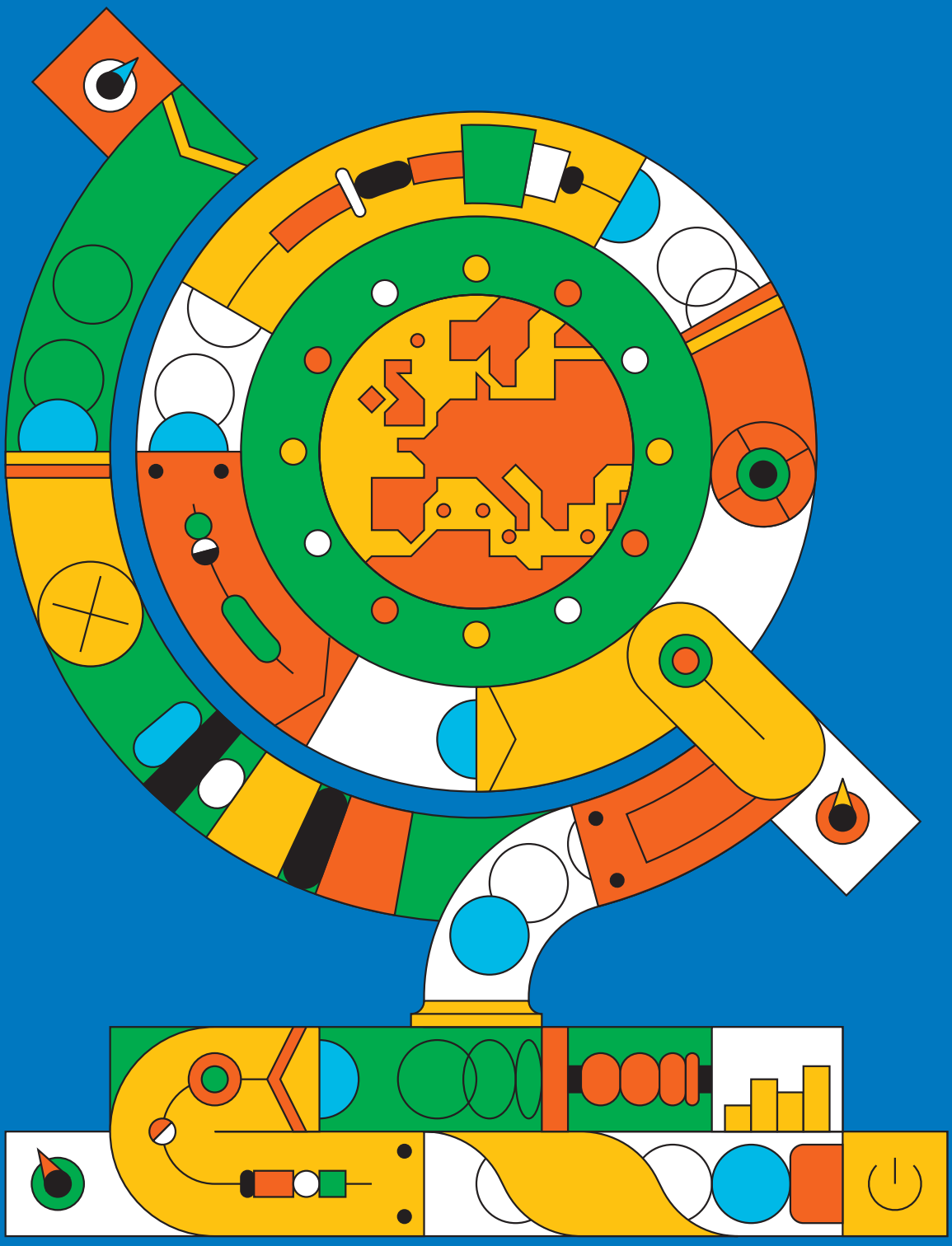
- Promote the **dissemination of interoperability standards** for charging infrastructure.

Proposal 7



→ Promoting a full integration of **districts** and **clusters of companies** at local level, **ecosystems of innovation** and **energy communities** with the national distribution grid.

- Promote the **creation of districts and clusters** of companies at local level to foster energy transition along the whole industrial value chain, also by creating an **ecosystem for innovation** and fostering cooperation between different companies.
- Support a fully integrated development of **energy communities**, addressing specific elements in the current legislation (current criterion of secondary substations, definition of incentives, governance of the mechanism), leveraging on positive externalities (e.g. fewer losses, fewer disconnections, higher quality and resilience, lower network costs, lower investment) and fostering distributed generation capacity from renewables and the active **involvement of citizens in more efficient consumption patterns**.



Part 1

The energy transition reference context in Europe and Italy

Key messages

1

→ **Climate change** represents the key challenge of our time. The increase in global GHG emissions is reflected in the rapid **increase in global temperatures** recorded in recent years, with severe consequences for the environment and society.

2

→ Although GHG reduction is an inherently global challenge, **an assessment** has been performed on policy targets, investments and actions needed, in order to understand how Europe and Italy are performing in this area. The results of the assessment highlight an important distance from the policy objectives, thus shedding light on great opportunities in terms of investments and actions needed to successfully address the energy transition in Europe and Italy.

3

→ Based on current trends, **Europe** will reach the **new 2030 target of -55% GHG emissions only in 2051**. As regards renewables, Europe will fall short with respect to the 2030 40% target by more than 12.2 percentage points, only reaching it in **2043**. Considering energy efficiency, Europe will reach the +36% 2030 target only in **2053** at the current rate of improvement.

4

→ In Italy, the Integrated National Plan for Energy and Climate (PNIEC) 2030 still needs to be revised[1] according to the new "Fit for 55" package. By estimating the new targets that Italy could set in the new version of the PNIEC, the following targets can be considered for the country: -43% of GHG emissions, 37.9% of renewables and 46.4% of energy efficiency improvements. However, assessing Italy's current performance in achieving these targets, a delay of **29 years** on average emerges compared to 19 years in Europe, with a delay of **24 years for RES**.

1 At the time of writing this report (August 2021).

5

→ The **European Commission** has envisaged significant additional investments between 2020 and 2030 to reach the more ambitious GHG emissions target. Overall, there is an opportunity of investing additional **3,564 billion Euros** in the energy system between the current investment trend and the -55% GHG scenario investments up to 2030. In **Italy**, the PNIEC estimates **186 billion Euros** of additional energy investments with respect to the current 2030 policies scenario.

6

→ Looking at the **actions needed** to reach the 2030 RES electricity production target, although performances in **Europe** are good with regard to the 'old' targets, the new revised target will not be achieved at the current pace. Conversely, the picture in **Italy** is different and the 2030 gap with respect to the PNIEC targets will be **23GW for photovoltaics** and **2.3GW for wind power**. These gaps will be even more severe with respect to the updated -55% target. The photovoltaics gap could be filled by installing 4.3 million small size plants, or 6,000 utility scale plants or 994,000 average size plants (requiring 20 more years starting from 2030 at the current rate), which means multiplying the number of installations present today by 5 in the first two cases and by 2 in the latter case.

7

→ With respect to grids, between **85 and 95 billion Euros** of investments in distribution grids for emission-free generation are needed in EU27+UK in the period 2020-2030, corresponding to **3.3 billion Euros** in Italy, which will allow to connect additional 35GW of RES power to the grid.

8

→ As far as **buildings** are concerned, to meet the current energy efficiency target in **Europe**, the current **renovation rate** (and the related energy savings) **must triple**, rising from an annual 1.0% to 3.0% by 2030. The same goes for **Italy**, where the **renovation rate must rise from 0.8% to at least 2.1%** in the residential and tertiary sectors.

9

→ With regards to **transport**, **30 million electric vehicles** are expected in **Europe** by 2030 (**x30** the current level). In Italy, according to a net zero decarbonisation scenario in 2050, it is reasonable to estimate **9 million electric cars** in 2030, which means multiplying the current number of electric cars by **227** over the next 10 years. **45,000 charging stations** would be needed in Italy, more than four fold increase in the next ten years compared to the current 9,709 charging stations.

10

→ The **industrial** sector in Europe shows a **stable composition of energy sources** in the last 10 years, still strongly relying on fossil fuels, as well as **minimal improvements in final energy consumption reduction**. The progressive shift to green energy sources is particularly urgent for sectors with higher electrification potential which generate greater GHG emissions.

11

→ Europe has an **unprecedented opportunity** to make the appropriate investments and fill these gaps. The core of the European strategy for the COVID-19 Recovery is **Next Generation EU**, a **750 billion Euros** multi-year plan that aims at creating a more connected, sustainable and resilient Europe. **Around 30%** of the total allocated resources from Next Generation EU and multi-annual budget 2021-2027 (around **500 billion Euros**) will be focused on climate-related projects. **Italy** is the main beneficiary of Next Generation EU, with the national Recovery and Resilience Plan (PNRR) amounting to a total of about **235 billion Euros**. Mission 2, the "**green revolution**" is the one receiving the largest amount of financing, equal to about 59 billion Euros, **30% of the total**.

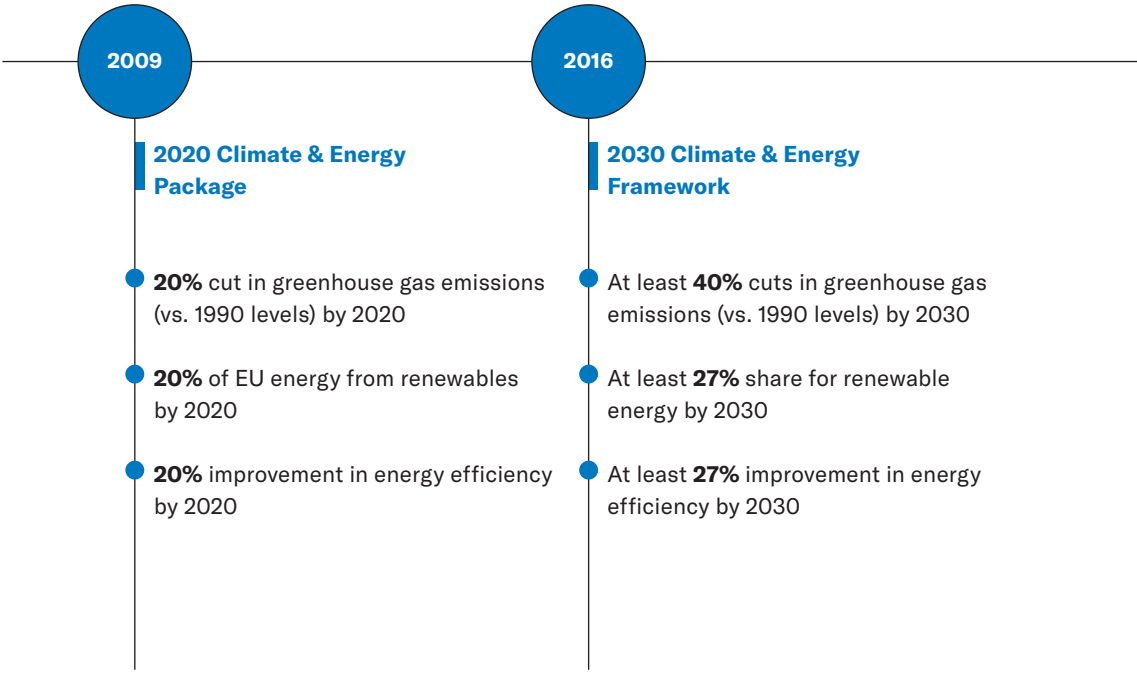
12

→ The deployment of investments in the analysed sectors involved in the energy transition process, also thanks to resources provided by the Next Generation EU and the Italian PNRR, would generate both in Europe and in Italy a number of benefits at **economic**, **societal** and **environmental** level. The GDP multiplier of the electricity sector reveals that for each Euro invested, the total impact on the economy is **2.28 Euros** of GDP (with a direct impact in the electricity sector of 1.19 and indirect and induced effect of 1.09). Thus, if the European Union and Italy were to succeed in unlocking the investment gap, they could generate a direct, indirect and induced benefit to their economies equal to **8,126 billion Euros** and **424 billion Euros** respectively.

1.1 The commitment of European and Italian Institutions to the energy transition

1. Climate change represents the key challenge of our time, a global endeavour that goes beyond national borders and impacts on all of our lives. The increase in global GHG emissions caused by human activities is reflected by the rapid increase in global temperatures of recent years and, consequently, a **+84%** increase in environmental disaster events in the last 20 years compared to the previous period. As stated in the UN-IPCC report published in August 2021, any of the changes across the whole of Earth's climate system are unprecedented, and some of the shifts are in motion now, while some - such as continued sea level rise – are already 'irreversible' for centuries to millennia ahead. The document shows that emissions of greenhouse gases from human activities are today responsible for approximately 1.1°C of warming compared to 1850-1900 period, and finds that averaged over the next 20 years, global temperature is expected to reach or exceed 1.5°C of heating.

● **FIG 1** → **European Climate and Energy targets**



*The "Fit for 55" package is not yet definitive; European Parliament and Member States will negotiate and adopt package of legislation for reaching 2030 climate targets by the end of 2021. The package has also introduced targets for the buildings (35 million should be renovated by 2030) and the industry (with the introduction of the CBAM).

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

Indeed, according to estimates by the Copernicus Climate Change Service, global temperature change will reach the critical threshold in **2034** if the warming trend continues as in the last 30 years.

2. Fossil fuels, responsible for most human-induced climate-changing emissions, still represent our main energy source today. In order to achieve decarbonisation[1], the traditional paradigm of **energy production and usage based on fossil fuels must be superseded**. Indeed, global, European, and national institutions are supporting the development of sustainable energy policies, paving the way towards the decarbonisation of the global energy sector.

3. In this context, since the 1990s the **European Union** has played a leading international role in the fight against climate change, adopting policies and defining highly ambitious objectives regarding the reduction of greenhouse gas emissions, the share of renewable sources in final energy consumption and energy efficiency improvements. During the State of the Union on 17th September 2020, the European Commission revised its target, setting a **net greenhouse gas emissions reduction goal for 2030 of at least 55% compared to 1990 levels**, superseding the previous target of at least 40%. Such an ambition for the next decade aims to put the EU on the right path to achieving climate neutrality by 2050. This revision follows the European Commission's acknowledgment of

55%
net greenhouse gas emissions reduction goal for 2030

2018

Political agreement between EU Commission, the European Parliament and the Council

- Sets a new target for renewables at **32%** by 2030
- Sets a new energy efficiency target for the EU for 2030 of **32.5%**, with an upwards revision clause by 2023

2021

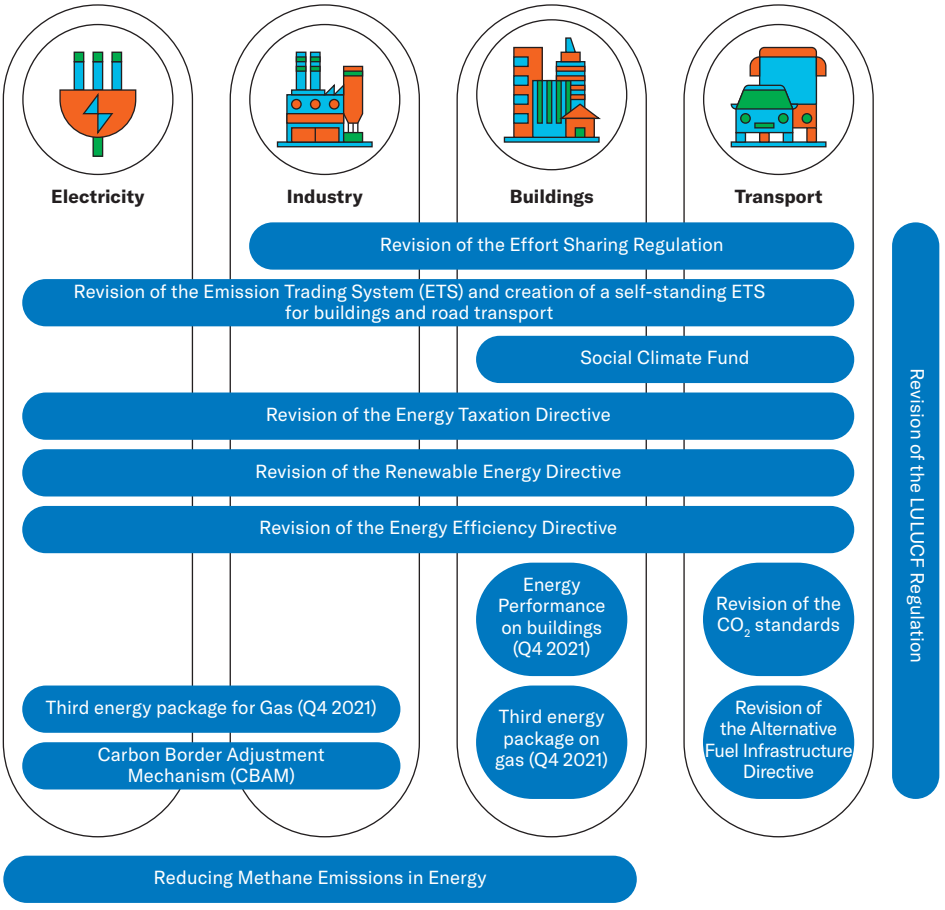
"Fit for 55" package*

- Sets a new target of **-55%** greenhouse gas emissions (vs. 1990 levels) by 2030
- Sets new targets: **40%** share for renewable energy and **36%** improvement in energy efficiency by 2030
- Along with the targets upgrade, the European Commission has introduced additional measures and targets to achieve Europe's carbon neutrality by 2050 in the electricity, industry, transport and residential sectors

1 The reduction of greenhouse gas emissions into the Earth's atmosphere, aimed at reducing the so-called greenhouse effect.

the inconsistency of the previous targets (and consequent policies), which would have led to a reduction in emissions by 2050 of about 60% compared to 1990 levels. Coherently with the -55% GHG target on 14th July 2021, the European Commission published a set of proposals (the "Fit for 55" package) to revise the European targets for energy transition at 2030. Besides the -55% net greenhouse gas emissions reduction goal for 2030, the other targets are 40% of renewable energy sources and +36% of energy efficiency improvement. The "Fit for 55" package consists of **13 pieces of legislation** (8 proposals of reviews of existing pieces of legislation and 5 new initiatives) that introduce measures at different levels and tackilng the challenge in the different sectors (see figure 2 for more details on the measures and the sectors covered).

● FIG 2 → **The proposed "Fit for 55" package**



Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

4. In **Italy and all other Member States**, the European targets have been implemented in National Plans and broken down into a series of specific objectives. The **Integrated National Plan for Energy and Climate** (PNIEC) 2030 in Italy sets the following targets: a 30% share of renewable

energies in gross final consumption, a 40% reduction in greenhouse gas emissions compared to 1990 levels and an energy efficiency improvement of 43% by 2030 with respect to the PRIMES 2007 reference scenario. However, the PNIEC still needs to be revised[2] to transpose the new European targets into more ambitious national objectives.

The European Green Deal, the investment plan for a sustainable Europe

Launched in December 2019 by the European Commission, the Green Deal represents a 1,000-billion-Euros investment plan to achieve carbon neutrality by 2050 and make Europe a world leader in the circular economy and clean technologies. The communication of the plan was accompanied by the presentation of a roadmap aimed at strengthening the eco-sustainability of the European Union through a wide range of interventions that focus primarily on the competences of the Member States and mainly concern energy, industry (including construction), mobility and agriculture. The roadmap provides for the definition of a binding law for all Member States upon reaching the goal of carbon neutrality by 2050, the so-called Climate Law published in March 2020. In light of the COVID-19 crisis, the objective of the European Union is to put the Green Deal at the centre of the EU post-Covid recovery, to ensure it pursues the objectives of sustainability and climate-neutrality.

Source → The European House - Ambrosetti and Enel Foundation elaboration on European Commission and other sources data, 2021.

5. The policy measures adopted to address the crisis caused by the **COVID-19 pandemic** must necessarily be combined with a broader vision that responds to the key challenges for the future of the planet, the effects of climate change and global warming, avoiding the risk of locking Europe into an economy based on fossil fuels and losing the industrial, commercial, technological and geopolitical opportunities of the energy transition. Indeed, the planned investments and the **Next Generation EU funds** represent an unrepeatable opportunity for energy transition in Europe. European leaders have agreed that around **30%** of total allocated resources (about **500 billion Euros**) should be devoted to climate-related projects, in order to make spending consistent with the objectives of the Paris Agreement.

● FIG 3 → EU budget approved in July 2020 by the European Council, 2021-2027 (billion Euros)

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Council data, 2021.

2 At the time of writing this report (August 2021).

1.2 The main levers of the energy transition: renewable energy sources, electricity transmission and distribution grids, energy efficiency and decarbonisation of carbon intensive sectors

6. To achieve the above-mentioned objectives, four main strategic levers have been identified as priorities as they play a pivotal role in the energy transition process, namely:

- Increasing the share of **renewable energy sources** in the energy mix.
- Developing **electricity transmission and distribution** grids.
- Improving **energy efficiency** in energy consumption.
- **Decarbonising carbon intensive sectors**, such as industry and transport.

7. As the energy sector is responsible for 53% of greenhouse gas emissions in Europe, increasing the share of **renewable energy sources** in the energy mix is essential to achieve a climate-neutral economy. The benefits deriving from the deployment of renewable energy sources are numerous, including savings in GHG emissions, with respect to which The European House - Ambrosetti and Enel Foundation have estimated the GHG emission reduction achievable by increasing the share of renewable energies by 1 percentage point[3].

● **FIG 4** → **GHG emissions avoided due to a 1 percentage point increase in the share of renewable energies in primary energy production in three different scenarios, 2018** (million tonnes CO_2e and % values vs. current GHG emissions of energy sector)

	Italy	EU27+UK
100% coal substitution	-3.84 (-1.1%)	-77.64 (-2.4%)
50% coal substitution and 50% natural gas substitution	-2.72 (-0.8%)	-55.07 (-1.7%)
100% natural gas substitution	-1.61 (-0.5%)	-32.49 (-1.0%)

Source → "Circular Europe: how to successfully manage the transition from a linear to a circular world", The European House – Ambrosetti and Enel Foundation, 2020.

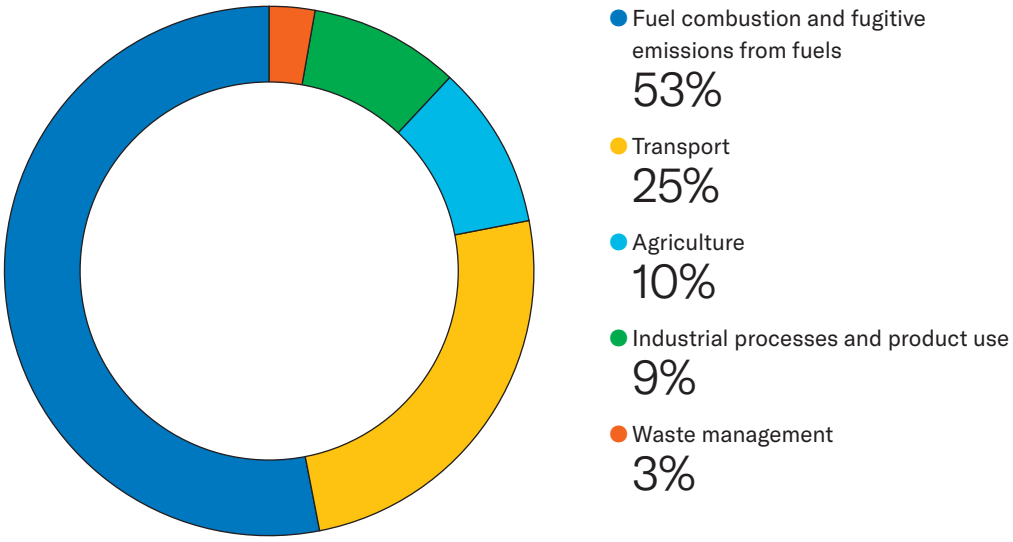
3 Source: "Circular Europe: how to successfully manage the transition from a linear to a circular world", The European House – Ambrosetti and Enel Foundation, 2020.

8. The development and digitalization of the electricity transmission and distribution grids represent crucial enabling factors for the integration and penetration of renewable energy sources in the energy system, to ensure that greater amounts of RES power can be connected to it.

9. Increasing **energy efficiency** in energy consumption means using less energy to provide the same output and is therefore an essential lever of the energy transition. Indeed, energy efficiency brings several benefits, including energy savings, energy security (reducing the dependence on energy imports by reducing overall demand), GHG emission savings and household and public budget savings (by enabling lower energy bills due to reduced energy consumption).

10. Another relevant lever for the energy transition is the **decarbonisation of carbon intensive sectors**, such as industry and transport, which together account for 34% of total GHG emissions in Europe (9% industry, 25% transport). Half of the emissions in energy-intensive industries[4] are caused by the combustion of fossil fuels for high-temperature processes.

FIG 5 → **GHG emissions by sector in EU27, 2018** (% values)



Source → The European House – Ambrosetti and Enel Foundation elaboration on European Environment Agency and Eurostat data, 2021.

4 Iron and steel, refineries, cement, petrochemicals, fertilizer, lime and plaster, and paper and pulp.

Enabling factors for the decarbonisation of trasport, buildings and industry

National focuses following the Enel Foundation's study "*Sustainable paths for EU increased climate and energy ambition*", carried out at the European level and published in October 2020, have identified enabling factors (technology, regulatory, and new business models) for the decarbonisation of the transport, buildings and industrial sectors.

In particular for the **transport** sector important **technology** enablers to be considered are:

- The recent and expected continued decrease in batteries price.
- Cost parity (for purchase cost) between electric vehicles (EVs) and traditional vehicles expected to be reached in 2025.
- Efficiency improvement and fuel savings of electric vehicles compared to internal combustion engines.
- Increasing availability of battery electric vehicles (BEVs) models and high production volumes due to mass-market manufacturing.
- Improvement in charging technology including fast and ultra-fast charging shortening time spent at public stations and reducing the "range anxiety" effect.
- New functionalities associated to EVs such as autonomous or assisted driving, home refueling and demand response.

For what concerns the **regulatory** enablers:

- Bonuses/maluses on internal combustion engines and low carbon vehicles purchase.
- Fuel taxes.
- Internal combustion engines bans in city centres.
- Stricter EU emissions norms and air quality standards.
- Incentives to car pooling (free tools, etc.).
- Internal combustion engines sales bans in the 2030's (e.g. recent European Commission proposal to ban carbon emitting cars and vans in 2035).

For what concerns new **business models**:

- Increased car pooling and multi modal transportation.
- Changes in consumer behaviour, i.e. the reduction in passenger kilometres, also thanks to shifts in transport modes, in particular in urban centres.

For what concerns the **buildings** sector, **technology** enablers that will represent a positive push are:

- Electrification of final uses through the deployment of heat pumps, with associated efficiency gains.
- Low carbon sources (electrification, bio energies, district heating) in energy consumption.
- Smart buildings, including energy management systems, active demand response capabilities, smart meters, digitalized services to occupants, and integration with transport systems.

Looking at the **regulatory** enablers:

- Government targets for renovation rate as part of national and EU policy targets for energy efficiency.
- Subsidies to incentivise uptake of heat pumps (tax reduction, grants, etc.).
- Energy Efficiency Obligation scheme (Italian White Certificates) and other fiscal incentives programs such as the Superbonus 110% to achieve energy efficiency targets.
- New regulatory tools fostering the renovation market, including one-stop shops, near zero energy buildings, extended Energy Performance Certificates, building renovation passports, standards on carbon content and minimum RES content, green public procurement, progressive bans for fossil fuels, incentives split among tenants and owners, schemes to alleviate energy poverty.

For what concerns new **business models**:

- The support of the government for the achievement of energy efficiency targets would allow historical energy companies, as well as new actors to offer energy efficiency services including advisory, engineering, financing, installations to deliver energy savings to their clients.

- Integrated offers by ESCOs including financing for upfront costs of works, demand response aggregation and energy performance contracts.

For what concerns the decarbonisation of the **industrial** sector, **technology** enablers identified are:

- Energy efficiency gains thanks to process improvements and electrification.
- Green hydrogen used as feedstock.
- Electrification technologies/innovations deriving from other industries: induction heating, mechanical vapor recompression, robotization, 3D printing.

For what concerns the **regulatory** enablers:

- EU directive on industrials emissions and the implementation of best available techniques to reduce emissions.
- Carbon price and carbon compensation measures (free allowances and State Aid) to support industry in decarbonisation efforts, in particular electrification.
- Schemes to support the use of green hydrogen in the industry.
- Demand side response.
- Energy efficiency schemes.
- Circular economy policies.
- Mandatory audit schemes.

As for new **business models**:

- Recycling and sector coupling amplifying energy efficiency gains.
- Energy services companies supporting industrial firms through a range of integrated services including energy management systems, demand side response and energy performance contracting.

Source → The European House - Ambrosetti and Enel Foundation elaboration on Enel Foundation, Compass Lexecon, Enerdata "Sustainable paths for EU increased climate and energy ambition"[5], October 2020 and other studies, 2021.

5 https://www.enelfoundation.org/news/a/2020/09/sustainable-paths-for-eu-increased-climate-and-energy-ambition.

1.3 Assessment of the current trends and required investments to activate the levers of the energy transition

11. To understand the challenge that Europe and Italy are facing to effectively reducing GHG emissions and becoming carbon-neutral, an assessment has been performed for each of the identified energy transition levers (renewable energy sources, electricity transmission and distribution grids, energy efficiency and decarbonisation of carbon-intensive sectors) with respect to three different dimensions:

- **Policy targets.** The 2030 policy targets have been mapped and the gap between targets and current trends has been analysed.
- **Investments.** The level of investment needed to achieve the 2030 targets has been mapped and the distance with respect to the current level has been analysed.
- **Required actions.** The actions required to reach the 2030 targets have been assessed, comparing them with present trends.

1.3.1 Assessment with respect to 2030 energy transition targets

12. In order to perform the assessment, consideration has been given to the new "Fit for 55" package. Indeed, the only consolidated revised target is the one regarding the **55% net reduction of GHG emissions**, while the other two have been announced as proposals but are not to be considered definitive yet. Nevertheless, the European Commission provides the targets for renewable energies and energy efficiency, revised accordingly to the -55% target:

- **40%** of renewable energy sources in final energy consumption by 2030.
- A reduction in final energy consumption of **36%**[6] by 2030.

6 The indicators Final Energy Consumption and Primary Energy Consumption are used to monitor progress towards achieving the European 2020 and 2030 energy efficiency targets. The target at European level is referred to as Final Energy Consumption as compared with the PRIMES 2007 scenario.

13. At the European and Italian level, the assessment compares current trends with the 2030 energy, climate and environmental targets with the objective of highlighting the **distance between the current trend and the efforts required to achieve the above-mentioned targets**. In the absence of elements suggesting a change of pace in the future, current trends have been calculated using a projection of historical data and therefore assuming a constant pace in the future.

14. Europe will need to work harder in all three dimensions to achieve the new targets. Indeed, at the current rate, Europe will reach the new GHG target only in **2051**. For renewable energies, Europe will fall short of the 40% estimated target for 2030 by 12.3 percentage points, reaching it only in **2043**. As regards energy efficiency, Europe will reach the +36% target only in **2053** at the current rate of improvement.

The social cost of GHG

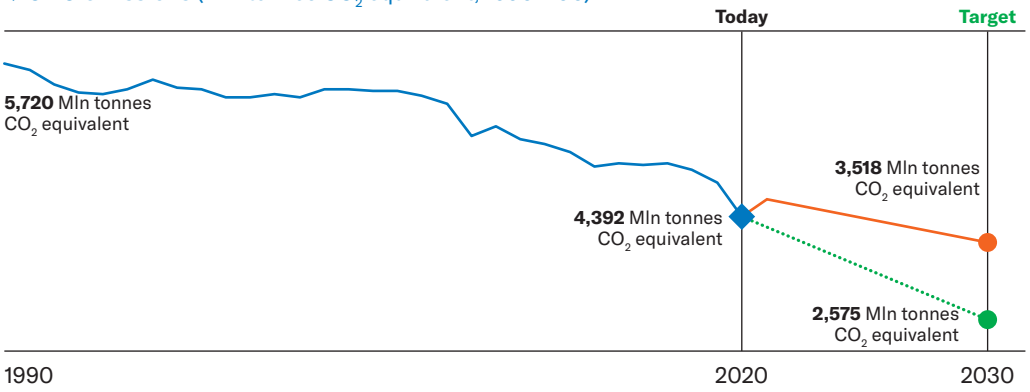
With reference to the "Fit for 55" framework, reaching 2030 with a 30% gap on the GHG target leads to social costs related to agricultural productivity, human health effects, property damage from increased flood risk, natural disasters, disruption of energy systems, risk of conflict and environmental migration.

The study of F. C, Moore e D. B. Diaz (2016), "*Temperature impacts on economic growth warrant stringent mitigation policy*" indicates a cost of €220/ton of GHG. So considering the existing gap on the GHG target, the social cost entailed if the gap is not bridged would be of 235 billion Euros by 2030.

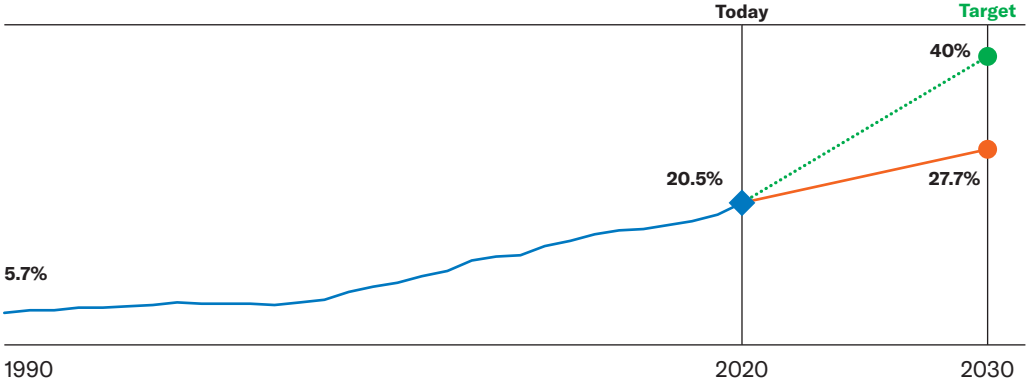
Source → The European House - Ambrosetti and Enel Foundation elaboration on Moore and Diaz "Temperature impacts on economic growth warrant stringent mitigation policy", 2021.

● FIG 6 → **Europe, 1990-2030**

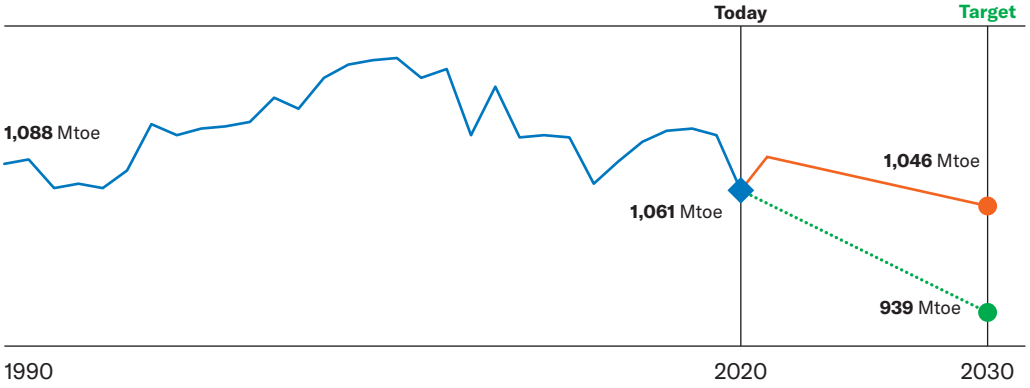
↓ GHG emissions (Mln tonnes CO_2 equivalent, 1990=100)



↓ Share of renewables (RES) in final energy consumption (% values)



↓ Energy efficiency (Mtoe)



● Historical trend ● Inertial trend* ● Trend needed to reach policy targets related to the "Fit for 55" package at 2030

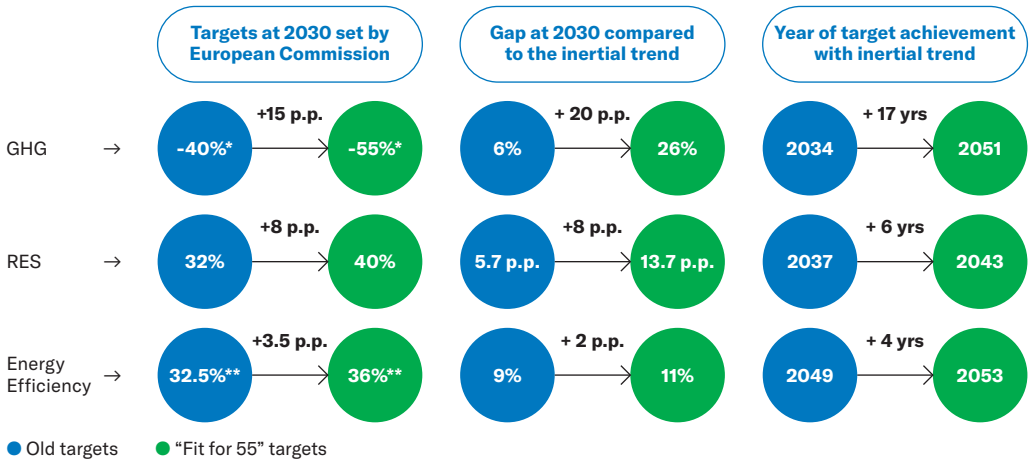
*Inertial trends have been calculated by projecting the CAGR (Compound Annual Growth Rate) of different time spans according to the indicator considered: from 2005 to 2018 in the GHG emissions analysis in order to consider the industrial evolution of each country, from 2015 to 2019 in the renewable energy analysis, in order to take into account the market maturity of renewable products; from 2006 to 2019 in the energy efficiency analysis.

N.B. → For GHG, the official 2020 data and 2021 projections both from International Energy Agency have been used. For RES, the 2020 data refers to International Energy Agency data. For 2021, the 2015-2019 trend has been taken into account. For energy efficiency, the 2020 data has been approximated with respect to the electricity demand in 2020 according to International Energy Agency. For 2021 data, the rebound in GHG emissions, after the reduction in 2020 due to COVID-19 emergency, has been used as a proxy.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Environment Agency and Eurostat data. 2021.

15. In order to understand the increase in the gap to achieve the 2030 objectives, compared to the previuos targets, a comparison has been performed. The table below summarizes the increased challange ahead.

● FIG 7 → **A comparison between the old targets and the "Fit for 55" package targets highlights the great challenge ahead**



*With respect to 1990 level.

**Compared to the PRIMES 2007 scenario.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Environment Agency and Eurostat data, 2021.

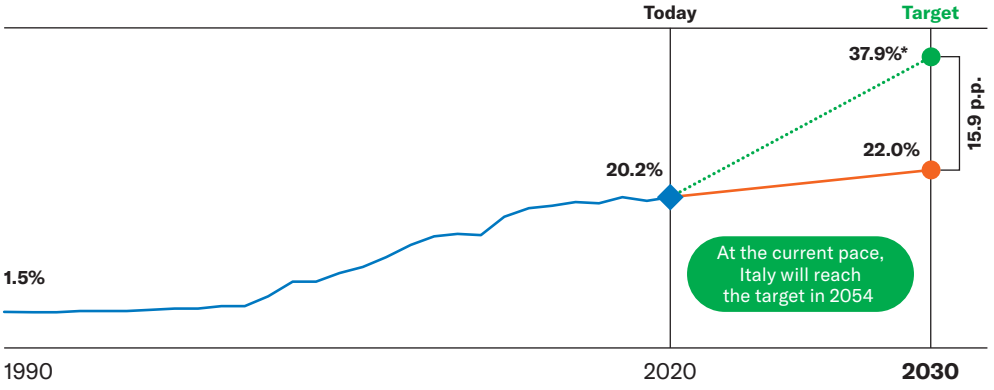
16. With regards to **Italy**, the **PNIEC 2030 targets** have been considered for the analysis. The current pace of GHG reduction for non-ETS sectors is on track for the 2030 objective but the country will fall short of the renewable energy sources target by 8 percentage points, only reaching it in **2042**. For what concerns the energy efficiency, at the intertial trend, Italy will reach its objective only in **2081**. However, it is important to highlight that **Italy still has to update its targets** according to the European Commission "Fit for 55" package. In the following box an estimate of the greater effort required by Italy to meet the 2030 targets has been realised. For instance, the analysis shows that the current pace of GHG reduction for non-ETS sectors – which would be on track for the current 2030 objective – will not be enough to fulfil the EU's new ambition.

Italian delay will be greater considering the coherent update of targets to the "Fit for 55" package

As already mentioned, Italy still has to update its targets according to the revision of the European Union, which has already set an increase for GHG emissions to -55% and will revise the other targets consequently. From the analysis of the "old" target, it is clear that a **greater effort is needed**, and this is particularly relevant if considering the update that will be needed to adapt the Italian PNIEC to the new EU targets. Assuming that the ratio between Italy and EU target is maintained, the new hypothetical targets for Italy have been estimated, and the performance on the 2020-2030 trajectory has been analysed. The following targets can be considered for the country: -43% of GHG emissions, 37.9% of renewables and 46.4% of energy efficiency improvements. However, assessing Italy's current performance in achieving these targets, a delay of **29 years** on average emerges compared to 19 years in Europe, with a delay of **24 years for RES**.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Environment Agency, Eurostat and PNIEC data, 2021.

FIG 8 → Share of renewables (RES) in final energy consumption, 1990-2030 (% values)



Historical trend Inertial trend**

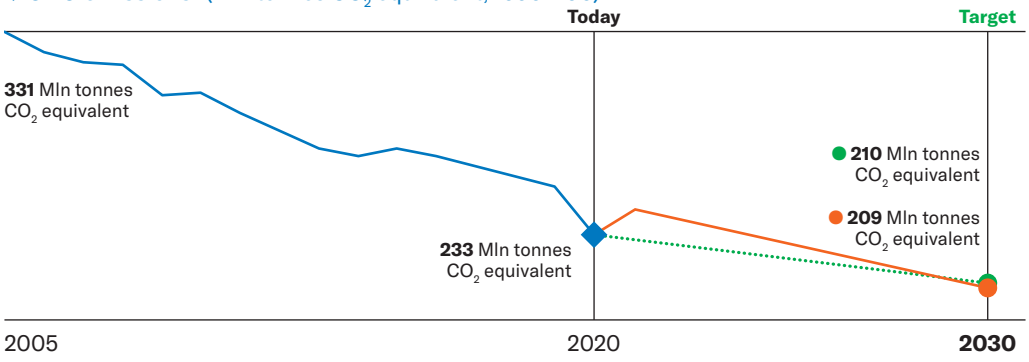
Trend needed to reach the estimated policy target related to the -55% GHG target at 2030

*Estimated RES target for Italy based on the PNIEC and the "Fit for 55" package.
**The updated targets for Italy has been estimated by projecting the same percentage increase estimated at European level. Inertial trends have been calculated by projecting CAGR (Compound Annual Growth Rate) of different time spans according to the indicator considered: from 2015 to 2019 in the renewables analysis, in order to take into account the market maturity of renewable products. For 2020, estimates from ENEA have been taken into account. For 2021 onwards, it has been assumed that the same trend 2015-2019 holds.

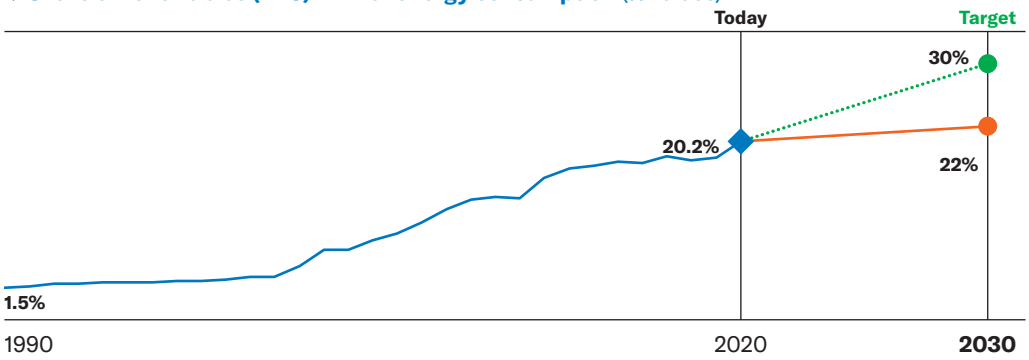
Source → The European House – Ambrosetti and Enel Foundation on European Environment Agency, Eurostat and PNIEC, 2021.

● FIG 9 → Italy, 1990-2030

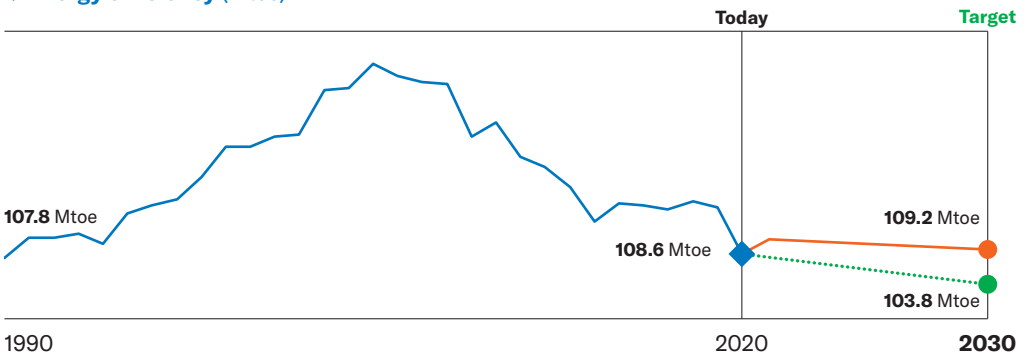
↓ GHG emissions* (Mln tonnes CO_2 equivalent, 1990=100)



↓ Share of renewables (RES) in final energy consumption (% values)



↓ Energy efficiency (Mtoe)



● Historical trend ● Inertial trend** ● Trend needed to reach policy targets at 2030

*The GHG emissions are those of non-ETS sectors. In the PNIEC, a -30% target at 2030 vs. 2005 has been defined, while the target for the ETS sectors has been set at -43%.
**Inertial trends have been calculated by projecting CAGR (Compound Annual Growth Rate) of different time spans according to the indicator considered: from 2005 to 2018 in the GHG emissions analysis in order to consider the industrial evolution of each country, from 2015 to 2019 in the renewables analysis, in order to take into account the market maturity of renewable products; from 2015 to 2019 in the energy efficiency analysis. For the GHG emission, the target linked to the non-ETS sectors has been used, since they are subject to the Italian energy transition governance.

N.B. → For GHG, the official 2020 data and 2021 projections both from International Energy Agency have been used. For RES, estimates from ENEA have been taken into account. For 2021 onwards, it has been assumed that the same 2015-2019 trend holds. For energy efficiency, the 2020 data has been approximated with respect to the electricity demand in 2020 according to International Energy Agency. For 2021 data, the rebound in GHG emissions, after the reduction in 2020 due to COVID-19 emergency, has been used as a proxy.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Environment Agency, Eurostat and PNIEC data, 2021.

Environmental targets in Europe and Italy

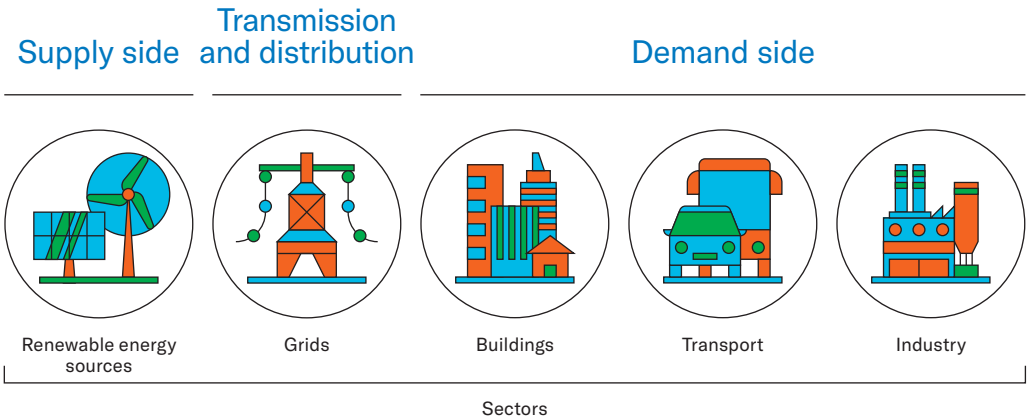
Even though they are not the specific focus of this study, it is worth noting that the identified levers for the energy transition (RES, energy efficiency and the decarbonisation of carbon intensive sectors) are able to generate multiple benefits in environmental terms, especially with regards to air quality. As such, the gap was also analysed with respect to environmental targets, at European and Italian level. As regards air pollution indicators, targets for 2030 have been set both at European and Italian level for Nitrogen Oxides (respectively -63% and -65%), Sulphur Dioxide (respectively -79% and -71%), ammonia (respectively -19% and -16%), $PM_{2.5}$ (respectively -49% and -40%) and non-methane volatile organic compounds (respectively -40% and -46%). Europe is on track to meet the environmental targets for NO_x (Nitrogen Oxides), SO_2 (Sulphur Dioxide) and NMVOC (non-methane volatile organic compounds) while falling short of the ammonia and $PM_{2.5}$ targets. For its part, Italy is on track to meet the environmental targets for NO_x and SO_2, as well as ammonia and NMVOC, while falling short of the $PM_{2.5}$ target.

Source → The European House - Ambrosetti and Enel Foundation elaboration on European Environment Agency and Eurostat data, 2021.

1.3.2 Assessment of the investments needed for the energy transition

17. In the context of the energy transition and among the different levers to decarbonise the economy, the study is focused on the **electric carrier** because of its importance for the decarbonisation of the system, including reduced CO_2 emissions, improved resilience, promotion of higher levels of energy efficiency, integration with digitalisation, stimulation of innovation and sustainability, promotion of the circular economy and reduction of noise pollution. From this point on, the analysis focuses on **the energy system's supply and demand sides**, as well as on **transmission and distribution**. Renewable energy sources have been considered for the supply side, while for the demand side the sectors analysed are buildings, transport and industry.

● FIG 10 → **The dimensions of the assessment with respect to investments and actions needed**



Source → The European House – Ambrosetti and Enel Foundation elaboration, 2021.

18. For each of the selected sectors, the level of investment needed to achieve the 2030 targets has been estimated and an assessment has been performed with respect to:

- **Renewable energy sources** and **power grids**.
- **Buildings**, with specific focus on the residential and tertiary sectors.
- **Transport**, with specific focus on electric vehicles and recharging infrastructures.
- **Industry**, with specific focus on the hard-to-abate sectors.

19. The assessment on investments has been performed at European and Italian level. For the European Union, the analysis relies on the **data provided by the European Commission**[7] and takes into consideration three different scenarios:

- Average annual investments, 2011-2020.
- Average 2021-2030 investments in baseline scenario (referring to the EUCO3232.5 scenario), which foresees a -40% reduction in GHG emissions.
- Average 2021-2030 investments in the -55% GHG scenario (including the more ambitious GHG reduction target for 2030 and the 40% share of renewable energies, -39.7% in primary energy consumption and -36% in final energy consumption, a scenario officially developed by the European Commission[8]).

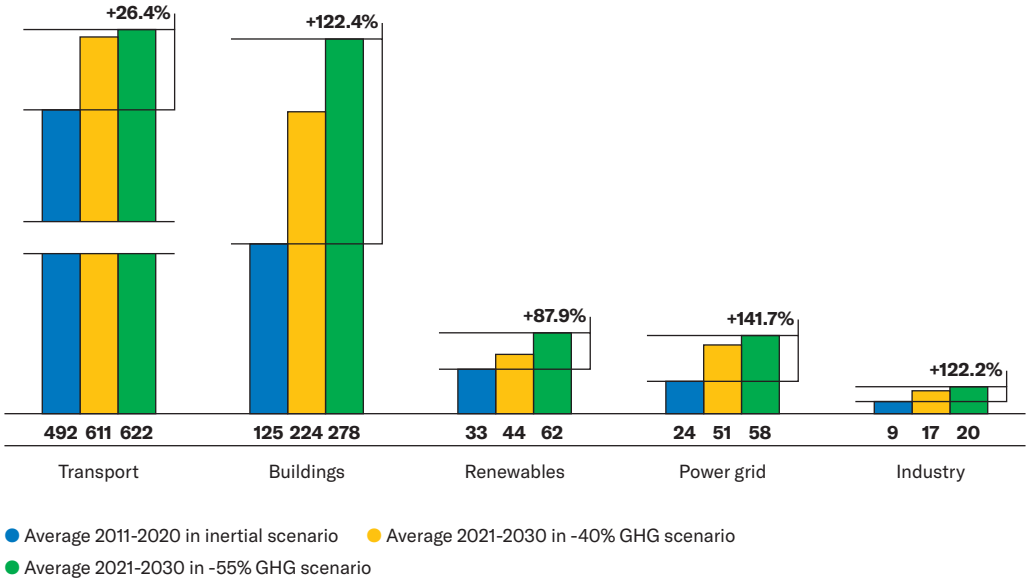
20. Due to the lack of historical data at Italian level, the investment analysis has been performed relying on **PNIEC data** and compares the investment trend needed to reach the PNIEC targets with those estimated as baseline before the implementation of the PNIEC (considered as the inertial scenario, i.e. the historical trend before the launch of the national plan). Again, it is important to point out that the investments reported in the Italian PNIEC refer to the targets currently in force, which do not yet take into account the EU target increase (-55%).

21. The European Commission has envisaged **significant additional investments between 2020 and 2030** to achieve the more ambitious target for GHG emissions. The power grid sector presents the highest percentage increase of average annual 2021-2030 investments, going from 24 billion Euros on average in the period 2011-2020 to 51 billion Euros and 58 billion Euros on average in the 2021-2030 period in the -40% GHG scenario and -55% GHG scenario respectively. On average, the transport sector invested the most each year over the 2011-2020 period (492 billion Euros) but still needs an increase in annual investment of +26.4% in the next 10 years according to the -55% GHG scenario.

7 Source: Impact Assessment accompanying the document "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Stepping up Europe's 2030 climate ambition. Investing in a climate-neutral future for the benefit of our people", European Commission, September 2020.

8 The scenario is referred to as MIX and achieves around 55% GHG reductions, both expanding carbon pricing to the transport and buildings sectors and moderately increasing the ambition of energy efficiency, renewable energy and transport policies.

● **FIG 11** → **Average annual historical investments, -40% GHG scenario investments and -55% GHG scenario investments in decarbonisation in EU27, 2011-2030** (billion Euros)

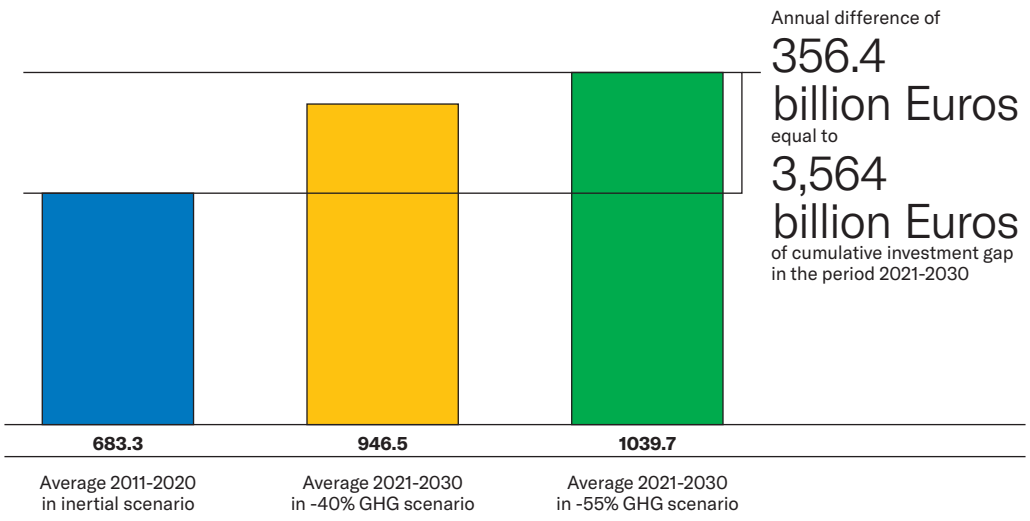


Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

22. Looking at the cumulative investments needed in the next 10 years, in Europe an additional 114 billion Euros are required **for renewable energies** in the -40% GHG scenario with respect to the inertial scenario over the period 2021-2030, with 162 billion Euros to be added on top in the -55% GHG scenario. The additional cumulative investments in the 2021-2030 period are equal to more than 80% of total cumulative investments between 2011 and 2020. **For power grids**, an additional 265 billion Euros is required with respect to the inertial scenario over the period 2021-2030, with 77 billion Euros to be added on top in the -55% GHG scenario, representing an increase of more than 140% of the total cumulative investments between 2011 and 2020. **For transport**, an additional 1,065 billion Euros is required over the period 2021-2030 with respect to the inertial scenario, with 102 billion Euros to be added on top in the -55% GHG scenario more than 20% of the total cumulative investments between 2011 and 2020. **For industry**, an additional 79 billion Euros are required over the period 2021-2030 with respect to the inertial scenario, with 34 billion Euros to be added on top in the -55% GHG scenario, which represents an overall increase of more than 125% of the total cumulative investments between 2011 and 2020. It is relevant to highlight that little investment is planned for the energy transition in the industrial sector, even if it is one of the major contributors to EU's GHG emissions (34.3% of the total) and value added (19.7% of the total). **For buildings**, an additional 990 billion Euros are required over the period 2021-2030 with respect to the

inertial trend, with 755 billion Euros to be added on top in the -55% GHG scenario, representing an overall increase around 140% of the total cumulative investments between 2011 and 2020. As seen, **different degrees of effort** are expected from the various sectors as for some of them most necessary investments were already incorporated in the policy scenario. For others, the -55% GHG scenario requires a relatively greater effort. Also, the additional effort required with respect to the historical cumulative investments **varies widely among sectors**. Overall, the gap between the inertial scenario investments and the -55% GHG scenario investments at 2030 in the **total energy system** is equal to **3,564 billion Euros** in the period 2021-2030.

● **FIG 12** → **Average total energy system investments (renewable energies, power grids, buildings, transport and industry) in different scenarios in EU27, 2011-2030**[E] (billion Euros)

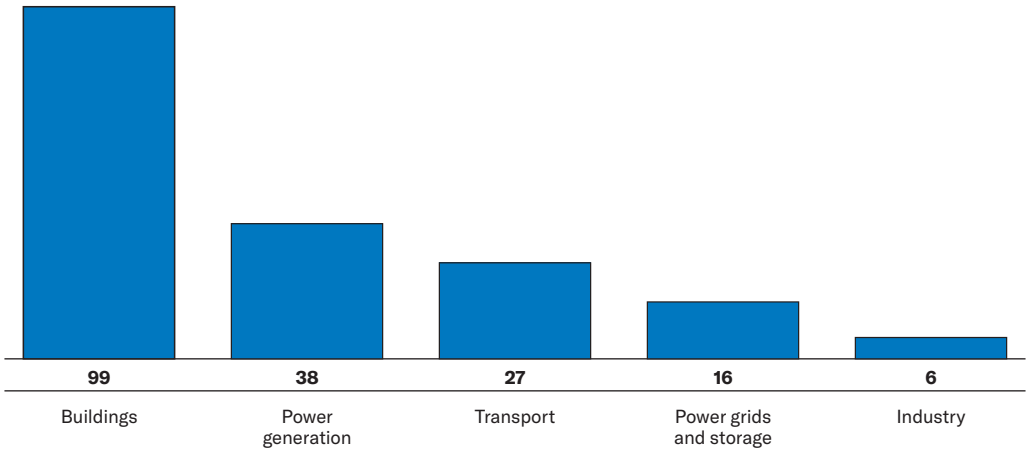


Source → The European House – Ambrosetti and Enel Foundation elaboration on Eurostat and European Commission data, 2021.

23. In **Italy**, the PNIEC estimates an **additional 186 billion Euros** of investments in energy with respect to the current policy scenario over the period 2017-2030, with the buildings and renewable energy sectors requiring greater additional investments to reach the 2030 PNIEC policy targets.

24. The PNIEC estimates are below what would be necessary to fulfil an ambition compatible with the target of reducing GHG emissions in the EU by 55% in 2030. According to deepdives undertaken by the Enel Foundation as a followup to its study "*Sustainable paths for EU increased climate and energy ambition*", published in October 2020, the increased ambition would imply comparable system costs in Italy. Investments would indeed have to be slightly higher, but overall energy system costs would be comparable to the PNIEC scenario, thanks to energy efficiency gains and fuel switching. This would mean that the increase in ambition would have **no impact on consumers** and would be aligned with the objectives of the EU Recovery Plan to prioritise green investments and steering private and public investments towards green projects. In a longer-term perspective, complete decarbonisation in 2050 can be achieved with lower system costs and comparable investment. As a matter of fact, costs would be lower thanks to fuel switching to electricity which enables end-uses to capture the reductions in battery costs and to achieve energy efficiency gains unlocked by electric vehicles and electrification. For what concerns investments, the decrease in investment in the transport sector due to changes in behaviours (reduction in car ownership, multi-modal transport, car pooling, etc.) and the reduction in battery costs would offset the increase in investments in buildings and hydrogen, thus leading to overall comparable levels of investments.

● **FIG 13** → **Additional investments in energy by sector in Italy estimated by the PNIEC scenario to reach the PNIEC targets with respect to the pre-policy scenario before PNIEC, 2017-2030[E]** (billion Euros)

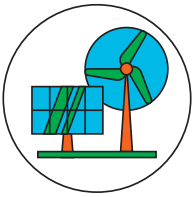


Source → The European House – Ambrosetti and Enel Foundation elaboration on PNIEC data, 2021.

1.3.3 Assessment of actions needed by 2030 to achieve the energy transition

25. For each of the selected sectors, the actions needed to reach the 2030 targets have been assessed with respect to:

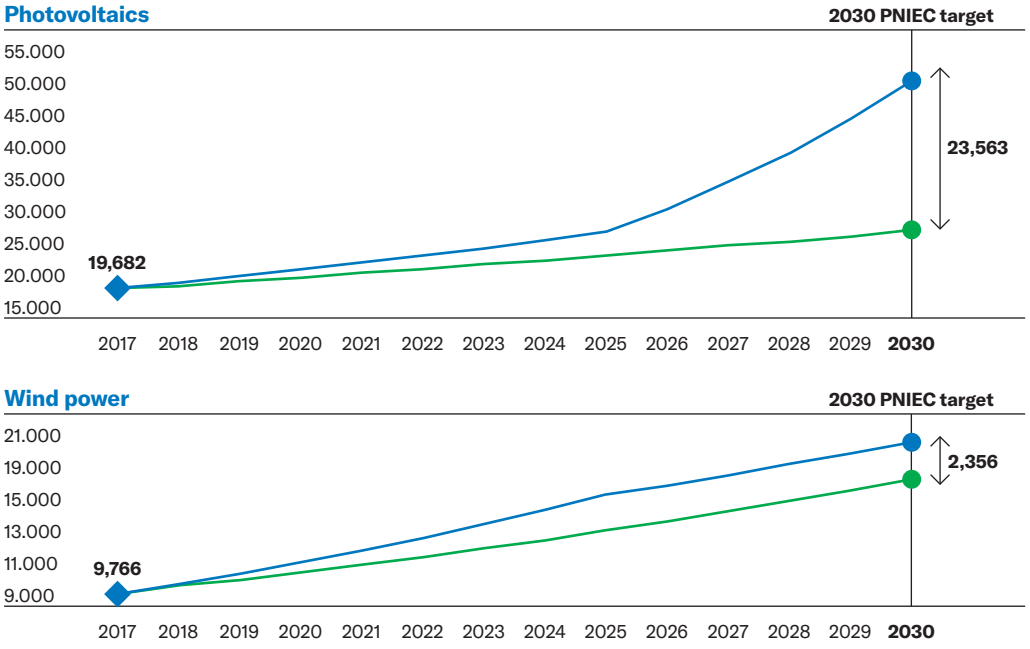
- **Renewable energy sources**, with specific focus on the installed capacity for small scale or utility scale systems for power generation.
- **Grids**, with specific focus on the investments needed to allow the connection of additional RES power.
- **Buildings**, with specific focus on the energy renovation rate for existing building stock and the technologies required to save energy.
- **Transport**, with specific focus on electric vehicles and charging infrastructure.
- **Industry**, with specific focus on the switch to electricity as the energy carrier for industrial processes.



→ **26.** The share of **renewable sources in power generation** has been considered in the assessment of the actions needed to reach the 2030 renewable energy targets. At the current rate, Europe is expected to exceed the current RES in electricity generation objective for 2030 by 2 percentage points, equal to 55.8% according to the EUCO3232.5 scenario. The same goes for electricity production capacity by RES, for which the EUCO3232.5 sets a target of 838 gigawatts by 2030, expected to be exceeded by 6 gigawatts at the current trend. However, it is important to bear in mind that according to the scenario officially developed by the European Commission to achieve the new objective of a 55% reduction in GHG emissions, the target for the share of renewable energies in final consumption would be increased to 40% and, as such, the target for renewable energies in power generation could be revised upwards accordingly. This would lead to an upgrade of the targets for RES in electricity generation and electricity production capacity by RES, which we can reasonably assume will not be achieved at the current pace. Moreover, the **current situation in Europe for solar and wind power is uneven** because the top 5 countries in terms of electricity production capacity (namely Germany, Italy, United Kingdom, France and Spain) have very different growth rates.

27. In particular, **Italy is the slowest country among the Big-5** in terms of solar installed capacity growth (3% in the period 2015-2019) and the second slowest after Spain in terms of wind installed capacity growth (4% in the period 2015-2019). Indeed, if Italy continues to install photovoltaic plants at the same rate, in 2030 the gap with respect to the PNIEC target will be **23GW**. The same gap, albeit with smaller differentials, also exists for wind power, equal to **2.3GW** in 2030.

● **FIG 14** → **Installed power gap for photovoltaics and wind power in Italy to achieve the 2030 target, 2017-2030[E]** (MW)



N.B. → The CAGR (compound annual growth rate) between 2017 and 2025 and between 2025 and 2030 has been exploited for the annual trend in installed power according to the PNIEC target for 2025 and 2030. For annual trends in actual installed power, the CAGR was used between the actual installed power in 2017 and the actual one in 2019.

Source → The European House – Ambrosetti and Enel Foundation elaboration on PNIEC data, 2021.

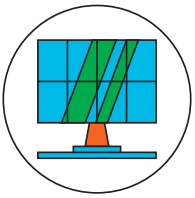
28. Elettricità Futura has provided estimates of the updated targets for Italy in light of the EU renewed GHG emission target. Specifically, it has been estimated **70% of RES** in net demand of electricity and **40% of RES** in final energy consumption in 2030. These estimates require an update of the RES installed capacity with respect to the one expected in PNIEC. For solar, Elettricità Futura estimated a required installed capacity of **70GW** in 2030, around additional 18GW with respect to the PNIEC expectations. For wind, Elettricità Futura estimates a required capacity of **24GW**, around additional 5GW respect to the PNIEC expectations.

29. For both photovoltaics and wind power, the **number of plants to be installed** to achieve the 2030 installed power target has been calculated, considering three different scenarios depending on the average size of plants considered for the additional installations.

● **FIG 15** → **Synoptic view of the dimensions of the different types of renewable plants in Italy considered in the scenarios**

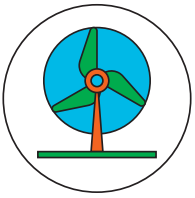
	Small size	Utility scale	Average size
Photovoltaics	<20kW Average 2019 size: 5.5kW	>1MW Average 2019 size: 3.9MW	23.7kW
Wind	<1MW Average 2019 size: 0.1MW	>1 MW Average 2019 size: 22.9MW	1.9MW

Source → The European House – Ambrosetti and Enel Foundation elaboration, 2021.



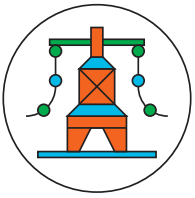
→ **30.** The results of the analysis show that the photovoltaics gap could be bridged by installing either:

- **4.3 million** small size plants, **5 times** the current number of small size plants or;
- **6,000** utility scale plants, **5 times** the current number of utility scale plants or;
- **994,000** average size plants, **doubling** the total number of plants at present (requiring 20 additional years starting from 2030 at the current rate).



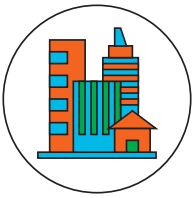
→ **31.** With regards to wind power, the gap could be bridged by installing:

- **24,000** small size plants, **4.6 times** the current number of small size plants or;
- **103** utility scale plants, equal to **23%** of the current number of utility scale plants or;
- **1,200** average size plants, equal to **22%** of the current total number of plants (requiring 2 additional years starting from 2030 at the current rate).



→ **32.** In this context, it is important to highlight that the **development of the electricity transmission grid** represents a fundamental enabling factor for the integration and penetration of renewable energy sources in the energy system. In Italy, over 14 billion Euros of investment in the development of the electricity transmission grid are planned for the 2020-2030 period, through which an additional 40GW of RES power could be connected to the grid[9]. The development of the electricity distribution grids as well represents a key factor to enable the integration of renewable energy sources in the energy system. Between **85 and 95 billion Euros** of investments in distribution grids for emission-free generation are needed in EU27+UK in the period 2020-2030, representing an increase of 50-70% with respect to 2011-2019 values. In Italy, **3.3 billion Euros** are needed during the same period, which will allow to connect additional 35GW of RES power to the grid.

9 Source: "Piano di Sviluppo 2020", Terna, 2021.



→ **33.** As far as **buildings** are concerned, the gap analysis focused on the **renovation rate** of residential and non-residential **building stocks** in the European Union and Italy, assuming that an upgrade to a full-electric, heat-pump based system is usually carried out when a building/apartment is renovated. For both the European Union and Italy, the analysis relied on the following **methodological steps**:

- Calculation of the primary energy consumption savings in the residential and non-residential sector[10] needed to achieve the energy 2030 efficiency targets.
- Calculation of annual energy savings for both the residential and non-residential sectors.
- Calculation of the average energy saving – renovation rate ratio, based on the average 2012-2018 annual energy renovation rate in Europe and Italy and the related primary energy savings in the same period[11].
- Calculation of the number of new buildings to renovate and of the renovation rate needed to achieve the 2030 energy efficiency target.

34. At European level, to achieve the 2030 objectives, the residential sector must reduce its primary energy consumption from **681 Mtoe** in 2000 to **535.8 Mtoe** in 2030, while the tertiary sector must reduce it from **387 Mtoe** to **304 Mtoe** in the same period.

35. Between 2020 and 2030, the EU residential sector must reduce its primary energy consumption by around **109 Mtoe** (annual reduction of 10.9 Mtoe), while the tertiary sector must reduce it by more than **62 Mtoe** (annual reduction of 6.2 Mtoe), for a cumulative total of 171 Mtoe. The average 2012-2018 annual energy related renovation rate is around **1%** for both the sectors with current primary energy savings related to renovations of **5.6 Mtoe** (3.0 Mtoe for residential and 2.6 Mtoe for tertiary).

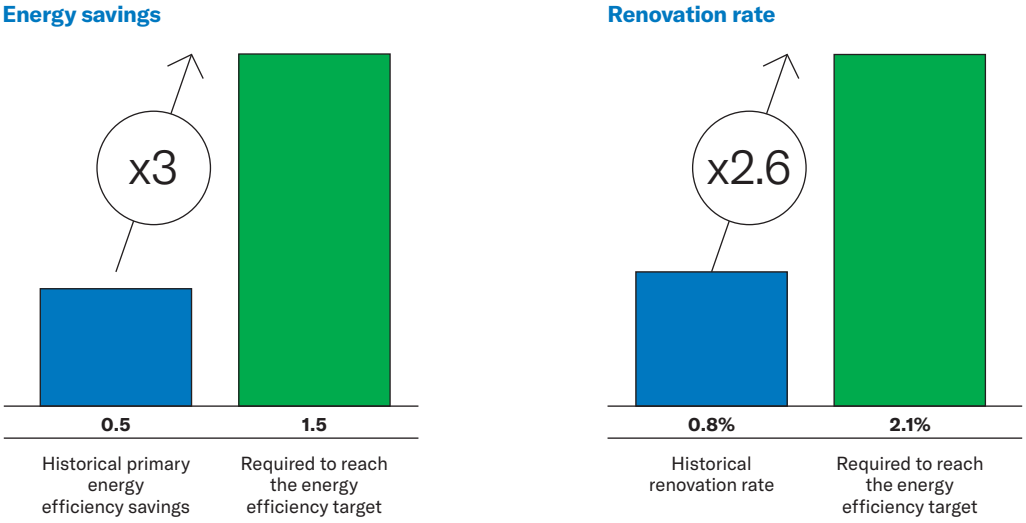
36. However, the current renovation rate (and related energy savings) is not enough to achieve the energy savings target for 2030. Indeed, it must **triple** from an annual rate of **1.0%** to **3.0%** in 2030, corresponding to **11.5 Mtoe** of annual energy savings[12].

37. The same goes for Italy where the residential and tertiary sectors account for the 61% of the primary energy consumption reduction required by 2030. Between 2020 and 2030 the residential sector in Italy must reduce its primary energy consumption by around **8 Mtoe**, while the tertiary sector must reduce theirs by more than **7 Mtoe**, for a cumulative total of around **15 Mtoe** (1.5 Mtoe annually, 0.8 Mtoe for

10 Data sources: technical note of the EUCO3232.5 scenario and from the PRIMES model (Europe); PNIEC data (Italy).
11 Data source: EU Building Stock Observatory.
12 It is worth mentioning that with the new proposed "Fit for 55" package, the European Commision increased the ambition regarding energy efficiency target. Therefore, even without knowing the expected primary and final energy consumption at 2030 for buildings sector in the new scenario, it is plausible to imagine that the residential sector may reduce its primary and final energy consumption by a greater amount, leading to a greater gap in the renovation rate and related energy savings.

residential and 0.7 Mtoe for tertiary). In order to achieve this result, a renovation rate equal to at least **2.1%** is necessary in the residential and tertiary sectors. However, the current average 2012-2018 annual energy-related renovation rate is around **0.8%** for both sectors with current primary energy savings related to renovations of 0.52 Mtoe (0.28 Mtoe for residential and 0.24 Mtoe for tertiary).

● FIG 16 → **Annual primary energy consumption and renovation rate in residential and tertiary sector in Italy 2020-2030[E]** (Mtoe)



Source → The European House – Ambrosetti and Enel Foundation elaboration on PNIEC, Eurostat and European Commission data, 2021.

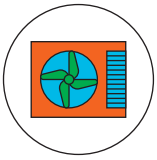
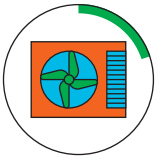
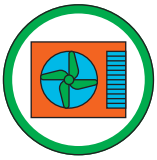
38. It is worth noting that efforts will have to largely focus on deploying energy efficiency in **existing buildings**. Considering existing Italian building stock and projecting the rate of new constructions in the period 2013-2019 through to 2030, existing buildings will represent around **97%** of the building stock. Considering that 72% of building stock is over **40 years old**, while about 21% of homes are in buildings over 75 years old, the magnitude of the challenge facing the sector is very clear.

39. Looking more closely at the **technologies able to support energy efficiency in buildings**, the energy savings generated by **heat pump** deployment have been estimated for 2030. The "what if" analysis considers an **inertial scenario** (projecting the 2011-2019 CAGR of heat pump installations, achieving around 15% penetration of heat pumps), a **full deployment scenario** (100% installation of heat pumps) and a **low deployment scenario** (20% penetration of the technology).

40. The calculation involved **preliminary steps** concerning heat pumps and current and future building stock in Italy:

- Analysis of existing housing stock in Italy based on information on existing residential buildings by type[13].
- Estimation of the number of new buildings to be built by 2030 based on the average rate of the last 5 years (2013-2019). The assumptions of the main scenarios are represented in Figure 17.
- Estimation of the average primary energy consumption savings for each heat pump[14].
- Estimation of the investments required to support heat pump deployment in each scenario.

● FIG 17 → Synthetic view of the main assumptions in the different energy efficiency scenarios

Scenarios	Hypotheses
Inertial 	→ This is the baseline scenario and considers the installation of heat pumps at 2030 **projecting the CAGR 2011-2019** of heat pumps sales and installation
Low deployment 	→ Installation of a heat pump in **20% of the existing residential sector** → Installation of a heat pump in **all the new buildings to be built until 2030** → Installation of a heat pump in **20% of the tertiary sector buildings** (schools, offices and hotels)
Full deployment 	→ Installation of a heat pump in **all the existing residential sector** → Installation of a heat pump in **all the new buildings to be built until 2030** → Installation of a heat pump in **all the tertiary sector buildings** (schools, offices and hotels)

N.B. → All the scenarios have been discounted for the buildings that already have a heat pump installed.

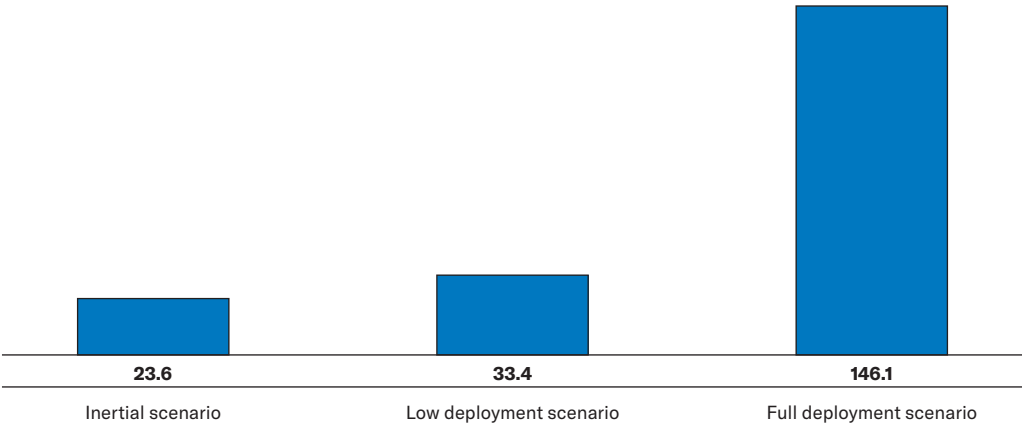
Source → The European House – Ambrosetti and Enel Foundation elaboration on PNIEC and ENEA data, 2021.

13 Single house, terraced house, building with 3-4 apartments, building with 5-8 apartments, building with 9-15 apartments and building with more than 16 apartments.
14 Data source: ENEA, 2021.

41. The full deployment of heat pumps in residential and tertiary buildings in Italy could generate around **45%** of the energy savings required to reach the 2030 target, in the full deployment scenario. This share is reduced to **10%** in the low deployment scenario and to **7%** in the inertial scenario. This is an indication that, even in a full deployment scenario, further technological and infrastructural interventions are needed in the residential sector to reach the energy efficiency objectives.

42. The different scenarios imply different level of investments. In the full deployment scenario, an estimated **146 billion Euros** of required cumulative investments in the value chain are required by 2030, while the low deployment scenario requires **33.4 billion Euros** of cumulative investments. For the sake of comparison, the inertial scenario would require almost **24 billion Euros** of investments, almost 10 billion Euros less than the amount required in the low deployment scenario.

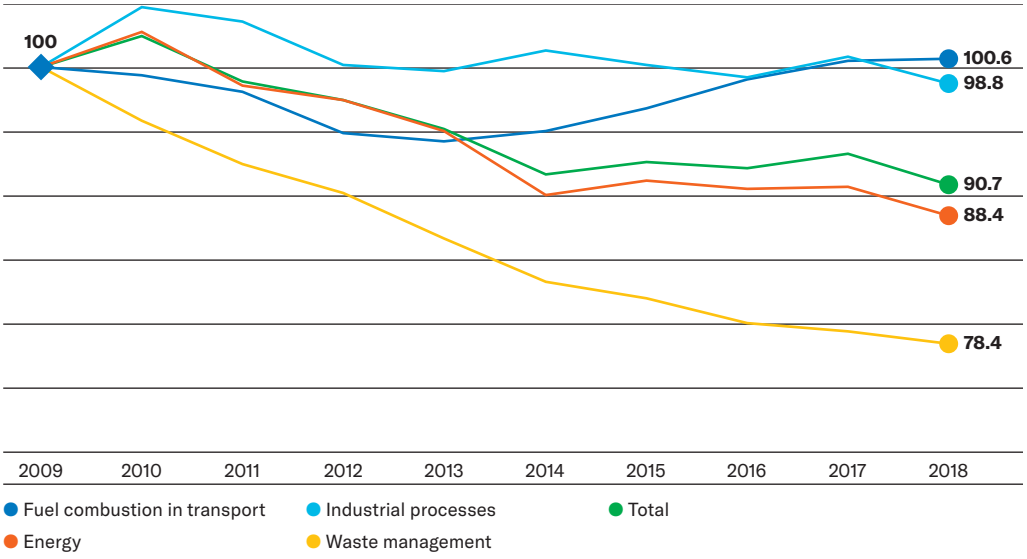
● **FIG 18** → **Cumulative required investments in the value chain for heat pump deployment in the three different scenarios in Italy, 2020-2030[E]** (billion Euros)



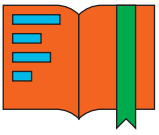
Source → The European House – Ambrosetti and Enel Foundation elaboration on PNIEC, ENEA and European Commission data, 2021.

43. As regards the decarbonisation of **carbon intensive sectors**, the industrial and transport sectors deserve particular attention. In fact, as shown in Figure 19, these sectors show the lowest historical levels of reductions in GHG emissions, and even a slight increase in the case of transport.

FIG 19 → **GHG emissions by sector in Europe (EU+UK), 2009-2018** (2009=100)



Source → The European House – Ambrosetti and Enel Foundation elaboration on Eurostat data, 2021.



Please refer to **Part 2** for a description of the new targets for transport stated in the "Fit for 55" package

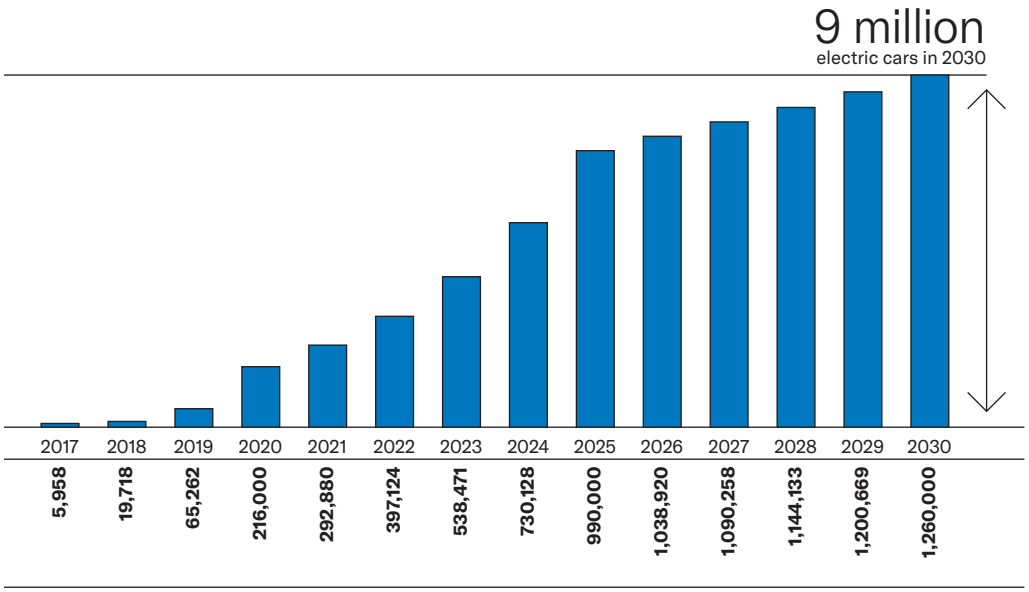
→ **44.** Starting with the decarbonisation of the **transport sector**, the European Union's long-term vision for 2050 establishes clean and safe mobility as a key pillar. The European Commission is engaged in the promotion of the use of alternative fuels to reduce emissions, for example by favouring greater deployment of electric and other alternative fuel vehicles in the overall stock of vehicles. In this regard it is worth mentioning that the European Performance Building Directive, currently under revision in the "Fit for 55" package, as well as the announced increased ambition for the decarbonisation of the transport sector (that will be described more in detail in Part 2 of the present report) would have an important role in supporting the deployment of private charging infrastructure in buildings and thus enabling greater digitalisation and deployment of RES. In this regard, the directive could offer important support in the electrification of both the transport and building sectors.

45. In terms of European and Italian electric mobility scenarios, the gap in terms of electric vehicles and charging infrastructure has been assessed. Starting with Europe, the "Sustainable and Smart Mobility Strategy" of the European Commission sets the 2030 objective for electric cars at **30 million vehicles** (**x30** compared to the current level). This would mean an increase from the current **0.2%** of the overall car stock in Europe to **11%** in 2030, equal to the change from the current **3.4%** of newly registered cars to over **42%** of stock upgraded by 2030. This scenario is in line with the intermediate one developed by The European House – Ambrosetti, Enel Foundation and Enel X in the 2018 study "*Elec-*

trify 2030". That scenario takes into account a ratio of 200 electric[15] cars per charging station, meaning that the EU would require **150,000 public charging stations** and **over 15 million private wall-boxes** by 2030 to support the uptake of electric vehicles. Considering that there are currently **164,000 public charging points** in Europe gathered in **82,000 charging stations**, to achieve the 2030 objective in the next few years the European effort has to increase by 80%.

46. With regard to **Italy**, the PNIEC sets a target of 5.9 million electric cars by 2030. However, considering the upward revision of the European targets and the subsequent adaptation of the Italian targets, it is reasonable to think that the target regarding the number of electric vehicles in circulation by 2030 will increase. This is confirmed by a review of the literature on electric mobility in Italy, from which different deployment scenarios have been identified. The RSE "E...muoviti" report estimates 10 million electric cars in Italy in 2030 on the basis of the demographic evolution forecast for 2030 and the trend in the number of users per car. The 2018 "Electrify 2030" report by The European House – Ambrosetti, Enel Foundation and Enel X also envisaged 3 scenarios for the deployment of electric vehicles. In the accelerated scenario, based on the declaration of business leaders declaring half of their production to be electric by 2022, **9 million electric cars** are estimated in 2030 in Italy.

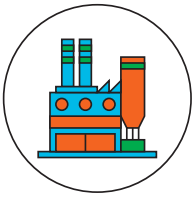
● FIG 20 → **E-cars sales in Italy, 2017-2030**



Source → The European House – Ambrosetti and Enel Foundation elaboration on EAFO data, 2021.

15 It is important to mention that the Alternative Fuel Infrastructure Directive, enacted in 2014 and destined to be revised, defined a 1:10 ratio for charging infrastructure, without specifications for private wall boxes and differentiation based on the population density.

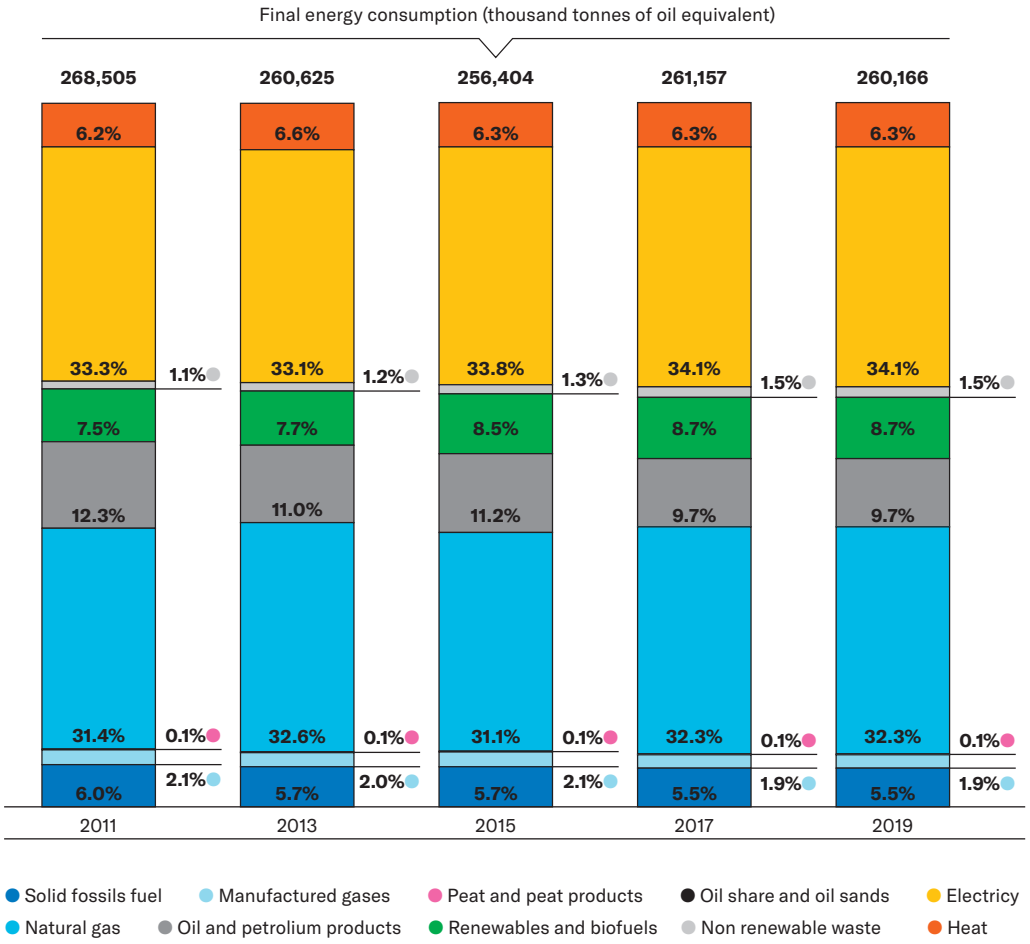
47. Achieving this scenario means multiplying the current number of electric cars circulating in Italy by **227** over the next 10 years (59,875 electric cars on the road in 2019). This means that the annual market share of electric vehicles needs to increase considerably: in order to reach the 2030 electric vehicle objective, almost **80%** of new cars sold in 2030 would need to be electric, while currently the quota is around 3%. Finally, an enabling aspect for the deployment of electric mobility is the diffusion of charging stations and private wall-boxes. Considering only electric cars and starting with the "*Electrify 2030*" study, which envisages 200 vehicles per charging station in the accelerated scenario, **45,000**[16] **public charging stations** and 4.5 million private wall-boxes would be needed in Italy, an increase of **460%** in the next ten years compared to the current 9,709 charging stations, and a multiplication factor of 75 for private wall-boxes (there are currently only 60,000).



→ **48.** Turning to **industry**, the decarbonisation challenge is particularly pressing because of the lack of improvements registered in the last years. As a matter of fact, in the last 10 years the industrial sector in **Europe** has maintained a stable **composition of energy sources**, still strongly relying on fossil fuels. Another aspect worth mentioning is that the decarbonisation approach depends on specific industrial applications, being related not only to the availability of an alternative energy source but also to the fact that to be converted to low carbon energy sources some industrial and manufacturing processes need a more substantial overhaul than just a fuel switch.

16 Other literature references, among which Elettricità Futura, forsee the deployment of a much higher number of charging points (200,000), so it worth pointing out that the gap might be underestimated.

● **FIG 21** → **Final energy consumption overall** (thousands of TOE) **and by fuel type in industry in Europe, 2010-2019** (% values)

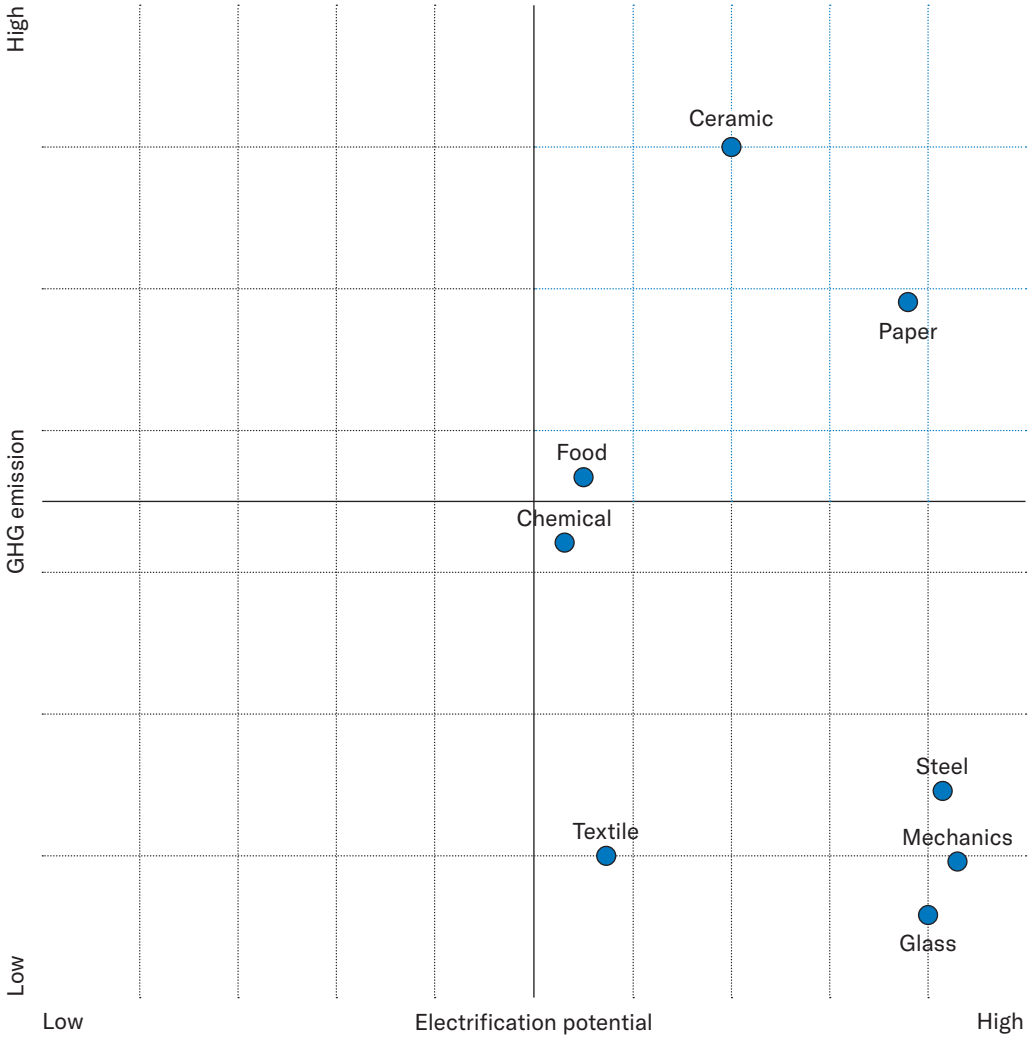


Source → The European House – Ambrosetti and Enel Foundation elaboration on Eurostat data, 2021.

49. In addition to the stability of the energy mix, the **final energy consumption** of the industrial sector has remained substantially constant in the last 10 years (269 million TOE in 2010 compared to 260 million TOE in 2019) meaning that the process of improving energy efficiency in this sector is also very limited. As mentioned above, this is also reflected in the stable quantity of GHG emissions associated with the sector.

50. The progressive shift to greener energy carriers is particularly urgent in segments that are responsible for **the highest shares of emissions** in the overall industrial sector. In addition to this, it is important to consider that there are some industrial sectors where high shares of energy consumption can be electrified and thus more easily decarbonised.

● **FIG 22** → **Electrification potential and GHG emissions in the main industrial sectors in Italy, 2019**



Source → The European House – Ambrosetti and Enel Foundation elaboration on Eurostat data, 2021.

51. By cross-referencing the information from the GHG emission assessment with the electrification potential[17] of energy consumption in different industrial sectors, it is possible to identify **4 sectors** (that account for about the 6% of GHG emission in the country and 5% of its GDP) with a higher degree of electrification potential: ceramics, paper, food and the chemical industry. This analysis has been carried out with regard to **Italy**[18].

Looking more specifically at these sectors:

- The ceramic sector has an electrification potential of 70% of final energy consumption that can be enabled by two main technologies: microwave ovens and resistance furnaces.
- The paper sector has an electrification potential of **88%** of final energy consumption that can be supported by two main technologies: heat pumps and technologies for drying (only electric technologies are considered, for example microwave dryer and infra-red drying).
- The food sector has a **55%** electrification potential (especially in the pasteurisation process) that can be enabled by four main technologies: heat pumps, high pressure processing (HPP; only considering electric technologies) pulsed electric fields and microwaves.
- Looking at the chemical sector, the potential for electrification is **more than 50%** and could be enabled by the deployment of heat pumps and electrolyzers (the first for lower temperature processes and the latter for higher temperature processes).

17 The numbers related to the electrification potential in different industrial sectors have been identified through a review of existing literature.

18 It is worth noting that the positions on the diagram are strongly influenced by the industrial structure of a country and the degree of technology development in each sector. Therefore, this estimation is not general but valid only for a specific geographical perimeter.

A focus on the electrification of some industrial sectors

Deep dives that Enel Foundation is carrying out as a follow-up to the "*Sustainable paths for EU increased climate and energy ambition*" study, published in October 2020, address the potential electrification of some industrial sectors.

The steel and iron industry has some of the most mature technologies to reduce emissions through electrification:

- Production of direct reduced iron (DRI) by electrolysis: no Carbon Sequestration and Storage (CSS) nor Carbon Capture Utilisation (CCU) would be needed as CO_2 is avoided.
- New green hydrogen plasma smelting reduction technology.
- Shift from primary to secondary (recycled) steelmaking.
- Increasing use of scrap metal in an electric arc furnace (EAF) powered by RES.

The chemical sector has a strong potential for sector-coupling and diversified paths:

- Replacing fossil-based feedstock by green hydrogen and biomass feedstock (e.g., bioethanol and biomethanol).
- Green hydrogen based ammonia.
- Power-to-X: power to fuels (such as gases - H2, CH4; liquids - synthetic kerosene, methanol, formic acid; heat), power-to-chemicals, power-to-fertilizers.
- Use of biogas instead of fossil gas for processes.

Non-metallic minerals are large GHG emitters but the technologies to reduce process emissions are not yet mature. This sector could be further decarbonised but there are some aspects to highlight:

- Two thirds of emissions are linked to industrial processes.
- Progress in fuel switching to biogas and biomethane and reduction of clinker content in cement are needed.
- More focus on circular measures (resource, material and product) is required.
- Progress in CO_2-cured concrete products is needed.

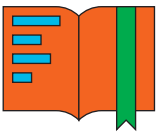
Source → The European House - Ambrosetti and Enel Foundation elaboration on Enel Foundation, Compass Lexecon, Enerdata "Sustainable paths for EU increased climate and energy ambition", October 2020 and other studies, 2021.

52. For some technologies, in particular for heat pumps, prices are expected to fall both due to mass production and new manufacturing techniques. Moreover, competitiveness of electric technologies can be enhanced by taking into account externalities (e.g., through CO_2 taxation) and by incentives granted to green solutions.

In summary, some industrial sectors demonstrate high electrification rates thanks to the use of existing and applicable technologies. The potential is great, however it is fundamental to work to facilitate the deployment of investment through policy measures that promote this kind of technology compared to the traditional one. In particular regulatory policies should work on leveling the playing field between the price of gas and the **price of electricity**. In 2019 the price ratio[19] between the two energy carrier is 3.8 on average in Europe, with great heterogeneity among Member States (i.e. in Belgium the price ratio is 5.2, in Finland 2.0), while in Italy is equal to 4.1. Another important aspect is that the pace of the electrification is strictly related to the willingness of business leaders to adopt new technologies, which in

19 Prices considered for electrcity and natural gas are for non-household consumers.

turn is related to external constraints. For example market and infrastructure readiness, regulation (bans, obligations, etc.) and, above all, total cost of ownership (TCO) are important determinants in favoring or not the deployment of electrification in a specific sector. In this light, the economic competitiveness of the electric carrier at the retail level should not be affected by costs not related to the electric service itself, in order to promote a fair market-based competition among different energy carriers and without penalizing the cleanest and most efficient ones. In 2019 the impact of **taxes and levies** on the electricity price was about **50%** in Italy, so efforts are needed to revising cost items within electricity bills and discharging them from unproper burdens. This issue related to the energy taxation has been addressed in the new "Fit for 55" package, highlithing its relevance and urgency (please see Part 2 for further details).



Please refer to **Part 2** for the details of the issues related to the energy taxation addressed in the new "Fit for 55" package

1.4 The investment opportunity: European and national recovery and energy transition plans

53. As outlined in the first part of the chapter, both the European Union and Italy have fallen behind in terms of investments required to achieve the 2030 targets. The Next Generation EU and the Italian PNRR represent important opportunities in this regard. The following part of the chapter analyses the possible energy transition investments that could be made.

1.4.1. The Next Generation EU Plan: guiding principles and operational mechanisms

54. The **COVID-19 pandemic** triggered an economic and social crisis with huge economic impacts: global GDP fell by 3.3%, Europe's overall GDP by 6.2% and Italy's by 8.9%. Faced with a situation of such magnitude, the EU institutions reacted with **unprecedented resources** in EU history. As the COVID-19 emergency went into full swing, the European Council approved the Next Generation EU on 21st July 2020, just four months after the declaration of the global pandemic by the World Health Organization on 11th March 2020.

55. Regarding the measures to immediately counter the health and socio-economic emergency, Europe has made new resources available to Member States through **three channels**: the European Stability Mechanism (ESM), the European Investment Bank (EIB) and the Temporary Support to mitigate Unemployment Risks in an Emergency (SURE) programme. The **ESM** and **EIB** mechanisms were already in place before COVID-19 and were dedicated from the outset to countering the health emergency in the strictest sense (ESM) and to managing the liquidity crisis of European companies (EIB). **SURE** represented an important innovation in terms of the European Commission approach. Its ambition is to support the fight against unemployment in post-pandemic Europe by providing resources to Member States in the form of soft loans worth 90.3 billion Euros, raised through several rounds of European social bond issuance. This is, therefore, an initial form of experimentation with common debt.

56. The core of the European strategy, however, is **Next Generation EU**, a **750 billion Euros** multi-year plan that, in synergy with European economic planning and the 2021/2027 EU Budget, aims to create a more connected, sustainable and resilient Europe. Next Generation EU is the most ambitious use of fiscal leverage in Europe and a major industrial policy instrument which aims to transform Europe's economic architecture, fully implementing the Green New Deal. Its reach extends until

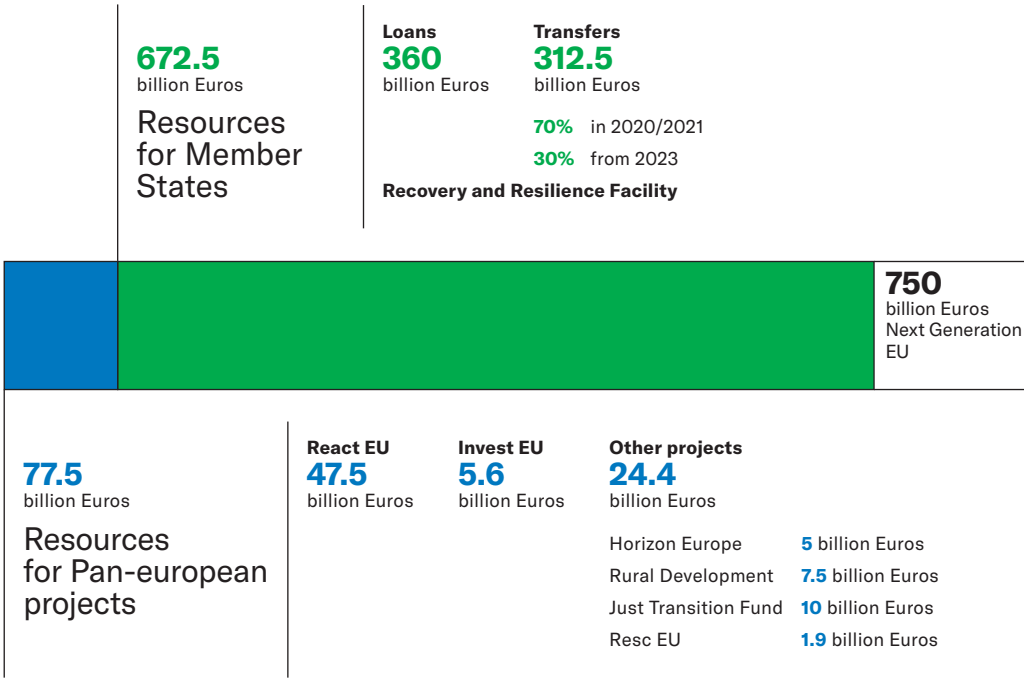
2026 but the direct and indirect effects of the plan are expected to last longer due to the leverage effect of the investments.

57. The most important component of the Next Generation EU is the 672.5 billion Euros **Recovery and Resilience Facility** (RRF)[20], divided into 312.5 billion Euros grants (i.e. non-repayable transfers in favour of the beneficiary Member State) and a maximum loan of 360 billion Euros, which each country may request up to a maximum of 6.9% of their GDP. Together with the RFF facility, the Next Generation EU package is completed by:

- **REACT-EU** (Recovery Assistance for Cohesion and the Territories of Europe), a programme for territorial cohesion with resources of 47.5 billion Euros.
- Funds for **Rural Development** (7.5 billion Euros).
- The **Just Transition Fund**, launched with the European Green Deal in December 2019 and amounting to 10 billion Euros.
- **Additional resources** from InvestEU (5.6 billion Euros), RescEU (1.9 billion Euros) and Horizon Europe (5 billion Euros).

The Recovery and Resilience Facility (RRF) therefore constitutes the fulcrum of the Next Generation EU's programmatic action.

FIG 23 → **Structure and funding of Next Generation EU**

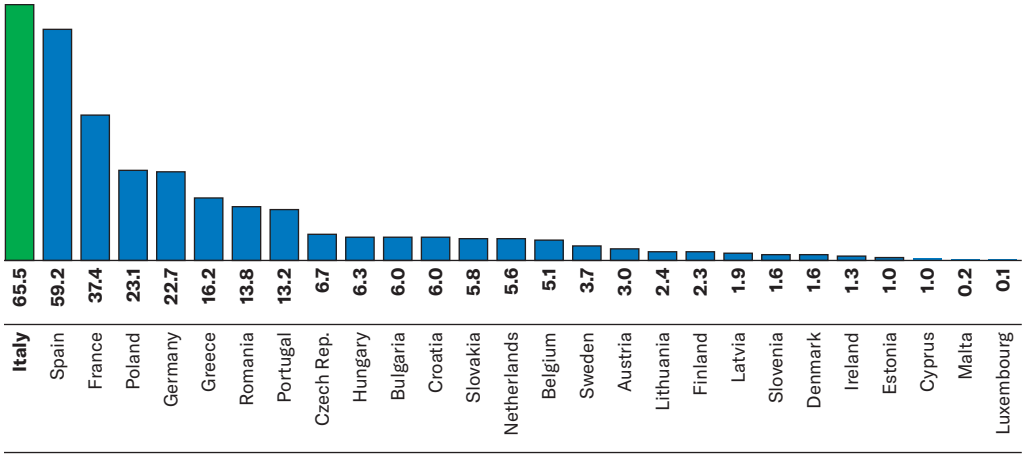


Source → The European House - Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

20 This component is erroneously known in the press as the Recovery Fund.

58. In terms of funds allocation, **Italy** – with a share of around 21% of the total (65.5 billion Euros)[21] – is the **leading recipient country**. As shown in the figure below, it is followed by Spain (59.2 billion Euros), France (37.4 billion Euros), Poland (23.1 billion Euros), Germany (22.7 billion Euros) and Greece (16.2 billion Euros). For some large European countries – such as Germany – the resources received from Next Generation EU are therefore lower compared to economies such as Italy and Spain.

● FIG 24 → **Grants by Member State of the Recovery and Resilience Facility**
(billion Euros, current prices)



Source → The European House - Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

59. These resources will be allocated based on strict **conditions**: each Member State has been called upon to draw up a National Recovery and Resilience Plan, which must detail the allocation of resources over the Next Generation EU period. The Commission, in fact, has prepared guidelines for the drafting of the Plans to which each country was required to conform, both in terms of the structure of the Plan and with reference to its contents. In particular, at least 37%[22] of the resources must be allocated to the green transition, while a minimum of 20% must be allocated to digitalisation. In addition, each plan must be consistent with:

21 According to the current proposal 70% of funds will be distributed in 2021-2022, with the remaining 30% distributed later based on real GDP decline experienced during the 2020-21 period.

22 Although, as mentioned elsewhere in the report, Italy allocates 30% of the PNRR's total budget to the "green revolution" mission, it must be considered that investments planned in other missions (e.g. "digitalisation") will also have an impact on the energy transition and therefore the total amount of investments is in line with European indications.

- The European Semester package, which contains recommendations to Member States on macroeconomic reforms and policies to be adopted.
- The EU Annual Sustainable Growth Strategy[23] as well as the Commission's recommendations on the Budget Law.

60. Moreover, once approved, the plan is subject to continuous evaluation and scrutiny by the Commission and the Council, which may suspend payments in the event of a deviation from the Plan's objectives, as well as in the event of non-compliance with the financial sustainability targets, pursuant to Article 126 of the Treaty on the Functioning of the European Union.

1.4.2. The National Recovery and Resilience Plan: energy transition projects and opportunities for companies and institutions

61. According to the version submitted to the European Commission in April 2021, the Italian National Recovery and Resilience Plan (**PNRR**) amounts to a total of **235.12 billion Euros**. More specifically, Italy will absorb 191.5 billion Euros from the Recovery and Resilience Facility (about 30% of RRF's total resources), in addition to the resources of the Recovery Assistance Package for Cohesion and European Territories (REACT-EU) amounting to 13 billion Euros. In addition, there are the resources of the Complementary Fund[24], amounting to 30.62 billion Euros.

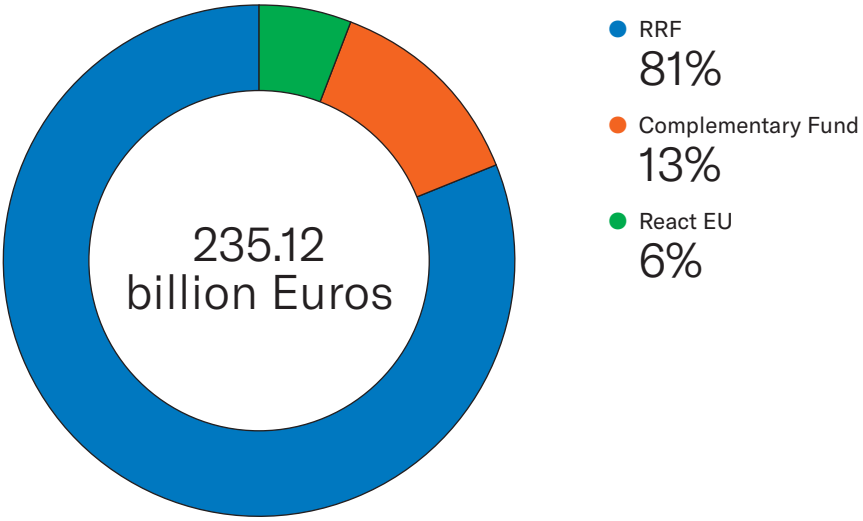
62. With the aim of restoring growth, the approximately 235 billion Euros of the PNRR is distributed over six years of projects, divided into six missions:
M1. Digitisation and innovation.
M2. Green revolution.
M3. Sustainable infrastructures.
M4. Education and research.
M5. Inclusion and cohesion.
M6. Health.

The allocation of investments shows a clear orientation towards compliance with European guidelines: more than half of the resources allocated are earmarked for sustainable and digital transition.

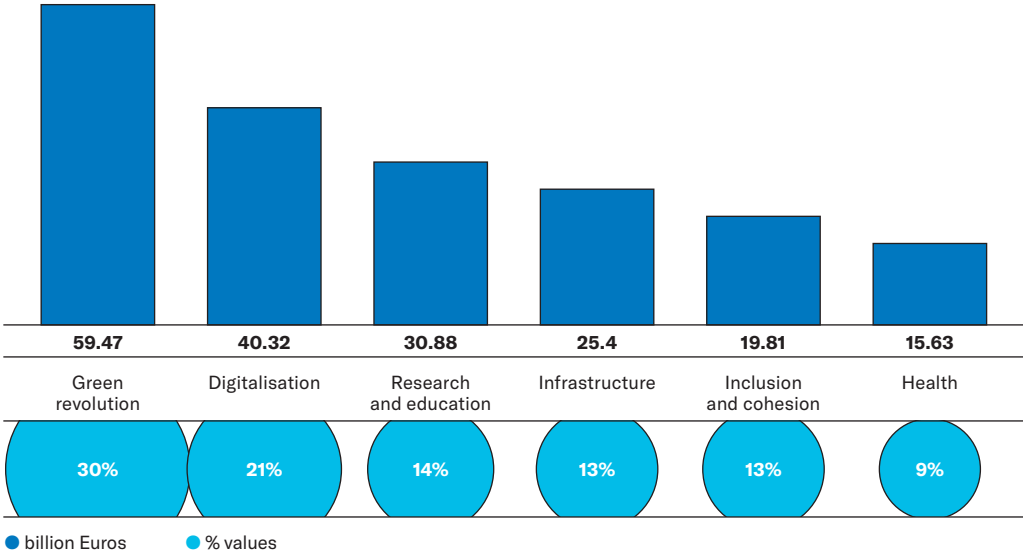
23 The Annual Sustainable Growth Strategy outlines the economic and employment policy priorities for the EU for the coming 12 to 18 months. From the 2020 Semester cycle on, it is structured around four dimensions: environmental sustainability, productivity, fairness and macroeconomic stability.
24 The Complementary Fund consists of resources that the Italian government allocates to projects that are not covered by European funds.

● **FIG 25** → **Graphic at the top: composition of the PNRR by funding, 2021** (billion Euros and % values)
Graphic at the bottom: composition of the PNRR by Mission (billion Euros and % values)

Composition of the PNRR by funding



Composition of the PNRR by mission



N.B. → Excludes the financial allocations from the Supplementary Fund and React EU.

Source → The European House - Ambrosetti and Enel Foundation elaboration on National Recovery and Resilience Plan data, 2021.

The process of approving National Recovery and Resilience Plans

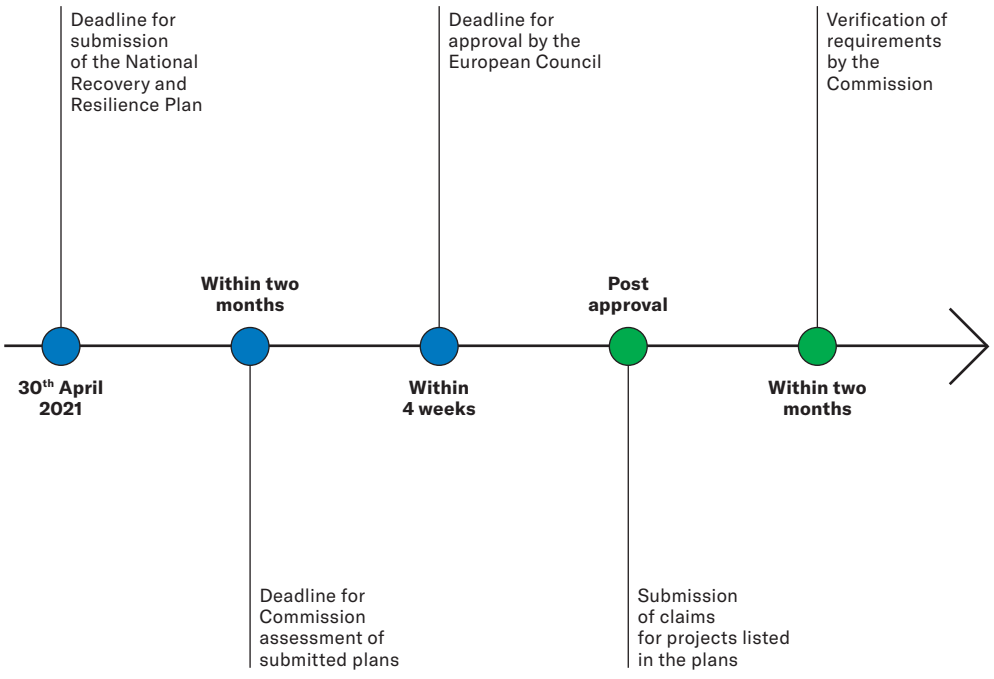
The procedure for approving the PNRR envisaged the submission of drafts by 30th April 2021. The Commission had two months to provide an assessment, which could be only extended in the event of a prior agreement between the Commission and the Member State concerned. The Italian PNRR was approved on 22nd June 2021. Once evaluated by the Commission, the Plan is submitted to the European Council, which decides within four weeks on the opinion provided by the Commission and, in the event of a positive audit, proceeds to immediately disburse 13% of the resources provided. For the remainder, each Member State may send the Commission the applications for the reimbursement of the individual projects once certain milestones have been reached, for which the Commission has a further two months to verify the consistency with the provisions of the Plan and the general requirements of the project.

In this process, four criteria for the evaluation of the Plans have been defined:

- **Relevance**: consistency with the Union's macroeconomic planning, the recommendations made to countries and the overall climate and digitisation objectives of the Next Generation EU.
- **Effectiveness**: ability of the Plan to generate structural changes in the economy and governance.
- **Efficiency**: reasonableness of costs against certain expected benefits.
- **Coherence**: the plan must contain measures that are harmonious and synergistic with each other.

Source → The European House - Ambrosetti and Enel Foundation elaboration on European Commission, 2021.

● FIG 26 → The timeline of National Recovery and Resilience Plans

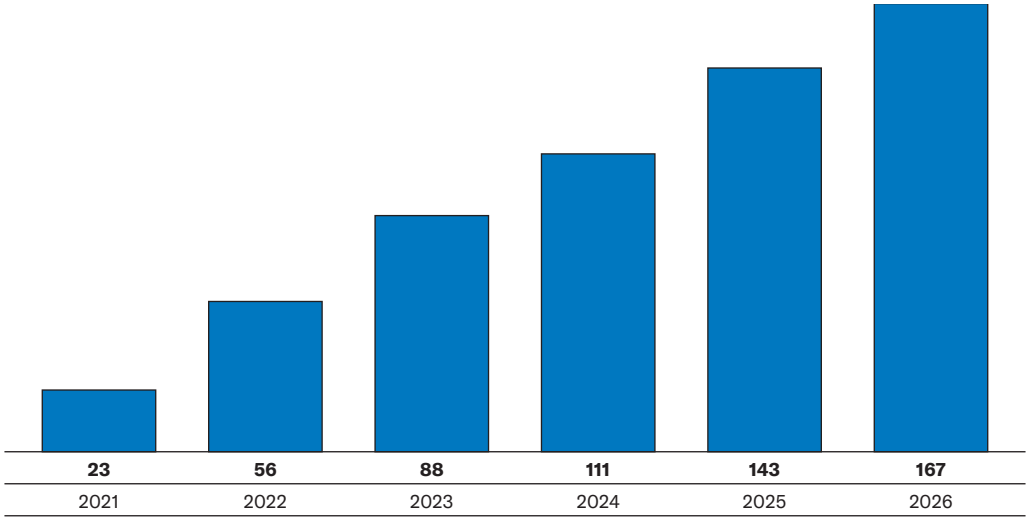


Source → The European House - Ambrosetti and Enel Foundation elaboration, 2021.

63. At least 70% of transfers must be deployed by 2022 and disbursed by 2023, with the rest to be deployed over the three-year period 2024-2026. Loans, on the other hand, can be applied for until 31st December 2023, with a maturity defined on the basis of the life cycle of the projects to be financed. It will therefore be necessary not only to act quickly to mobilise the resources by the summer, but also to finalise the plan by next year.

64. Over the next five years, Next Generation EU can generate a significant **impact on the growth of European countries**. According to the macroeconomic impact assessments, GDP growth in 2026 is expected to be in the +2.7 p.p. (medium scenario) to +3.6 p.p. (high scenario) range, compared to the baseline scenario. Cumulatively, over the period 2021-2026, Next Generation EU will be able to activate more than 580 billion Euros of potential additional GDP, **assuming that all funding is actually used**.

● **FIG 27** → **Additional GDP generated by Next Generation EU, 2021-2026**
(billion Euros)



Source → The European House - Ambrosetti and Enel Foundation elaboration on National Recovery and Resilience Plan data, 2021.

65. The actual possibility of implementing the planned projects depends primarily on the **ability to plan and execute investments**. In this regard, it should be noted that, historically, Italy has been characterised by its limited capacity to use the resources that derive from the European channel. In the 2014-2020 programming period of the European Structural and Investment Funds, Italy allocated only 87% of the total resources available and the share actually spent is currently equal to 51% of the total budget due to, according to the literature, the scarcity of skills in the public administration both to follow the bureaucratic procedures for accessing funds and to implement pro-

jects. The result is a loss of resources amounting to at least 9.4 billion Euros, which could increase if the difference between the resources allocated and spent is not used within three years of the end of the programming cycle.

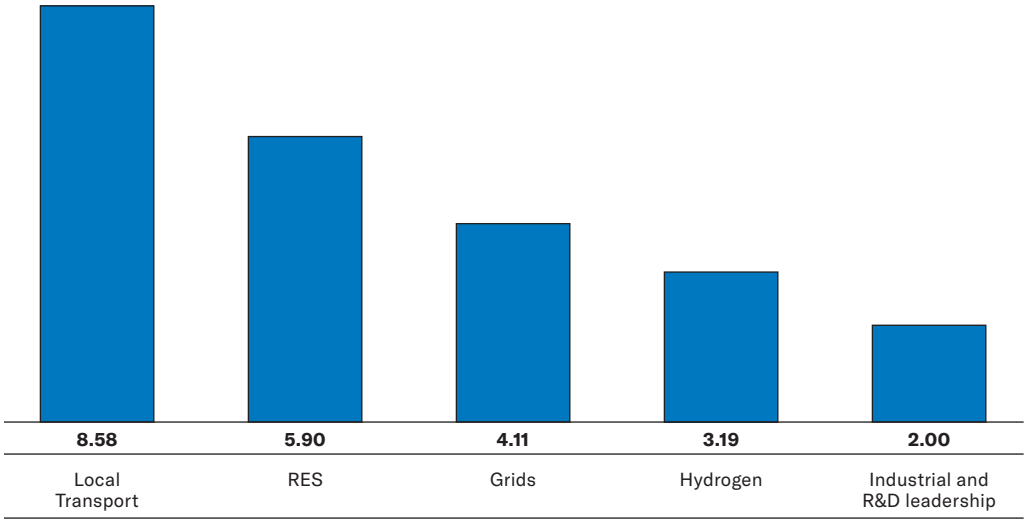
66. As far as the **energy transition** is concerned, the PNRR resources provide important opportunities to support investments in the key sectors identified. As seen, Mission 2 - the "green revolution" - is receiving the largest share of resources, equal to **59.47 billion Euros**, **30%** of the total. Within Mission 2, the second component, "Renewable energy, hydrogen, grid and sustainable mobility", and the third component, "Energy efficiency and building renovation", are the most relevant for the subject of this study. 23.78 billion Euros are devoted to the second component, 15.36 billion Euros to the third. To ensure that these funds are used effectively and produce the desired results, it is necessary to carry out further work on efficient governance mechanisms[25].

67. To ensure the progressive decarbonisation of all sectors, the second component, "**Renewable energy, hydrogen, grid and sustainable mobility**", foresees measures – investments and reforms – to increase the penetration of renewables through decentralised and utility-scale solutions (including innovative solutions, in terms of both technologies and plant structures and configurations, and offshore solutions) and the strengthening of grids (smarter and more resilient) to accommodate and synchronise new renewable resources and decentralised flexibility, and to decarbonise end uses in all other sectors, with particular focus on more sustainable mobility and the decarbonisation of some industrial segments, including initiating the adoption of hydrogen-based solutions (in line with the EU Hydrogen Strategy). In particular, the second component has the following objectives (each one with a specific amount of resources allocated):

- M2C2.1: increasing the share of energy produced from renewable energy sources in the system (5.90 billion Euros).
- M2C2.2: upgrading and digitalising grid infrastructures to accommodate the increase in RES production and increase resilience to extreme climate events (4.11 billion Euros).
- M2C2.3: promoting hydrogen production, distribution and end uses (3.19 billion Euros).
- M2C2.4: developing more sustainable local transport (8.58 billion Euros).
- M2C2.5: developing an international industrial and research & development leadership in the main transition sectors (2.00 billion Euros).

25 The renewable targets in the Italian PNRR are already more ambitious than those in the PNIEC. Therefore, in light of the volumes of new renewable capacity that must be realised by 2030 - compared to the current rate of authorisation and penetration of renewables - it becomes extremely urgent to introduce measures to streamline and increase the efficiency of authorisation processes in order to support the achievement of these targets.

● **FIG 28** → **Resources per area of intervention of the second component of Mission 2 of the PNRR, 2021** (billion Euros)



Source → The European House - Ambrosetti and Enel Foundation elaboration on National Recovery and Resilience Plan data, 2021.

68. The line of investment related to **RES** aims at increasing the share of renewable energies, unlocking the potential of utility-scale plants, which first and foremost require the reform of authorisation mechanisms and market rules to reach their full potential, enhancing the development of agro-voltaic opportunities, accelerating the development of energy communities and small-scale distributed systems, encouraging the development of innovative solutions, including integrated and offshore solutions, and strengthening the development of biomethane. The objective related to RES consists of the following specific measures:

- Investment 1.1: Agro-voltaic development, with the aim of installing an agro-voltaic production capacity of 1.04GW, which would produce about 1,300GWh per year (1.10 billion Euros).
- Investment 1.2: Promotion of renewables for energy communities and self-consumption, which aims to secure the resources needed to install approximately 2,000MW of new electricity generation capacity in a distributed configuration by renewable energy communities and self-consumers of renewable energy acting jointly (2.20 billion Euros).
- Investment 1.3: Promotion of innovative installations (including offshore), aiming at building plants with a total installed capacity of 200 MW from RES in the coming years (0.68 billion Euros).
- Investment 1.4: Biomethane development, which will make it possible to increase the capacity of biomethane from agricultural waste to be used for the greening of the gas network by approximately 2.3-2.5 billion cubic metres (1.92 billion Euros).
- Reform 1.1: Simplification of authorisation procedures for onshore and offshore renewable installations, new legal framework to sup-

port renewable generation and extension of the timeframe and eligibility of existing support scheme.
- Reform 1.2: New legislation for the promotion of renewable gas production and consumption.

The objectives of **Reform 1.1** are the standardisation of authorisation procedures throughout the national territory, the simplification of procedures for the construction of off-shore renewable energy generation plants, the simplification of environmental impact procedures, the sharing of a regional plan for the identification and development of areas suitable for renewable energy sources, boosting private investment and encouraging the development of energy storage mechanisms, public-private investment in the renewable energy sector and the development of renewable energy plants. The reform envisages regulatory actions, including the creation of a simplified and accessible regulatory framework for RES plants, in continuity with the provisions of the "Decreto Semplificazioni". The reform also provides for the issuance of a discipline, shared with the regions and the other state administrations concerned, aimed at defining the criteria for the identification of areas suitable and not suitable for the installation of renewable energy plants with total power at least equal to that identified by the PNIEC, for the achievement of the renewable energy development objectives. The reform also foresees the completion of the RES support mechanism also for non-mature technologies and the extension of the auction period, maintaining the principles of competitive access. Finally, the reform envisages regulatory facilitation for investments in storage systems, as in the legislative decree transposing Directive (EU) 2019/944 on common rules for the internal electricity market.

69. To accommodate the increase in renewable energy production, but also to increase resilience to increasingly frequent extreme weather phenomena, the line of action related to **grids** aims to upgrade and digitalise the grid infrastructure. The objective related to grids consists of the following specific measures:
- Investment 2.1: Strengthening the smart grid, which aims to increase the capacity of the grid to accommodate and integrate additional distributed generation from renewable sources by 4,000 MW (3.61 billion Euros).
- Investment 2.2: Climate resilience of networks, aiming to improve the resilience of approximately 4,000 km of networks (0.50 billion Euros).

70. The objective related to **hydrogen** intends to promote its production and use by developing flagship projects for its deployment in hard-to-abate industrial sectors (starting with the steel industry), favouring the creation of "hydrogen valleys" leveraging in particular on areas with disused industrial sites, enabling – through recharging stations – the use of hydrogen in heavy transport and selected non-electrifiable railway lines, supporting research and development and completing all necessary reforms and regulations to enable the use, transport and distribution of hydrogen.

71. The objective related to the **transport sector** is to develop more sustainable local transport, investing in "soft" mobility, promoting inter-modality and the use of bicycles and public transport, developing an adequate public electric recharging infrastructure network, accelerating the spread of green local public transport, with a renewal programme for the obsolete bus fleet towards low/zero emission solutions, and green trains. The objective related to the transport sector consists of the following specific measures:

- Investment 4.1: Strengthening cycling, providing for the construction of around 570 km of urban and metropolitan cycle paths and around 1,250 km of tourist cycle paths (0.60 billion Euros).
- Investment 4.2: Development of rapid mass transport, providing for the construction of 240 km of equipped networks for rapid mass transport infrastructures divided into metro, trams, trolleybuses and cableways (3.60 billion Euros).
- Investment 4.3: Development of electric charging infrastructure, aiming to develop 7,500 fast-charging points on motorways and 13,755 in urban centres, as well as 100 experimental charging stations with energy storage technologies (0.74 billion Euros).
- Investment 4.4: Renewal of bus fleets and green trains, with around 3,360 low-emission buses to be purchased by 2026, 53 trains to be purchased to replace an equivalent number of old units by 2026, and about 3,600 electric and gas-powered vehicles to be introduced in the fire service fleet (3.64 billion Euros).
- Reform 4.1: Faster procedures for project assessment in the field of local public transport systems with fixed installations and in the field of rapid mass transport.

Reform 4.1 aims at speeding up the implementation of interventions and at simplifying the procedures for evaluating projects in local public transport and rapid mass transport, rationalising responsibilities and eliminating the duplication of competences in project evaluation within the same administration.

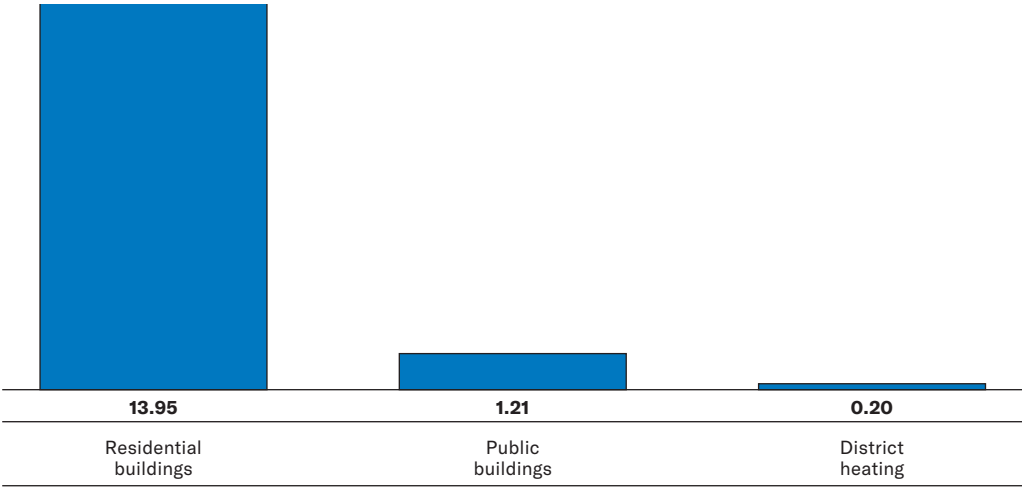
72. Objective 5, "developing an international industrial and research & development leadership in the main transition sectors", is worth pointing out due to its relevance for the energy transition. Indeed, the investments contained in this objective are intended to promote the development in Italy of competitive supply chains in the areas of greatest growth that will make it possible to reduce dependence on imported technologies and, indeed, to make them an engine of employment and growth. In particular, investments are devoted to technologies for renewable generation (e.g. innovative PV modules, new-generation and medium-large wind turbines) and for electrochemical storage, technologies for the production of electrolysers, means of sustainable mobility (e.g. electric buses) and batteries for the transport sector.

73. The third component, "**Energy efficiency and building renovation**", is aimed at strengthening energy efficiency by increasing the level of efficiency of buildings, an extremely important lever for reducing emissions in Italy, characterised by its old public and private build-

ing stock, more than 60% of which is over 45 years old. The overall aim is to increase the energy efficiency of public and private building stock while stimulating local investment, job creation, the promotion of social resilience and the integration of renewable energies. In particular, the third component has the following objectives (each one with a specific amount of resources allocated):

- M2C3.1: energy efficiency in public buildings (1.21 billion Euros).
- M2C3.2: energy and seismic upgrading of private and public residential buildings (13.95 billion Euros).
- M2C3.3: district heating systems (0.20 billion Euros).

● **FIG 29** → **Resources per area of intervention of the third component of Mission 2 of the PNRR, 2021** (billion Euros)



Source → The European House - Ambrosetti and Enel Foundation elaboration on National Recovery and Resilience Plan data, 2021.

74. The objective related to **energy efficiency in public buildings** consists of the following specific measures:

- Investment 1.1: School building replacement and energy renovation plan, which aims to work on some 195 school buildings (0.80 billion Euros).
- Investment 1.2: Efficiency upgrading of court buildings, with the aim of intervening on 48 buildings by mid-2026 (0.41 billion Euros).
- Reform 1.1: Simplification and acceleration of procedures for energy efficiency measures.

Reform 1.1 stems from the necessity to promote the rapid energy conversion of building stock, encouraging major renovations and the transformation of buildings into "nearly zero energy buildings" (nZEB), in line with the strategy for the energy upgrading of national building stock. In order to achieve this aim, the reform recognises the importance of combining economic measures with measures to overcome

non-economic barriers that reduce investment choices in the energy refurbishment of buildings or slow down the execution of works. In particular, the reform consists of four lines of action:

- Activating the National Portal for the Energy Efficiency of Buildings.
- Strengthening the activities of the Information and Training Plan for the civil sector.
- Updating and strengthening the National Energy Efficiency Fund.
- Accelerating the implementation phase of projects financed by the PREPAC programme.

75. The objective related to the **energy and seismic upgrading of private and public residential buildings** consists of Investment 2.1: Ecobonus and Sismabonus up to 110% for the energy efficiency and safety of buildings, which is intended to extend the recently introduced 110% Superbonus measure (Article 119 of the so called Decreto Rilancio) from 2021 to 2023.

76. The objective related to **district heating systems** consists of Investment 3.1: Development of district heating systems, concerning the development of 330 km of efficient district heating networks and the construction of plants or connections for waste heat recovery for 360 MW.

77. There are other missions and components of the PNRR that are not specifically related to the sectors on which the study is focused, but that are worth mentioning because they are linked to the themes of the energy transition in general. One of these is the first component of the second mission, devoted to "Circular economy and sustainable agriculture". The objective related to "Developing integrated projects" includes Investment 3.3: **Culture and awareness of environmental issues and challenges**, which aims to raise the level of awareness of climate change scenarios and their consequences, to educate on the options available for adopting more sustainable lifestyles and consumption at individual, family and community level, and to promote the adoption of virtuous behaviour, also at community level. To do this, the objective is to develop omni-channel content on ecological transition issues (podcasts, videos for schools, documentaries, long forms), provide an open platform accessible to all that contains the most relevant educational material on environmental issues, and involve influencers and thought leaders to maximise the dissemination of the most relevant messages to all citizens.

78. It is also worth pointing out the first mission, "Digitisation, innovation, competitiveness, culture and tourism", containing Investment 2.3: **Skills and administrative capacity**, within the objective "P.A. Innovation" of the first component "Digitisation, innovation and security in the public sector". This investment is relevant because it aims to make a wide range of online courses for the reskilling and upskilling of human capital available. These courses will focus on the priorities of the PNRR, including green transition, and the managerial skills needed for modern and effective public administration. Still within the same component, the objective "P.A. digitalisation" contains Investment

1.4: **Digital services and digital citizenship**, aimed at improving the digital services offered to citizens. First, the take-up of national digital service platforms is reinforced. Secondly, new services are introduced, such as the single digital notification platform, to ensure that as much interaction as possible is shifted to digital channels. Experiments are also being developed in the area of mobility (Mobility as a Service) to improve the efficiency of urban transport systems. Finally, an organic intervention is also planned to improve the user experience of digital services, harmonising the practices of all public administrations towards common quality standards. This line of investment could also include the creation of a single repository and interface for citizens, including a detailed mapping of all existing incentives related to the energy transition, in order to provide a clear picture and understanding of the possible incentives of which they can benefit.

1.5 Expected benefits deriving from the deployment of energy transition investments in Europe and Italy

79. The following section presents the benefits that the deployment of investments in the analysed sectors involved in the energy transition process, also thanks to the massive amount of resources provided by the Next Generation EU and the Italian PNRR, would generate both in Europe and in Italy.

80. Investments represent one of the most important components in the formation of GDP: an economic system that invests, optimises its production processes, creates jobs and, consequently, additional income and consumption. In 2020, despite the COVID-19 crisis, gross fixed investment totaled **2,881 billion Euros** in Europe and **321.2 billion Euros** in Italy, equivalent to 21.6% of the cumulative EU27 GDP and 17.8% of the Italian economy.

81. Economic growth is a priority for governments around the world. The technical-economic debate in recent years, especially since the financial and economic crisis that hit the global economy in 2007 and the subsequent crisis triggered by the COVID-19 health emergency, has focused on this need, elaborating various theories on what could be the best recipe to foster national growth. As witnessed during the recent economic-health crisis in 2020, policies have been oriented towards the revival of household purchasing power as a lever for the recovery of consumption. This represents a fundamental action, but without robust recovery in investments, both private and public, it is not possible to revive growth. This is not an option, but an urgent necessity.

82. The reduction in investment as a result of the economic shocks of the last 13 years is among the main causes of Italy's lack of growth. Between the start of the economic and financial crisis in 2007 and 2019, investment fell by around **86 billion Euros**, more than **7 times** the drop in public spending and around 3 times the drop in private consumption. Even if with different volumes and growth rates, the same goes for the EU27.

● **FIG 30** → **GDP variation in Italy and its components, 2007 and 2019**
(chain linked volumes 2010, billion Euros)

Source → The European House – Ambrosetti and Enel foundation on Eurostat data, 2021.

83. The reduction of investment in Italy is a phenomenon that has its roots in the past. Since 2000, public and private investments have gradually reduced both in absolute value and in terms of their impact on GDP. Gross fixed capital formation by private companies fell from 20.4% of GDP in 2000 to 18.3% in 2019 and since 2007 cumulative investments have fallen by around 488 billion Euros. Similarly, the weight of public investment fell from 3.4% to 1.9% of GDP between 2000 and 2019.

84. Moving on from this premise, to consider the significant additional investments between 2020 and 2030 envisaged by the European Commission to achieve the more ambitious target for GHG emissions at European level, the comprehension of the economic, social and environmental benefits created by investing in the green energy sector has never been so pivotal.

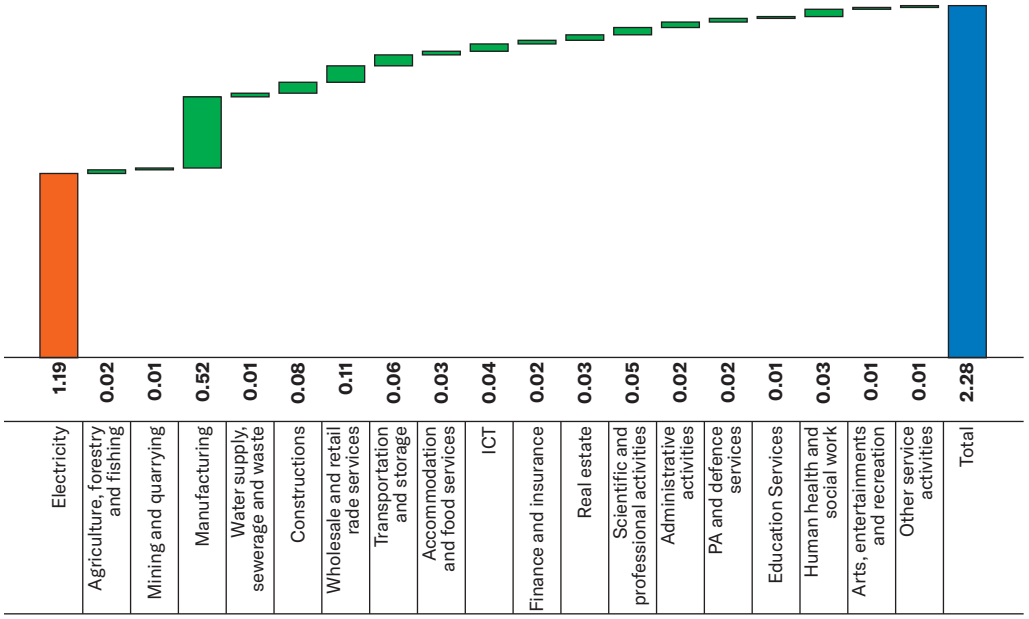
85. In this sense, the analysis of the investment stock and gap in Europe and in Italy has been expanded to define the total **economic (GDP) benefits** linked to the effective deployment of green energy investments at 2030.

86. To estimate the economic benefit, the **GDP multiplier** has been used. Leveraging on the results presented in The European House – Ambrosetti and Enel study "*Empowering Europe's Investability*", published in 2016, the multiplier was calculated using **input-output analysis** (or the analysis of sectoral interdependence[26]) with the aim of analysing interindustrial and intersectoral relations.

87. The analysis conducted on the contribution of the electricity sector[27] to industrial development reveals that for each Euro of GDP generated in the energy sector, the total impact on the economy is **2.28** Euro of GDP. In particular:

- The direct effect is equal to **1.19**, where 1 is the direct increase in GDP and 0.19 is the GDP effect activated in the production process and attributable to consumption and/or uses within the sector.
- The indirect and induced effect (activated by cross-sectoral interdependencies) is equal to **1.09**.

● **FIG 31** → **GDP multiplier of the electricity sector in the EU27+UK**
(absolute value)



Source → The European House – Ambrosetti and Enel Foundation elaboration on "Empowering Europe's Investability" study and Eurostat data, 2021.

26 Input-output analysis makes it possible to: construct a diagram of input and output flows among economic sectors, institutions and families in an economy of exchanges; estimate the impact in monetary terms and work units on the sectors/fields of supply activities with respect to changes in the production of a specific sector or field of activity following an increase in demand in that sector; assess ex ante and evaluate ex post the reactivity of the economic system following the implementation of economic incentives by the government or local administrations.

27 In this case, the Eurostat's "electricity sector" has been considered as a proxy of the entire energy sector.

The different impacts on the economy

Input-output analysis allows to accurately estimate the impact of demand variation in any sector of activity across the economic system, representing inward and outward flows among economic sectors in an exchange economy and estimating the monetary impact of supply activities on the economic sectors, with reference to changes in production, after an increment in demand in that specific sector.

Three different types of impacts on the economic system can be evaluated:

- Direct impact, which refers to the sector analysed and the effect produced within its perimeter.
- Indirect impact, generated by the economic system through the production process consisting of the suppliers of goods and services external to the considered sector, whose outputs are, however, inputs for the selected sector chain.
- Induced impact, generated through expenses and consumption induced by the direct and indirect impact.

Source → "Empowering Europe's Investability - 2016", 2021.

88. According to the European Commission estimate, the overall gap between the inertial scenario investments and the -55% GHG scenario investments in 2030 in the total energy system is equal to **3,564 billion Euros**. By applying the GDP multiplier of the energy sector, it can be estimated that bridging the investment gap could generate direct, indirect and induced benefits to the economy of **8,126 billion Euros**.

89. In Italy, the PNIEC estimates **186 billion Euros** of additional energy investments with respect to the current policy scenario over the period 2017-2030. The direct, indirect and induced benefits to the economy calculated by applying the GDP multiplier of the energy sector to this level of additional investment would be **424 billion Euros**.

90. However, the benefits related to bridging the gap in investment are not linked exclusively to the economic dimension and could be extended to the **social** and **environmental** dimensions.

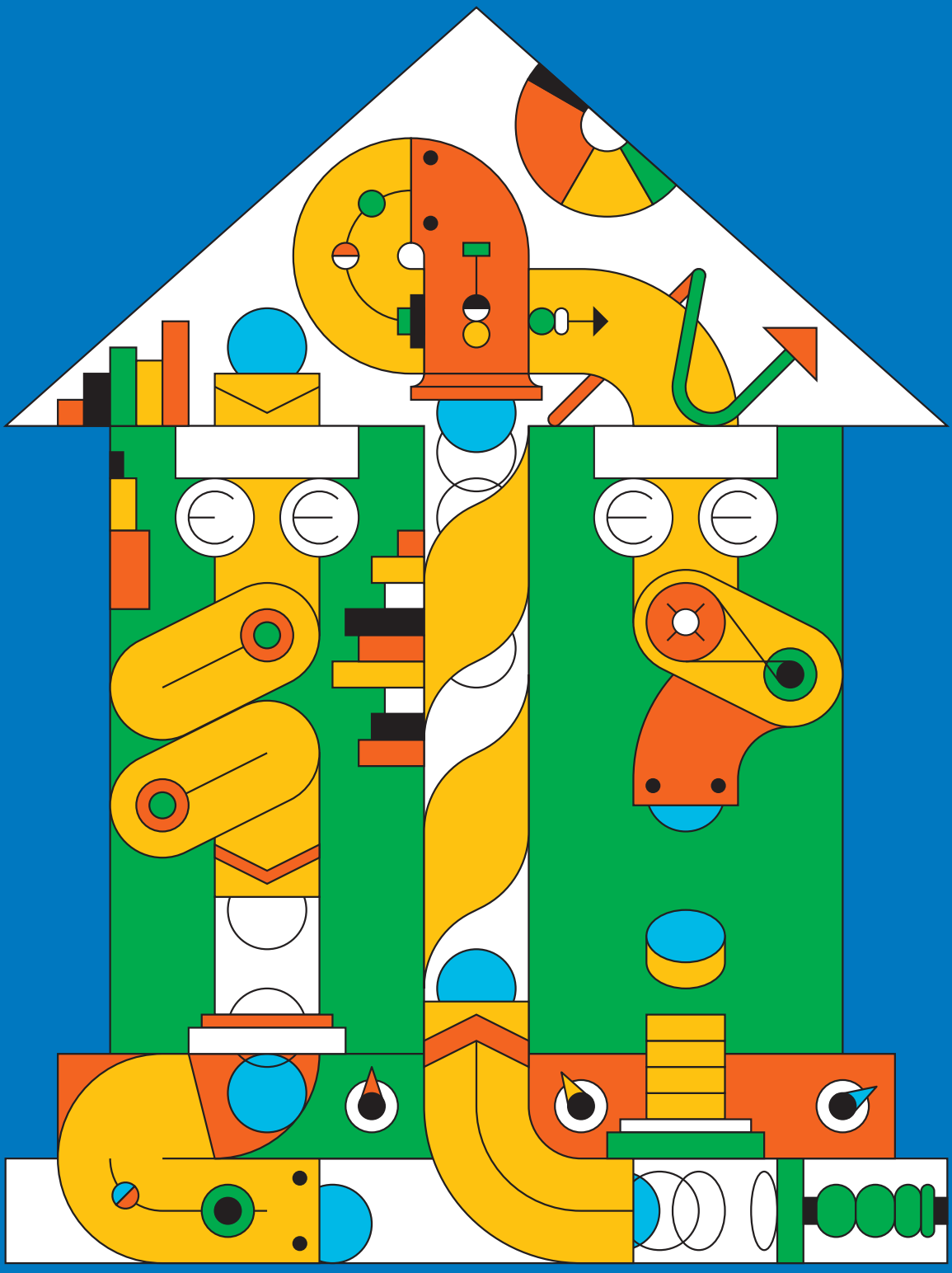
91. According to The European House – Ambrosetti and Enel Foundation study "*Just E-volution 2030*", published in 2019, the energy transition brought about by electrification has a positive impact on employment. It has been estimated that employment in the electric technologies sector in the EU27+UK could reach 6.8 million in 2030, a 30% increase with respect to 2017, with a net employment gain[28] of **1.4 million**. In Italy, the forecast net gain in employment in the electric technologies sector could reach 173,000 in 2030.

28 Considering the employment lost due to the reduction in thermal technologies.

92. Moreover, according to the same study, the electric carrier enables the reduction of pollutant emissions and an **improvement in air quality**, in particular in urban areas. The impact of the energy transition on air quality has been assessed for the European Union and Italy by considering emissions from transport and residential sectors, which together account for more than 50% of total EU emissions. In particular, the substitution of thermal technologies with electric technologies in transport (e.g. electric vehicles) and residential sectors (e.g. heat pumps) could reduce premature deaths in the European Union and Italy by 5,000 and 1,000 respectively by 2030. Moreover, the costs related to air pollution in the European Union could be reduced from between a minimum of **1 billion Euros** and a maximum of **2.9 billion Euros** by 2030.

93. However, the energy transition and decarbonisation can also have **positive social impacts**. According to the "Equality" study (2020) by Guidehouse and Cambridge Econometrics, with the scientific contrbution of Enel Foundation and Eurelectric, the key decarbonisation policies needed for Europe to achieve its climate goals will have a mix of **progressive and regressive effects**. Some policies will result in lower income households financially benefiting more than other income groups (progressive effect), while others will result in lower income households being disproportionately burdened by costs (regressive effect). Decarbonisation policies which directly increase costs such as energy taxes have the most regressive effects, while policies that reduce costs or energy consumption such as energy efficiency measures are found to be the most progressive.

94. A number of policy options exist that could effectively reverse the regressive effects of the decarbonisation policies so that the **net effect is progressive**. In other words, it is possible for decarbonisation policies to both help achieve necessary climate goals and financially benefit lower income households to reduce inequality. If implemented correctly, revenues raised by carbon pricing and energy taxes can be redistributed in a way that reverses the policies' regressive tendencies and increases progressiveness. This finding, taken from the experience of various governments and jurisdictions around the world, shows that the **redistribution of the revenues** raised by decarbonisation polices often form the **core** of measures seeking to mitigate the regressive impacts of the transition to decarbonisation.



Part 2

The current governance of the energy transition in Europe and in Italy: key elements and areas of improvement

Key messages

1

→ The current energy transition governance in Europe is affected by **three main issues**:

- Energy is a **shared competence topic** implying a constant dialogue of the Member States and European institutions in the policy-making process: this leads to the **challenge of consolidating effective common policy frameworks and regulatory schemes** among Member States.
- There is the **need to implement a new "indirect" enforcement**. From a system based on binding EU-wide targets and non-binding Member State targets (with the exception of GHG reduction, binding also at Member State level) matched with an indirect enforcement system, through the Recovery Plan the EU is progressively turning to a system where the Member States are responsible for making good use of the huge resources provided by the Commission. This requires urgent and coordinated action by Member States to lay out and implement one of the biggest investment programmes in history, assuring timely coordination of various public and private actors, while at the same time addressing the inefficiency of the current system.
- There is **need to strengthen the new mechanism for managing policy targets**. The current mechanism for managing policy targets and transpositions into National Plans is still based on a pre-Recovery Plan vision, which has led to some inefficiencies. The RES and energy efficiency targets set out in the "2030 Climate and Energy Framework" are not binding at Member State level, but only at the level of the EU as a whole, while the target for GHG emissions is also directly binding for Member States. As a consequence, EU targets are **not adequately addressed by all Member States** and their results are very uneven and unsatisfactory. Member State targets - and actions to achieve them - must be quickly aligned with the opportunity offered by the available resources of the Recovery Plan.

2

→ These issues have **impacts** on the analysed sectors (renewables, power grids, buildings, transport and industry).

- As far as renewable energy is concerned, since the policy targets are not binding for individual Member States, they are not **adequately addressed by all Member States**. With regards to grids, instead, the "European Clean Energy Package" does not recognise the current and future importance of the role of Distribution System Operators and the presence of regulatory uncertainty on interconnectors prevents investments.
- As concerns **energy efficiency**, the related **objectives are not adequately addressed** with policies and measures by all Member States, and there is a **huge variety** of metrics, design calculation methods for the Energy Performance Certificates as well as different energy label scales.
- As concerns the **transport sector**, several issues derive from the fact that the alternative fuels infrastructure is a trans-national challenge, but across the EU there are **no minimum requirements** for harmonized payment systems and user information and there are no clear and coherent **charging infrastructure targets**.
- In the **industrial sector**, the main issues are related to the **risk of carbon leakage** and the free allowances scheme, as well as the **lack of harmonization of the fiscal and para-fiscal components** of energy carrier prices that does not incentivize to carry out energy efficiency measures.

3

→ When it comes to the Italian case, there are **five main issues** affecting the energy transition governance:

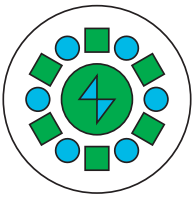
- The **fragmentation of competences** among different actors at different levels of governance and between central government and local institutions (regions, metropolitan cities, provinces and municipalities).
- **Territorial differences and discrepancies** related to how the processes work in different regions or even municipalities, together with an issue of non-uniform application of laws at local level.
- The lack of effective **involvement and commitment to the energy transition by local authorities and communities**.
- Insufficient staffing and skills in **the technical administrative public bodies** (including appropriate professional figures for RES authorisation processes) leading to inefficiency in the deployment of investment.
- **Fragmentation in sectoral policy design** which emerges in the incoherence of the legislative framework and the absence of long-term targets for energy efficiency, as well as in the fragmented cooperation mechanism in place between local institutions on the one hand, and Charge Point Operators and Distribution System Operators on the other hand for the development of recharging infrastructure.

4

→ These issues create inefficiencies for the energy transition in the sectors considered.

- As far as renewable energy is concerned, there is an inefficiency of **national permitting procedures** (territorial differences, different competences, non-uniformity of application of laws at local level, veto power of the Ministry of Cultural Heritage) that also causes a progressive decline in participation in bidding schemes, and there is a **high number of disputes** by local stakeholders, even when a plant has already been authorised.
- Moreover, full deployment of renewables needs relevant investments in the **national electricity transmission and distribution grids**. Therefore, **bureaucratic delays in local permits** or environmental authorizations related to grid investments must be addressed to facilitate the transition.
- With regard to energy **efficiency in buildings and industry** there is inefficiency in the **incentive mechanism** of Certificati Bianchi and of the financial framework, characterised by onerous and lengthy procedures for obtaining resources by financial institutions and an excess of bureaucracy. The result is that current instruments (like the "110% Super bonus") leave the risk of denied certification at the expense of those who support the investments. Moreover, the legislative framework should be improved for the full deployment of the **ESCOs**.
- Finally, the energy transition in the transport sector has to face the **absence of a standardized and homogeneous collaboration mechanism** between local authorities (municipalities and regions) on the one hand, and DSOs (Distribution System Operators) and CPOs (Charge Points Operators) on the other to identify recharging point sites and charging needs, and the delay in the revision of PNire needed to respond to the recent evolution of the market.

2.1 Governance of the decision-making and implementation process of the energy transition in Europe

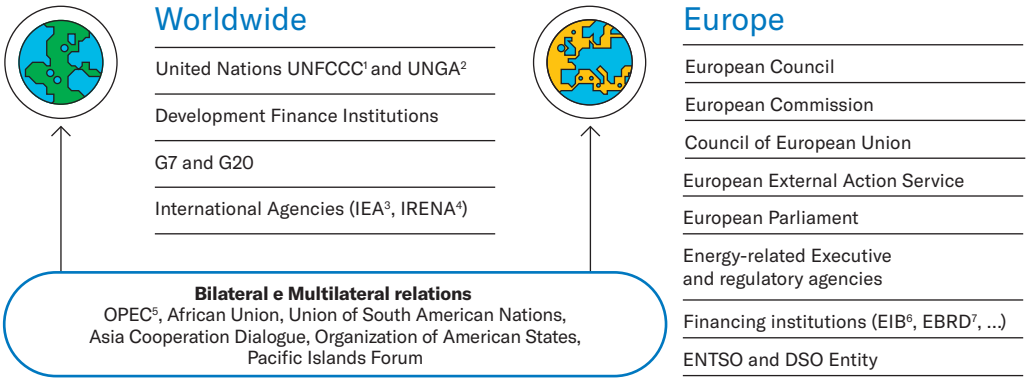


→ ACTORS OF THE EU ENERGY TRANSITION

1. In the first part, this chapter analyses the current **governance of the energy transition** in Europe, examining the energy transition **legislative process**, the **actors** involved and their **interactions**. In the second part of the chapter, the analysis delves into the **main issues** related to the governance framework at European level with respect to the considered sectors, renewable energy sources on the supply side, grids for transmission and distribution and buildings, transport and industrial sectors on the demand side. In the present study, the governance of the energy transition has been identified as the **set of roles, rules, procedures and tools** (at legislative, implementation and monitoring level) concerning the management of the energy transition that aims at reaching strategic and operational objectives:

- Setting **climate, energy and environmental targets** and effectively and efficiently **achieving** them.
- Maximizing **synergies** between all the sectors and actors involved, including EU Institutions and Member States and non-EU countries.
- Facilitating the **effective and efficient deployment** of the necessary investments.
- Ensuring **smooth processes and procedures** and setting up accountability, control and enforcement provisions, ensuring that actions are put in place and results achieved.

● **FIG 1** → **International and European actors involved in the governance of the energy transition**



1 → United Nations Framework Convention on Climate Change. 2 → United Nations General Assembly. 3 → International Energy Agency. 4 → International Renewable Energy Agency. 5 → Organization of the Petroleum Exporting Countries. 6 → European Investment Bank. 7 → European Bank for Reconstruction and Development.
Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data and various sources, 2021.

2. The governance of the energy transition in Europe involves actors exercising their executive and legislative powers and interacting at different levels among them. The **actors** involved are summarised in the scheme above.

3. The **European Commission** (EC) is the **principal executive body** of the EU. The Institution can propose new legislation, enforce legislation and implement policies and the EU budget. The Commission is divided into several Directorates-General (DGs), according to the specific policy field they deal with. The DGs directly involved in EU energy governance are DG Energy (DG ENER) and DG Climate Action (DG CLIMA), but it is important to note that many others DGs have an impact on energy issues in a broader sense[1].

4. In particular, the following DGs have a significant impact on energy governance: DG Research and Innovation, which focuses on research and innovation policies; DG Enterprise and Industry, which promotes a favourable context for the economic growth for EU enterprises, particularly with regard to energy efficiency; and DG Environment, which proposes and implements policies to ensure environmental protection and preserve the quality of life of EU citizens.

5. The **European Parliament** (EP) plays a relevant role in the energy transition governance, and in particular through the Committees on Industry, Research and Energy (ITRE) and on the Environment, Public Health and Food Safety (ENVI). Within the European legislative framework, the EP has **3 main roles**: legislative, supervisory and budgetary.
In its **legislative role**, the European Parliament has responsibilities for:

- Discussing and approving EU laws (together with the Council, it co-decides on the content of EU laws proposed by the EC).
- Deciding on international agreements.
- Deciding on enlargements.
- Reviewing the European Commission's work programme and asking it to propose legislation.

In its **supervisory role**, the European Parliament has responsibilities for:

- Scrutinising other EU institutions.
- Electing the Commission President and approving the Commission as a body. The European Parliament has the power to vote a motion of censure, obliging the Commission to resign.
- Granting discharge, namely approving the way EU budgets have been spent.
- Examining citizens' petitions and setting up inquiries.
- Discussing monetary policy with the European Central Bank.
- Questioning Commission and Council.

1 DG Energy, DG Climate Action, DG Internal Market, Industry, Entrepreneurship and SMEs, DG Mobility and Transport, DG Communications Networks, Content & Technology, responsible for promoting the use of and public access to digital goods and services and for supporting research and innovation of information & communications technologies, DG Economic and Financial Affairs, DG Research and Innovation, DG Taxation and Customs, DG Trade, DG Competition, DG Financial Stability, Financial Services and Capital Markets Union.

- Observing elections.

In its **budgetary role**, the European Parliament has responsibilities for:

- Establishing the EU budget, together with the Council.
- Approving the EU's long-term budget, the "Multiannual Financial Framework".

6. The **Council of the European Union** represents the governments of the individual Member States. Depending on the policy to be discussed, the Member States delegate their corresponding national minister to a Council meeting. The Council, with configuration on Energy (TTE) and on Climate (ENV), strategically has power to lead the discussion on matters related to energy. The main responsibilities of the Council are:

- Discussing and approving (together with the Parliament) European laws proposed by the Commission.
- Coordinating EU countries' policies.
- Approving the annual EU budget (a joint decision with the EP).
- Developing European foreign policies.

Simply put, the Council is the place where Member States can express their national views most directly at an EU level. For energy policies, these national views are often controversial, as there are major differences in national energy policies, preferences and contexts.

7. The Council of European Union and the Parliament cannot propose new legislation, but can invite the European Commission to do so. The Commission is not obliged to submit proposals for legislation as advised by the Parliament and the Council, but it has to provide official argumentation for its decision.

8. Together with the Parliament and the European Commission, the **European Council** also has a role in setting the priorities and the general political direction of the European Union, including the energy and climate-related ones. The European Council is composed of the heads of state or government of all European countries, the President of the European Council, and the President of the European Commission. The European Council usually meets 4 times a year; however, the President can convene additional meetings to address urgent issues. It generally decides issues by consensus, but there are some cases in which unanimity or qualified majority is also used, voted only by the head of state/government. The European Council is responsible for:

- Deciding on the EU's overall direction and political priorities but it does not pass laws.
- Dealing with complex or sensitive issues that cannot be resolved at lower levels of intergovernmental cooperation.
- Setting the EU's common foreign & security policy, taking into account EU strategic interests and defence implications; nominating and appointing candidates to certain high profile EU-level positions, such as the European Central Bank (ECB) and the Commission.

On each issue, the European Council can ask the European Commission to make a proposal to address it and pass it on to the Council of the EU to deal with.

9. The **27 EU Member States (MS)** also have important responsibilities in European energy policies. Under the Governance of the Energy Union Regulation, finally adopted on 4th December 2019, the Member States must establish **10-year integrated national energy and climate plans** (NECPs) for the 2021–2030 period, submit a progress report every two years and develop consistent national long-term strategies to meet the goals of the Paris Agreement.

10. 8 energy-related agencies[2] have a technical role in carrying out activities and research on energy issues and are specialised in the three pillars of the EU energy policy. In particular, the role of the Agency for the Cooperation of Energy Regulators (ACER), supported by the Council of European Energy Regulators (CEER), is relevant in the process of definition and implementation of the policies, namely the regulatory framework necessary to establish an integrated European grid market in electricity and gas in the interest of Europe's consumers.

11. Together with the formal institutions, **ENTSO-E**[3] and **EU DSO entity**[4] have a pivotal role in the European energy context for electricity. ENTSO-E (representing more than 40 Transmission System Operators from 35 European countries) promotes closer cooperation across Europe's TSOs to support the implementation of EU energy policy and achieve Europe's energy and climate policy objectives. It also has a fundamental role in the definition of the network codes to favour the harmonisation, integration and efficiency of the European electricity market. The DSO entity fosters cooperation between all electricity Distribution System Operators at European level, under the impetus of the Commission; the DSO entity is meant to be a interlocutor in defining the policy and regulations related to distribution networks.

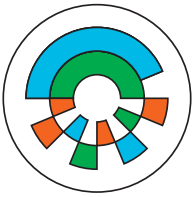
12. Finally, European and non-European **financial institutions** (EIB[5], EBRD[6], etc.) are an essential element in the governance process, especially with regard to the implementation of investments, representing an enabling factor for the energy transition.

13. When describing European governance of the energy transition, it must be considered that climate change is a global threat and Europe cannot fight it on its own. Cooperation with partner countries is therefore essential. Overall European governance on energy is embedded in a complex global **network of diplomatic and political relations** in which the goals of decarbonisation and European energy transition leadership must be balanced with the need to maintain European industrial and

2 European Research Council & the ERC Executive Agency, Innovation and Networks Executive Agency, Joint Research Centre, Research Executive Agency, Executive Agency for Small and Medium-Sized Enterprises, European Environment Agency, European Institute of Innovation and Technology, Agency for the Cooperation of energy Regulators.
3 European Network of Transmission System Operators for Electricity https://www.entsoe.eu/.
4 European Distribution System Operators entity https://www.eudsoentity.eu/.
5 European Investment Bank.
6 European Bank for Reconstruction and Development https://www.ebrd.com/home.

manufacturing competitiveness with respect to the rest of the world. The EU declared a firm interest in working towards a net-zero GHG economy by 2050. Now the effort is to do so by maintaining and guaranteeing growth and prosperity of the Union, which will encourage other economies to do the same. One of the contexts in which the external energy dimension is shaped is the Paris Agreement. Within its framework, Member States and the European Union have discussed with countries from all around the world the long-term vision necessary to deal with climate change and the related challenges. In the external energy dimension, a role is also played by the **European External Action Service** (EEAS), which represents the diplomatic body of the European Union as a whole also in the field of energy and climate diplomacy. The EEAS works closely with the foreign and defence ministers of all the Member States, but also has a close relationship with the United Nations and other International Organisations. Given the strategic relevance of energy, EU institutions and every single Member State institution play a crucial role in defending their own interests and balancing their sovereignty on energy with the need to collaborate in achieving decarbonisation.

14. Other international institutions and agencies involved in the external relations of the European energy transition include the **G7** and **G20**. They represent important opportunities for the heads of the world's leading countries to meet and deliberate on agreements including energy issues. International energy agencies, such as the **IEA** and **IRENA**, provide numerous occasions for the European Union and its individual Member States to meet and interact on energy-related issues with countries around the world.



→ GOVERNANCE OF THE EU ENERGY TRANSITION

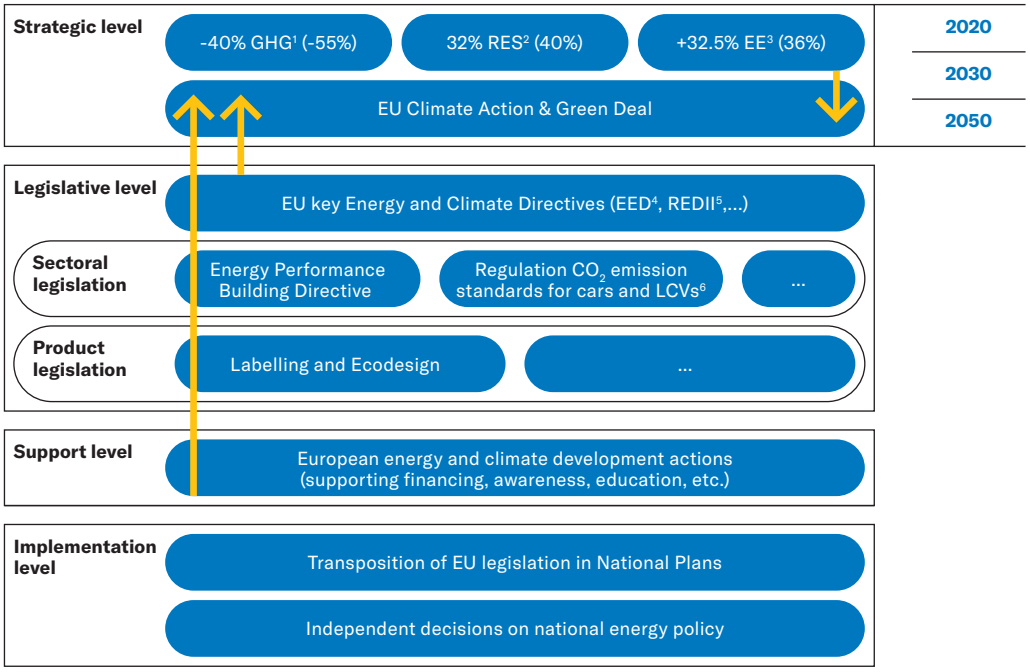
15. The **general energy governance scheme** of the European Union can be divided into four levels, namely the strategic, the legislative, the support and the implementation level.

- At the **strategic level**, the EU defines a range of policy roadmaps and communications that create a framework for action, set medium- and long-term targets and objectives and enable new directives and regulations, as well as support actions to be designed as supporting mechanisms for these strategies. The high-level strategies, namely the “2020 Climate and Energy Package”, the “2030 Climate and Energy Framework”, the “2050 Long-term Strategy” and the recently launched “Fit for 55” package, shape a framework for the creation of laws that enforce actions and the implementation of policies in a defined time frame consistent with a set of requirements deemed adequate for the policy objectives in place.

7 Legislative instruments are divided into regulations (binding legislative acts that must be applied in their entirety across the EU), directives (legislative acts that set out a goal that all EU countries must achieve, with individual countries free to draft their own laws on how to reach these goals) and decisions (legislative acts that are binding on those to whom they are addressed, such as an EU country or an individual company, and directly applicable).

- The **legislative level** refers to all the key legislative instruments[7] transposing the climate and energy policies and roadmaps (for example, the Energy Efficiency Directive and the Renewable Energy Directive). The legislative level can be divided into sectoral legislation, containing directives and regulations referred to specific sectors (EPBD, CO_2 emission standards for cars and LCVs, etc.), and product legislation, containing directives and regulations referred to specific products (Labelling, Ecodesign, etc.).
- In addition to the legislative and strategic actions mentioned, the EU develops a range of support actions that consist in programmes and joint actions for more specific parts of the policy roadmaps in place. The **support level** consists of the efforts to remove market barriers and support the delivery of planned energy objectives. This level includes all the EU programmes and initiatives designed to boost information sharing, training activities, and financial support enabling a broader reach of the necessary evolution on practices and technologies across the EU (e.g., Horizon 2020 programme).
- The **implementation** level refers to the transposition and application of EU rules in Member States' national plans and the independent decisions on energy policy taken at national level.

● FIG 2 → Illustrative scheme of the European Union energy governance



This is an illustrative scheme, therefore it does not include all the directives related to energy and climate.
1 → Greenhouse gases. 2 → Renewable Energy Sources. 3 → Energy Efficiency. 4 → Energy Efficiency Directive.
5 → Renewable Energy Sources Directive. 6 → Light Commercial Vehicles.

N.B. → The targets in parenthesis refer to the new "Fit for 55" package.

Source → The European House – Ambrosetti and Enel Foundation elaboration on various sources, 2021.

16. Each level of European energy governance **interacts** with the other levels as described below:

- **Strategic** and **legislative** levels interaction: the definition of climate and energy targets and frameworks requires the development of legislative acts to support their delivery and correct implementation, while the implementation of laws on energy and climate supports both the accomplishment of medium- and long-term strategies and the necessary Member States' contributions for a sustainable energy future in the EU.
- **Strategic** and **support** levels interaction: strategic roadmaps outline support actions to boost the expected results to ensure that targets and measures are reached (e.g., Horizon 2020 Program), while support level initiatives contribute to the definition or fine-tuning of new and existing strategies for the energy system, through the insights from Member States' realities.
- **Legislative** and **support** levels interaction: existing or new legislative acts on energy and climate benefit from support actions by ensuring communication, collaboration, and structures for Member States to comply with the law (e.g., EU Energy STAR Programme), while the development and implementation of support programmes provide insights to improve, amend, or repeal energy directives at legislative level.

17. In the definition of legal acts included in the energy transition governance scheme, the European Union has adopted a set of tools aimed at assuring **accountability and transparency**. These tools are:

- **Formal stakeholder engagement**, which is commonly carried out by means of public consultations, but workshops, bilateral meetings, and consultation on specific documents are also used. Typical stakeholders involved include industry, consumer organisations, environmental organisations, energy companies, Transmission System Operators (TSOs), National Regulatory Authorities (NRAs), etc. Stakeholder involvement is provided by the treaties of the EU and two stakeholder institutions have an official advisory role in the policy-making process, namely the European Economic and Social Committee (EESC) and the Committee of the Regions (CoR). The European Commission, European Parliament, and Council are required to consult the EESC and the CoR regarding legislation on a wide range of topics. Furthermore, the two committees can issue opinions on their own initiative too.
- **Informal policy-making**, which includes informal meetings of energy ministers in the EU as well as lobbying in Brussels from a broad range of organisations. Interest group interaction with EU institutions and national governments has historically played a crucial role in internal energy market policy development[8] and its relevance has been confirmed by the fact that President Juncker made improving the transparency of informal policy-making one of the ten priorities for his term.

8 Per OveEikeland, 2008.

- **Reporting**, which is set by regulation at different levels, namely Member State, European Commission and agency level.

18. In the legislative context, European Union and Member States have different levels of autonomy and coordination depending on the type of competence on the specific subject matter[9]. As shown in Figure 3, **energy belongs to the shared competence** topics, implying a constant dialogue between Member States and European institutions in the policy-making process.

FIG 3 → **Competences in the European Union**

Exclusive Competences	Shared Competences	Supporting Competences
Customs union	Internal market	Protection and improvement of human health
Establishing of competition rules necessary for the functioning of the internal market	Social policy, but only for aspects specifically defined in the Treaty	Industry
Monetary policy for Euro area countries	Economic, social and territorial cohesion	Culture
Conservation of marine biological resources under the common fisheries policy	Agriculture and fisheries	Tourism
Common Commercial Policy	Environment	Education, vocational training, youth and sport
Conclusion of international agreements under certain conditions	Consumer protection	Civil protection
	Trans-European networks	Administrative cooperation
	Energy	
	Area of freedom, security and justice	
	Shared safety concerns in public health matters, limited to the aspects defined in the TFEU	
	Research, technological development, space	
	Development cooperation and humanitarian aid	

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

9 Exclusive competence: the European Institutions only can legislate and adopt binding acts; shared competence: both European Union and Member States can legislate and adopt legally binding acts. European countries exercise their own competence where the EU does not exercise, or has decided not to exercise, its own competence; supporting competence: European Union can only intervene to support, coordinate or complement the action of EU countries. Legally binding EU acts must not require the harmonisation of EU countries' laws or regulations.

19. Figure 4 provides a **synthetic view of the relation of EU and Member State level governance** with respect to five key aspects: setting of European targets, binding national targets, monitoring, enforcement and suggestions on corrective actions and enforcement on targets.

- **Existence of European policy targets**. The European energy policy framework provides for targets for 2030 only for the **GHG**, while Renewable Energy Directive (RED) sets the target for RES and transport. Despite the overall energy efficiency target and the amended Energy Performance of Buildings Directive (2018/844/EU) introduce new elements and send a strong political signal on the EU's commitment to modernise the building sector, no specific national policy targets for 2030 have been specified[10] and the same is true for the industrial sector.
- **Existence of binding policy targets for Member States**. The "2030 Climate and Energy Framework" provides RES, energy efficiency and GHG emission targets[11]. However, the new 2030 framework eliminated the binding nature of the targets at national level (with the exception of the GHG emission policy target), maintaining it only at European Union. In particular, **RES and energy efficiency targets are not binding** at Member State level, but only at the level of the European Union as a whole, while the **GHG emission target is binding** at both levels. The fact that the policy targets, within the renewed 2030 energy framework, are not binding anymore, makes the European Commission's role of coordination, supervision and control even more relevant.
- **Existence of an EU monitoring mechanism for Member States**. The Governance Regulation establishes an integrated framework for **monitoring**, planning, reporting, and reviewing related to the 2030 framework. The Governance Regulation required each Member State to submit in 2019, and every ten years thereafter, an integrated National Energy and Climate Plan (NECP). In these plans, Member States have to include national contributions to the EU-wide RES and energy efficiency targets, as well as related existing and planned policies and measures, with the obligation to update them every five years[12]. Member States are also required to submit **two-year progress** reports on the implementation of their NECPs[13], and to report every two years on policies and measures to implement their GHG emission target[14] and every year on GHG emissions[15]. Member States must also prepare, submit, and regularly update long-term strategies for climate and energy with a time horizon of at least 30 years[16].

10 It is worth pointing out that the new "Fit for 55" package (not yet definitive) has proposed energy transition targets for buildings. See the box below for further details.
11 In the "Fit for 55" package new targets have been established for buildings and industry.
12 It refers to articles 3, 9 and 14 of European Governance Regulation.
13 It refers to articles 17, 20–25 of European Governance Regulation.
14 It refers to article 18 of European Governance Regulation.
15 It refers to article 26 of European Governance Regulation.
16 It refers to article 15 of European Governance Regulation.

Indeed, the Governance Regulation enhances transparency through planning and reporting by Member States, and mandates the European Commission to monitor implementation and take remedial actions to reach the climate and energy targets[17].

- **Suggestions on corrective actions for Member States**. Furthermore, the Governance Regulation mandates the European Commission to monitor progress and take any remedial actions[18], assisted by the European Environment Agency[19]. In addition to regularly assessing overall progress by the EU as a whole, the European Commission assesses individual Member States' plans and progress in their implementation, including the ex-ante assessment of draft plans before they are finalised[20]. Where the Commission finds the overall ambition of plans or overall progress towards the relevant energy and climate targets to be insufficient, it holds the power to take targeted action in response. This includes recommendations to individual and/or all Member States as well as proposing other measures (e.g., legislation) and exercising "its powers at Union level"[21]. Member States whose progress is lagging are required to implement additional measures within one year to make up for the gap. Even though the form and content of such corrective actions are left to each Member State, failure to take effective action can in principle lead to infringement procedures according to the same articles. Enforcement is not oriented on targets anymore – as it was before the new Energy Governance Regulation, but rather it focuses on the **implementation of corrective actions** to reach the 2030 targets[22].
- **Enforcement on targets for Member States (penalty system)**. Even if the 2030 RES and energy efficiency targets are not binding anymore, **infringement proceedings** under Article 13 of the Treaty on the Functioning of the European Union (TFEU) on mutual sincere cooperation can still be employed to enforce national targets. Indeed, in the case of insufficient national measures, undermining the chance to reach the targets for EU as a whole, the European Commission shall propose measures and exercise its power at Union level in order to ensure the achievement of the Union's 2030 target for renewable energy, however this does not apply in practice.

17 S. Oberthür (2019), "Hard or Soft Governance? The EU's Climate and Energy Policy Framework for 2030".
18 It refers to articles 9 and 13, Chapter 5 of European Governance Regulation.
19 It refers to article 42 of European Governance Regulation.
20 It refers to Articles 9 and 13, Chapter 5 of European Governance Regulation.
21 It refers to articles 31 and 32 of European Governance Regulation.
22 This mechanism has not yet occurred as the first two-year assessment has yet to take place. Source: S. Oberthür (2019), "Hard or Soft Governance? The EU's Climate and Energy Policy Framework for 2030".

The "Fit for 55" package introduces European policy targets for buildings

The new EU package introduces specific targets for buildings, under two objectives. The first objective is "leading the third industrial revolution": the green transition presents a major opportunity for European industry by creating markets for clean technologies and products. In this regard the "Fit for 55" outlines the following targets:

- **35 million buildings** to be renovated by 2030.
- **160,000 additional green jobs** could be created in the construction sector by 2030.

The second objective is to renovating buildings for greener lifestyles. As a matter of fact the renovation of the European homes and buildings will save energy, protect against extremes of heat or cold and tackle energy poverty. To achieve such objective the European Commission proposes to:

- Require Member States to renovate **at least 3%** of the total floor area of all public buildings annually.
- Set a benchmark of **49% of renewables** in buildings by 2030.
- Require Member States to increase the use of renewable energy in heating and cooling by **+1.1 percentage points** each year, until 2030.

Source → The European House - Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

● FIG 4 → Synthesis of the main governance characteristics at European Union level

	GHG	RES	Buildings	Transport	Industry
Existence of European policy targets	●	●	●*	●	●*
Existence of binding targets for MS	●	✕	✕	✕	✕
Existence of EU monitoring mechanism vs. MS	●	●	●	●	●
Suggestions on corrective actions for MS	✕	●	●	●	●
Enforcement on targets for MS (penalty system)	●	●	●	●	●

● Indicates whether the specific topic (left side) holds or applies for the specific sector

✕ Indicates whether the specific topic (left side) does not hold or does not apply for the specific sector

● Indicates whether the specific topic (left side) holds or applies formally, but has not yet been applied to date

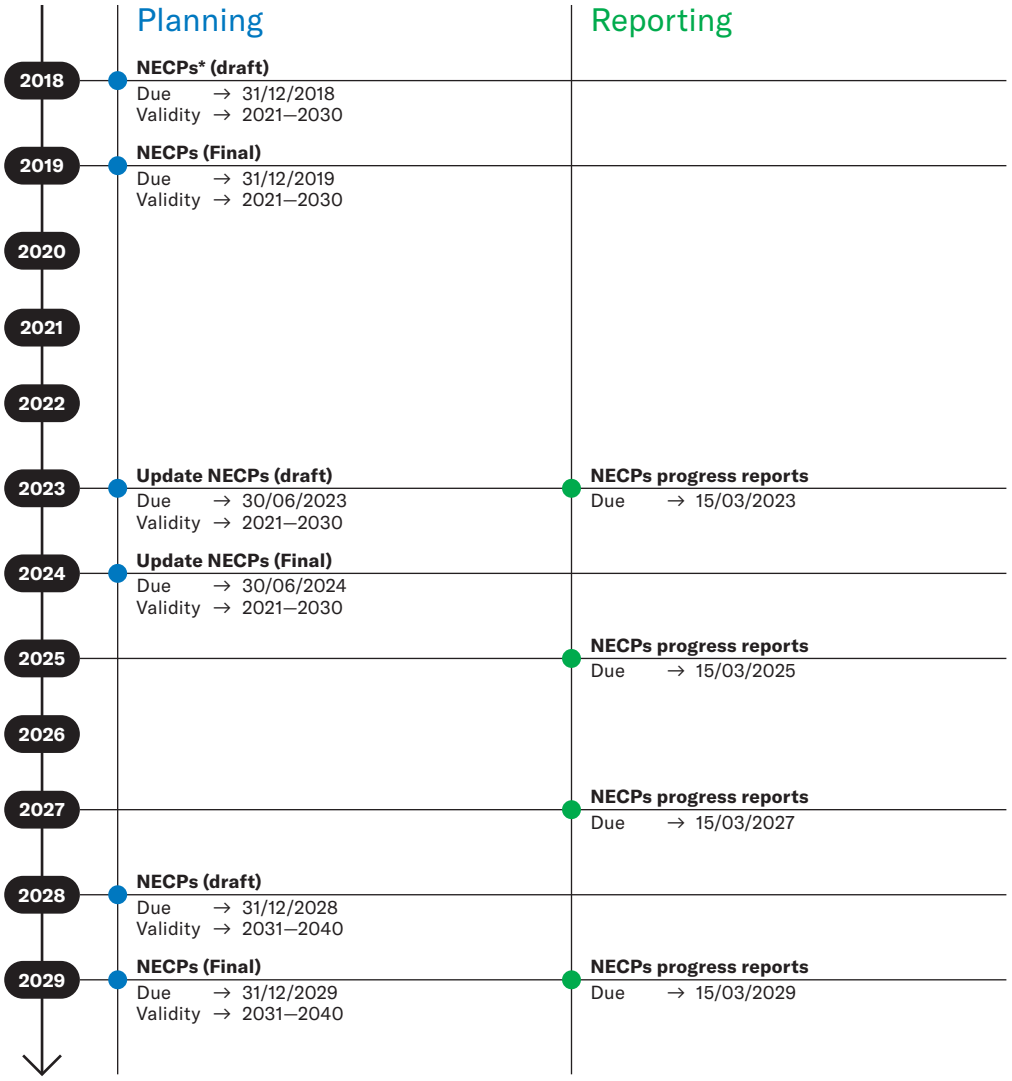
*The new "Fit for 55" package has introduced targets for buildings and industry; see details in the box above and in other parts of the present report.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission and European Parliament data, 2021.

20. Member States define their national energy strategy in the integrated NECPs: a fundamental piece of legislation that allows the alignment of every Member State with the European Union's vision, strategy and objective. Integrated National Energy and Climate Plans are subject to a formal procedure so that their content is shared also with European Institutions. In this procedure, **reporting** is a fundamental step. By 30th June 2024, the Member States must update the plans, in line with the 5-year ambition cycle of the Paris Climate Agreement, giving them the opportunity to adapt to significant changing circumstances. As part of these updates, Member States should make efforts to mitigate any adverse environmental impacts that become apparent and notify modifications in objectives, targets and contributions reflecting changes in the overall ambition as regards the 2030 targets for energy and climate[23]. To strike the right balance between the need to ensure a proper follow-up of the implementation of the plans and the need to reduce administrative complexity, Member States should also draw up two-year progress reports on the implementation of the plans and other developments in the energy system.

23 Member States have to set their own contributions and indicative trajectories with reference points in 2022, 2025 and 2027 (these shall reach 18%, 43% and 65% of the 2030 contribution).

● **FIG 5** → **Planning and reporting requirements within Energy Union governance regulation framework (Regulation (EU) 2018/1999 Articles 9, 14 and 17)**



*National Energy and Climate Plans.
N.B. → The process started in 2018 with the first delivery of the NECPs drafts.
Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission and European Parliament data, 2021.

21. In compliance with Article 13 of the Regulation on the Governance of the Energy Union and Climate Action, on 18th June 2019 the Commission published its **assessment of the national draft plans**. The draft plans were analysed by the Commission with an overall assessment and country-specific recommendations published in June 2019. Taking these recommendations into account, Member States submitted their final NECPs, which were assessed in the detailed EU-wide report published by the Commission on 17th September 2020.

The gap filling mechanisms for EU 2030 targets

With the introduction of the 2030 Energy Governance Regulation, the European Commission has introduced **gap filling mechanisms** to ensure the effectiveness of reporting, monitoring and enforcement with respect to the 2030 energy and climate targets.

For the **GHG emission targets**, under Article 30 (Inconsistencies with overarching Energy Union objectives and targets under Regulation (EU) 2018/842):

- There is no gap filling mechanism for Effort Sharing Regulation (ESR) sectors, as national contributions are distributed to Member States (MSs) as binding national targets through a GDP/capita-based methodology defined in the ESR.
- Member States can resort to certain flexibilities to stay on track for the ESR. Flexibilities include limited access to LULUCF credits, transfers among Member States, banking and borrowing, one-off access for certain MSs to past ETS allowances, and access to a safety reserve for certain MSs once the other flexibilities are used up.
- The European Commission shall issue recommendations to a Member States if policy developments in that MS show inconsistencies with the ESR.

For the **RES target**, under Articles 31, 32 and 33 (Response to insufficient ambition of National Energy and Climate Plans (NECPs), Response to insufficient progress towards Union's energy and climate objectives and targets, Union renewable energy financing mechanism):

- Member States falling below one or more of their national reference points in 2022, 2025 and 2027 shall ensure that additional measures are implemented within 1 year after Commission's assessment:
  - National measures to increase deployment of renewable energy.
  - Adjust the share of renewable energy in heating and cooling (Art. 23 RED).
  - Adjust the share of renewable energy in transport (Art. 25 RED).
  - Make a voluntary financial payment to the EU renewable energy financing mechanism.
  - Contribute to renewable energy projects managed directly or indirectly by the European Commission.
  - Use cooperation mechanisms set out in the RED (bilateral/multilateral agreements).
- If national measures are insufficient, the European Commission shall propose measures and exercise its power at Union level in addition to those to ensure the achievement of the Union's 2030 target for renewable energy.

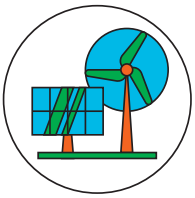
For the **energy efficiency target**, under Articles 31 and 32 (Response to insufficient ambition of NECPs, Response to insufficient progress towards Union's energy and climate objectives and targets):

- The European Commission may issue recommendations to all Member States. Where, on the basis of its assessment of the NECPs and their updates, the Commission concludes that the objectives, targets and contributions of NECPs are insufficient for the collective achievement of the Energy Union objectives, it may issue recommendations to all MSs.
- The European Commission shall propose measures and exercise its powers at Union level in order to ensure the collective achievement of those objectives and targets, and in particular to improve efficiency of: a) products (ecodesign/energy labelling), b) buildings (EED/ EPBD), c) transport.

Source → The European House - Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

2.1.1 European governance of the sectors considered: renewable energy sources, buildings, transport and industry

22. This chapter analyses in greater detail the European-level governance of the **sectors** considered: renewable energy sources, transmission and distribution grids, buildings, transport and industry. The implementation level is not considered here because implementation is carried out at Member State level and will be analysed in the part dedicated to Italy.



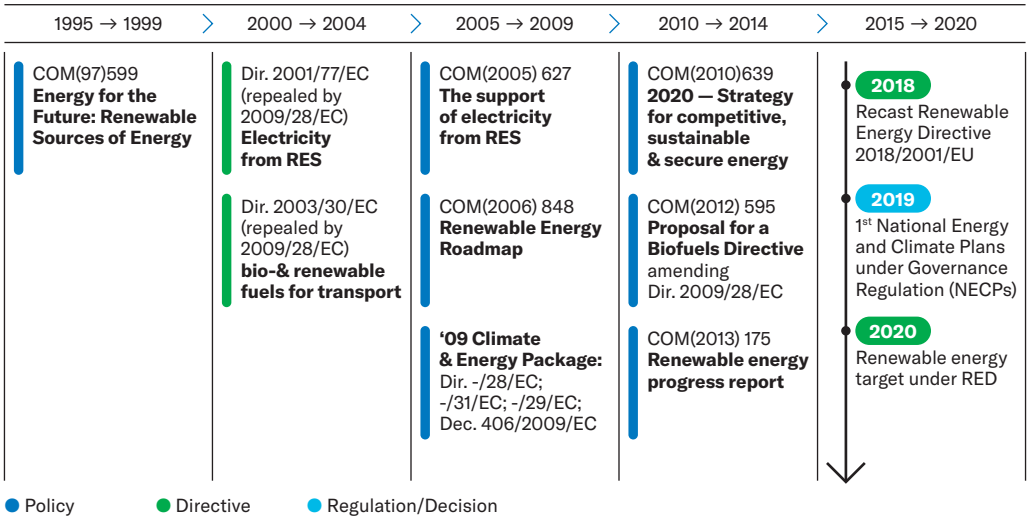
→

RENEWABLE ENERGY SOURCES

23. In the past 25 years, **several policies** and legislative measures on renewable energy have been issued. Starting back in 1997, the Communication from the Commission "Energy for the Future: Renewable Sources of Energy"[24] set out an Action Plan for the achievement of a 12% penetration of renewables in the Union by 2010. After various directives that progressively raised the target, in December 2018 the recast Renewable Energy Directive 2018/2001/EU[25] (known as Renewable Energy Directive II) entered into force, as part of the "Clean Energy for all Europeans" package, setting a target of 32% of renewables in energy consumption by 2030. This directive will be revised coherently with the new announced ambition of the "Fit for 55" package that sets **40%** target for renewables in energy consuption by 2030. In 2019, the National Energy and Climate Plans for the period from 2021 to 2030, introduced under the Regulation on the Governance of the Energy Union and Climate Action[26], were submitted, determining national contributions to meet the EU's energy and climate targets for 2030.

24 "Communication from the Commission. Energy for the Future: Renewable Sources of Energy. White Paper for a Community Strategy and Action Plan", European Commission, 1997.
25 "Directive (EU) 2018/2001 of the European Parliament and of the Council of 11th December 2018 on the promotion of the use of energy from renewable sources", 2018.
26 "Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11th December 2018 on the Governance of the Energy Union and Climate Action", 2018.

● FIG 6 → **The European legislation and regulatory framework related to the renewable energy sources sector, 1995-2020**



Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021

24. At the **strategic level** of renewable energy governance, the "2020 Climate and Energy Package", the "2030 Climate and Energy Framework" and the "2050 Long-term Strategy" contain the high-level strategies that set the objectives and shape the framework for the creation of the specific legislative instrument applying to renewable energy. At the **legislative level**, the instrument relevant for renewable energy is the Renewable Energy Directive. Within the legislative level, there is then a second layer referred to sectoral legislation. An example is the directive to reduce indirect land use change for biofuels and bioliquids[27]. At the **support level**, the EU develops a range of actions to foster the deployment of renewables, which include cooperation mechanisms through which Member States can work together to exploit renewable resources[28], guidance for Member States for the design of renewable energy support schemes and the EU renewable energy financing mechanism, through which contributing countries can voluntarily pay into the mechanism and finance renewable energy projects in hosting countries, while sharing the statistical benefits (see the box below for further details). The **implementation level** concerns the transposition of EU directives into national legislation, which still has to be done for renewable energy in Italy at the time of writing.

27 "Directive (EU) 2015/1513 of the European Parliament and of the Council of 9th September 2015", 2015.
28 Examples are represented by joint support schemes implemented by Norway and Sweden (joint electricity certificate market) and by Denmark and Germany (joint auction for ground-mounted solar photovoltaic energy).

The EU renewable energy financing mechanism

To better support renewable energy projects, and encourage a greater uptake of renewable energy sources, the European Commission has established (article 33 of the Governance Regulation (EU) 2018/1999 of the "Clean energy for all Europeans" package) a new financing programme, the **EU renewable energy financing mechanism**.

The main objective is to enable EU countries to work more closely together in the take-up and promotion of renewables. In so doing, the countries can more easily achieve both individual and collective renewable energy targets.

The mechanism links countries that voluntarily pay into the mechanism (contributing countries) with countries that agree to have new projects built on their soil (hosting countries). However, there is no direct link or negotiation between contributing and hosting countries.

The financial contributions that enter the financing mechanism scheme will, through competitive tenders for grants, support new renewable energy projects in all EU countries that are willing to host such projects.

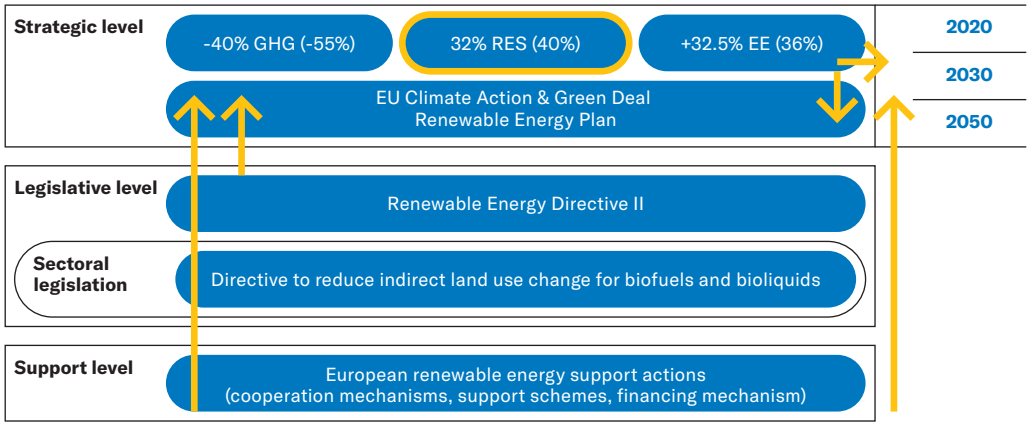
The key element of the mechanism's collective nature is that all the participating countries will share the statistical benefits of the produced renewable energy. It means that a contributing country can count part of the statistics from a financed project in a host country to their own national renewable energy target. The other part of the statistics remains with the host country.

The EU renewable energy financing mechanism was adopted in September 2020 and is now in the implementation phase, with the first call to be published in the second half of 2021.

At the time of writing there is no definition of the promoters who will actually develop the plants operationally. According to this mechanism, the MSs should not fall behind the targets on the indicative trajectories, otherwise they have to somehow close the gap within one year. This is also why, in Italy, the view is that the mechanism would probably provide greater incentives for offshore wind, which has fewer permitting issues.

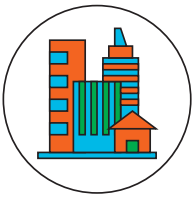
Source → The European House - Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

● FIG 7 → The European Union renewable energy governance



N.B. → The targets in parenthesis refer to the new "Fit for 55" package.

Source → The European House – Ambrosetti and Enel Foundation elaboration on various sources, 2021.



→ BUILDINGS

25. "**Energy efficiency first**" is one of the key principles of the Energy Union, intended to ensure secure, sustainable, competitive and affordable energy supply in the EU. Energy efficiency is a concept spanning across all sectors, including infrastructures for generation, transmission and distribution, and demand sectors like buildings, industry, and transport. The following section analyses energy efficiency across these three demand sectors, focusing on their legislative frameworks and governance mechanisms[29].

26. As shown in Figure 8, the European energy efficiency legislative and regulatory framework dates back to the Energy Labelling Directive in 1992, subsequently amended in 2012. The current pivotal policy is the **Energy Efficiency Directive** (Directive 2012/27/EU) that has established a set of binding measures to help the EU reach the 2020 and 2030 targets. Under the directive, all EU countries are required to use energy more efficiently at all stages of the energy value chain, including energy generation, transmission, distribution, and end-use consumption. In the context of the directive, a number of important measures have been adopted throughout the EU to improve energy efficiency in Europe[30]. In 2018, as part of the "Clean energy for all Europeans" package, the new amending Directive on Energy Efficiency (2018/2002) updated the policy framework to 2030 and beyond, setting the target for 2030 of an improvement of at least 32.5% relative to the 2007 modelling projections of energy use for 2030. This directive will be revised coherently with the new announced ambition of the "Fit for 55" package that sets a **36%** target for energy efficiency by 2030.

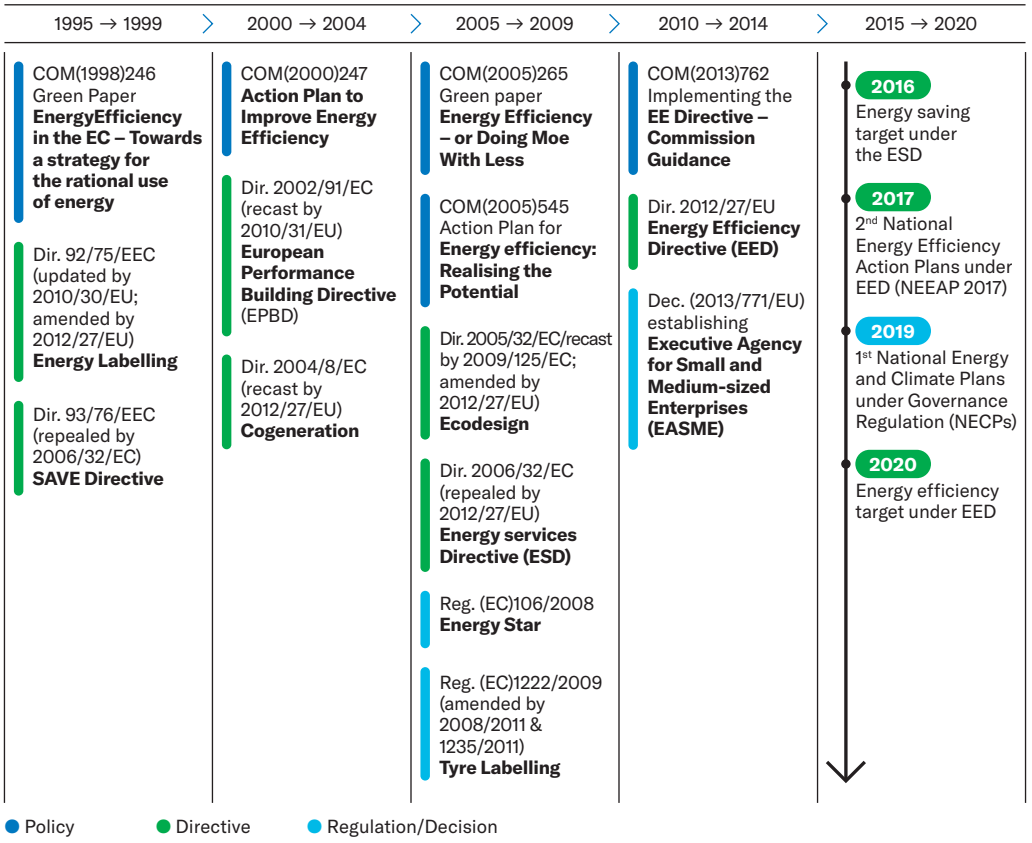
27. The strategic level is composed of the "2020 Climate and Energy Package" (setting a 20% improvement target in 2020 with respect to 1990[31]), the "2030 Climate and Energy Framework" (setting a 32.5% improvement target in 2030 with respect to 2007 modelling projections of energy use for 2030) and the "2050 Long-term Strategy" (setting the ambitious target to be climate-neutral by 2050).

29 Each Member State shall, in 2030, limit its GHG emissions at least by the percentage set for that Member State in Annex I in relation to its greenhouse gas emissions in 2005 in non-ETS sectors, namely transport, buildings, agriculture and waste sectors.

30 These measures include policies to achieve energy savings equivalent to an annual reduction of 1.5% in the national energy sales of EU countries, making energy efficient renovations to at least 3% of buildings owned and occupied by central governments every year, national long-term renovation strategies for the building stock in each EU country, mandatory energy efficiency certificates accompanying the sale and rental of buildings, the preparation of national energy efficiency action plans (NEEAPs) every three years, minimum energy efficiency standards and labelling for a variety of products such as boilers, household appliances, lighting and televisions (energy label and ecodesign), the planned roll-out of close to 200 million smart meters for electricity and 45 million for gas by 2020, obligation schemes for energy companies to achieve yearly energy savings of 1.5% of annual sales to final consumers, large companies conducting energy audits at least every four years, and protecting the rights of consumers to receive easy and free access to data on real-time and historical energy consumption.

31 This means that overall EU energy consumption should have been no more than 1483 million tonnes of oil equivalent (Mtoe) of primary energy or 1086 Mtoe of final energy.

● **FIG 8** → **The European legislation and regulatory framework related to the energy efficiency of the building sector, 1995-2020**

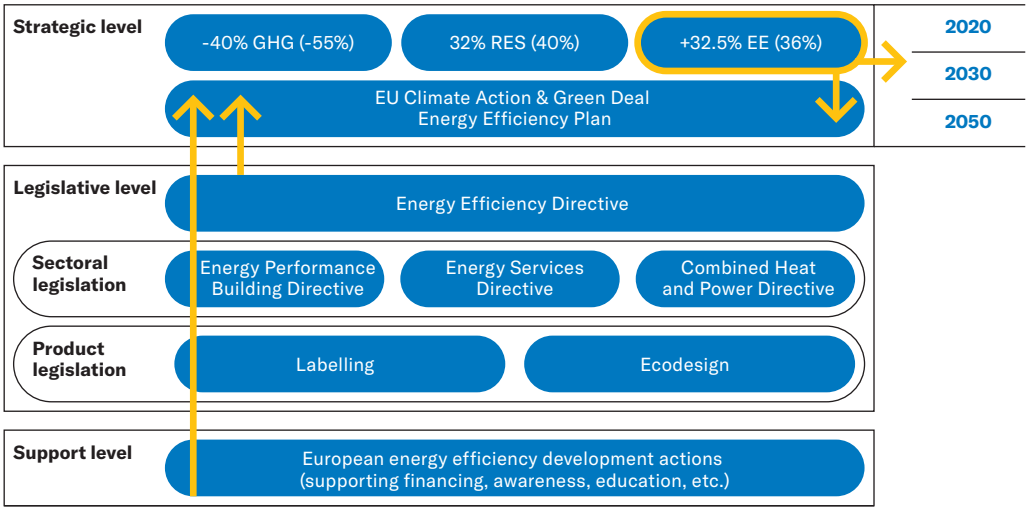


Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission and European Parliament data, 2021.

28. The key legislative instrument containing measures for the improvement of energy efficiency is the Efficiency Directive. The sectoral legislation level is composed of the Energy Performance of Building Directive (EPBD)[32], while the product legislation level comprises the Labelling and Ecodesign directives. The support level focuses on the efforts to remove market barriers and support the delivery of planned energy savings, such as the EU Energy STAR programme, GreenLight programme or the GreenBuilding programme.

32 The directive also addresses smartisation of buildings, private recharging infrastructure for electric vehicles and the design of long-term building strategies.

● **FIG 9** → **The European Union energy efficiency of buildings governance**



N.B. → The targets in parenthesis refer to the new "Fit for 55" package.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission, European Parliament data and various sources, 2021.

→ TRANSPORT

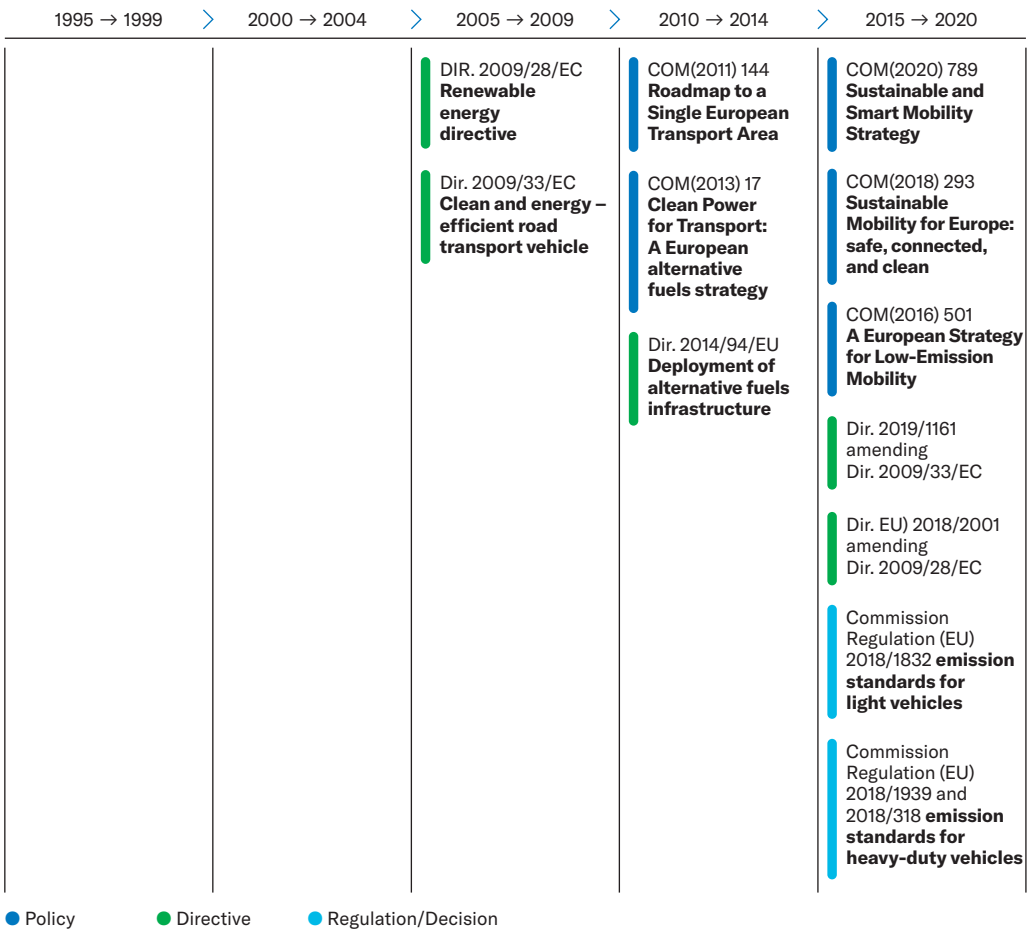
29. Recently, the European Commission presented the "**Sustainable and Smart Mobility Strategy**"[33] that highlights the European effort to decarbonise the sector, by laying the foundation for how the EU transport system can achieve its green and digital transformation and become more resilient to future crises. Before that, the Alternative Fuels Infrastructure Directive (DAFI, 2014/04/EU) defined the common framework of measures for the deployment of alternative fuels infrastructure in the Union in order to minimise dependence on oil and to mitigate the environmental impact of transport. This directive sets out minimum requirements for the building-up of alternative fuels infrastructure, including recharging points for electric vehicles and refuelling points for natural gas (LNG and CNG) and hydrogen, to be implemented by means of national policy frameworks of the Member States, as well as common technical specifications for such recharging and refuelling points, and user information requirements.
This directive will be revised coherently with the new announced ambition of the "Fit for 55" package together with new more ambitious targets related to the transport sector.
In particular, the European Commission proposes more ambitious targets for reducing the CO_2 emissions of new cars and vans: 55% reduc-

33 Comm (2020) 789 from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.

tion of emissions from cars by 2030, 50% reduction of emissions from vans by 2030 and **0 emissions from new cars by 2035**. The Commission also promotes the growth of the market for zero-and low-emissions vehicles. In particular, it seeks to ensure that citizens have the infrastructure they need to charge these vehicles, for short and long journeys. In addition, from 2026, road transport will be included in the emissions trading scheme, putting a price on pollution, stimulating cleaner fuel use, and re-investing in clean technologies.

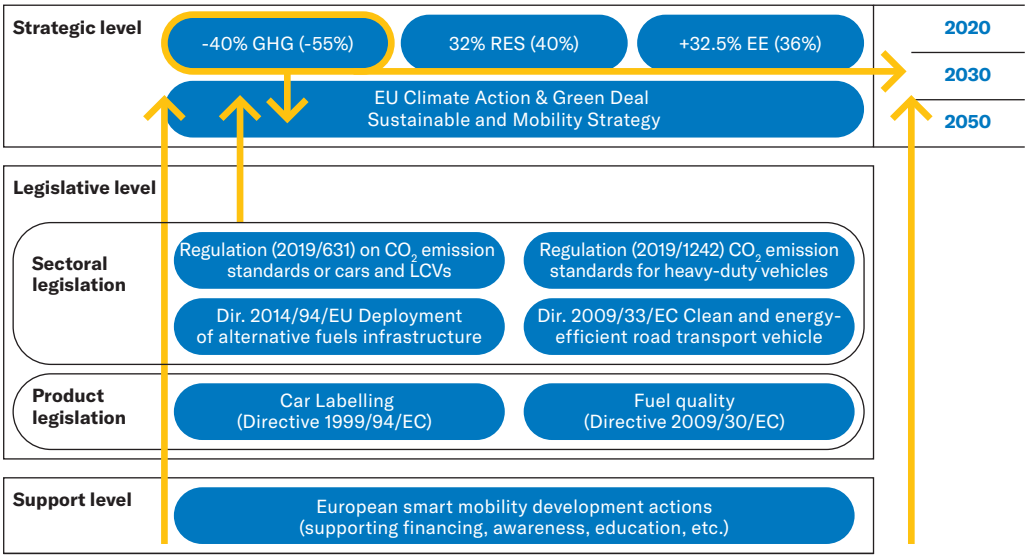
30. The strategic level of the transport **governance scheme** mainly consists of the new Smart and Sustainable Mobility strategy, also linked with the Green Deal, which has set the basis for a renewed effort in the decarbonisation of the transport sector. At the legislative level, the regulations on the CO_2 emission standards (for light duty vehicles, for cars and heavy-duty vehicles) and the Clean and Energy-Efficient Road Transport Vehicles Directive set the standards for a progressive decarbonisation of the transport sector. Moreover, at the legislative level the Alternative Fuel Infrastructure Directive (**DAFI**) plays a crucial role in the deployment of charging infrastructure. The European Commission has already announced the review of the DAFI, moving further toward a decarbonisation of the sector and following the new inputs of the Sustainable and Smart Mobility Strategy.

● FIG 10 → **The European legislation and regulatory framework related to the transport sector, 1995-2020**



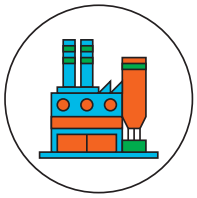
Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

● **FIG 11** → **The European Union decarbonization for the transport sector governance**



N.B. → The targets in parenthesis refer to the new "Fit for 55" package.

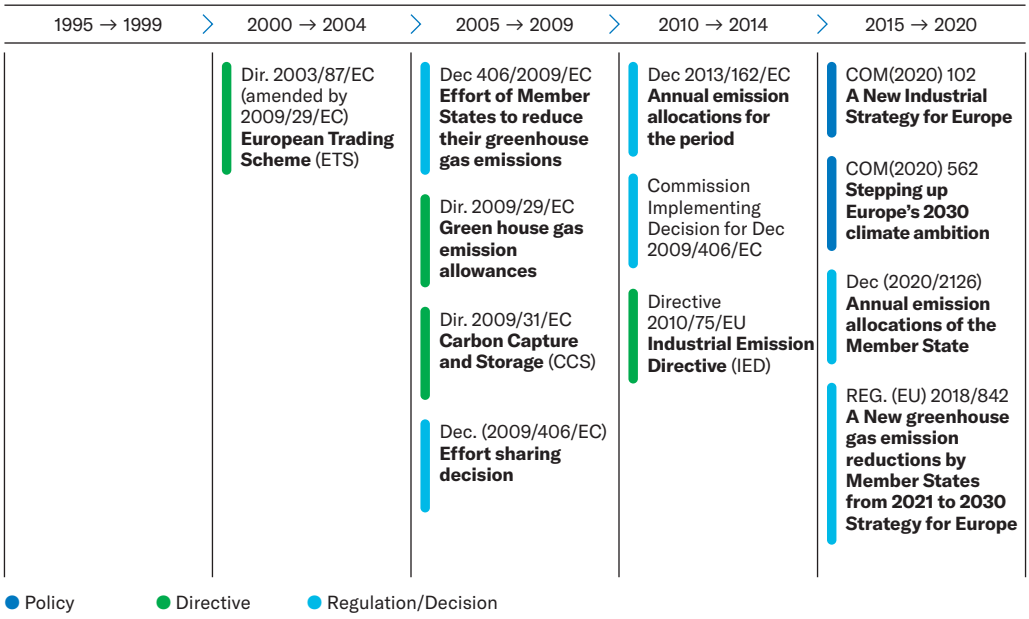
Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.



→ INDUSTRY

31. The **European Emission Trading Scheme** (EU-ETS) is the main element impacting on the energy governance of the industrial sector. EU-ETS is the world's first major carbon market and still is the biggest. It operates in all EU countries plus Iceland, Liechtenstein, and Norway (EEA-EFTA States), it limits emissions from around 10,000 installations in the power sector and manufacturing industry, as well as airlines operating between these countries and covers around 40% of the EU's greenhouse gas emissions. The European ETS was first launched by the 2003/87 Directive that set the basis for the overall system and represents one of the most important climate and energy policies that have been passed at EU level. More recently another fundamental policy element that strengthens Europe's effort in the decarbonisation of the industrial sector is the **New Industrial Strategy for Europe**, which highlights how European industry has a leading role to play in the decarbonisation of the sector, reducing its own carbon footprints but also accelerating the transition by providing affordable, clean technology solutions and by developing new business models. It is important however to highlight that the strategy does not contain specific targets nor specific objectives, but it only sets a comprehensive framework and ambition related to the industrial sector in Europe.

● FIG 12 → **The European legislation and regulatory framework related to the industrial sector, 1995-2020**



Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

32. As regards the governance scheme, following the EU Climate Action and the Green Deal at strategic level, the central role at legislative level is played by the 2003 **ETS Directive**. The ETS has been in place since 2005 and covers the EU and three EEA-EFTA countries. In 2013 the ETS entered its third phase covering the period 2013-2020. The transitional periods and exemptions granted to some industries has expired and now the ETS covers around **40%** of the total GHG emissions in the EU originating from power and heat generation, energy-intensive industries and commercial aviation. The scope of GHG emissions covered by the EU ETS has been expanding since the start of phase 1 in 2005. The scope has increased in terms of geography, sectors and type of greenhouse gases. As regards the sectors, the third phase of the ETS covers the following manufacturing sectors: power stations and other combustion plants ≥20MW, oil refineries, coke ovens, iron and steel plants, cement clinker, glass, lime, bricks, ceramics, pulp, paper and board, aluminium, petrochemicals and aviation. Also, as regards the greenhouse gases included, the mechanism has registered a progressive extension from only CO_2 to CO_2, N_2O, and PFC. The presence in the ETS Directive of a mechanism to allocate allowances for free (together with auctioning), although aimed at protecting competitiveness, limits the effective strength of the ETS. As a matter of fact, over the third trading period (2013–2020), 57% of the total amount of allowances were auctioned, while the remaining allowances were available for free allocation. At the beginning of third trading period, the manufacturing industry received **80% of its allowances for free**, and this proportion has decreased gradually each year to **30% in**

2020. The power generation sector did not receive any free allowances. Airlines have continued to receive the large majority of their allowances for free (82%) in the period 2013-2020. From phase 3 (2013-2020) onwards, a **benchmarking approach** is used for the free allocation of allowances. The free allocation for each installation is calculated using greenhouse gas emission benchmarks developed for each product[34]. A product benchmark is based on the average greenhouse gas emissions of the best performing 10% of the installations producing that product in the EU and EEA-EFTA countries. In the fourth period, allocation will focus on sectors at the highest risk of relocating their production outside the EU[35]. These sectors will receive 100% of their allocation for free. For less exposed sectors, free allocation is planned to be phased out after 2026 from a maximum of 30% to 0 at the end of phase 4 (2030).

33. One of the main changes proposed in **"Fit for 55" package** is the **enlargement of the perimeter of the ETS**. As a matter of fact, reflecting the need for steeper emission reductions, in the "Fit for 55" Package the Commission proposed that:

- The annual emissions cap will need to be lowered, in line with the pathway to meeting the higher 2030 ambition.

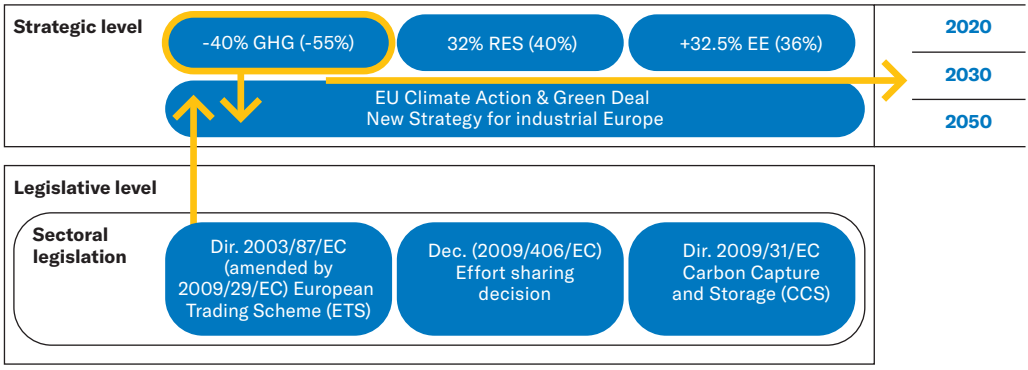
34 Currently, there are 54 benchmarks (52 product and 2 so-called fallback approaches based on heat and fuel): they were elaborated based on extensive technical work and consultations with various stakeholders.

35 The list has been updated in 2019 and will be valid for the 2021-2030 period (NACE CODE 0510) mining of hard coal, (0610) Extraction of crude petroleum, (0710) Mining of iron ores, (0729) Mining of other non-ferrous metal ores, (0891) Mining of chemical and fertiliser minerals, (0899) Other mining and quarrying n.e.c., (1041) Manufacture of oils and fats, (1062) Manufacture of starches and starch products, (1081) Manufacture of sugar, (1106) Manufacture of malt, (1310) Preparation and spinning of textile fibres, (1395) Manufacture of non-wovens and articles made from non-wovens, except apparel, (1411) Manufacture of leather clothes, (1621) Manufacture of veneer sheets and wood-based panels, (1711) Manufacture of pulp, (1712) Manufacture of paper and paperboard, (1910) Manufacture of coke oven products, (1920) Manufacture of refined petroleum products, (2011) Manufacture of industrial gases, (2012) Manufacture of dyes and pigments, (2013) Manufacture of other inorganic basic chemicals, (2014) Manufacture of other organic basic chemicals, (2015) Manufacture of fertilisers and nitrogen compounds, (2016) Manufacture of plastics in primary forms, (2017) Manufacture of synthetic rubber in primary forms, (2060) Manufacture of man-made fibres, (2311) Manufacture of flat glass, (2313) Manufacture of hollow glass, (2314) Manufacture of glass fibres, (2319) Manufacture and processing of other glass, including technical glassware, (2320) Manufacture of refractory products, (2331) Manufacture of ceramic tiles and flags, (2351) Manufacture of cement, (2352) Manufacture of lime and plaster, (2399) Manufacture of other non-metallic mineral products n.e.c., (2410) Manufacture of basic iron and steel and of ferro-alloys, (2420) Manufacture of tubes, pipes, hollow profiles and related fittings, of steel, (2431) Cold drawing of bars; (2442) Aluminium production, (2443) Lead, zinc and tin production, (2444) Copper production, (2445) Other non-ferrous metal production, (2446) Processing of nuclear fuel, (2451) Casting of iron. (0893) Extraction of salt, (1330) Finishing of textiles, (2110) Manufacture of basic pharmaceutical products, (2341) Manufacture of ceramic household and ornamental articles, (2342) Manufacture of ceramic sanitary fixtures, (2332) Manufacture of bricks, tiles and construction products, in baked clay, (Prodcom Code Description 081221) Kaolin and other kaolinic clays, (10311130) Frozen potatoes, prepared or preserved (including potatoes cooked or partly cooked in oil and then, frozen; excluding by vinegar or acetic acid) (10311300) Dried potatoes in the form of flour, meal, flakes, granules and pellets, (10391725) Concentrated tomato puree and paste, (105121) Skimmed milk powder, (105122) Whole milk powder, (105153) Casein, (105154) Lactose and lactose syrup, (10515530) Whey and modified whey in powder, granules or other solid forms, whether or not concentrated, or containing added sweetening matter, (10891334) Bakers' yeast (20302150) Vitrifiable enamels and glazes, engobes (slips) and similar preparations for ceramics, enamelling or glass, (20302170) Liquid lustres and similar preparations; glass frit and other glass in powder; granules or flakes, (25501134) Open die forged ferrous parts for transmission shafts, camshafts, crankshafts and cranks etc.

- The maritime sector will be gradually included in the ETS sectors over the period 2023 to 2025.
- Greater efforts will also be required from aviation operators to reduce their emissions (phasing out the free emissions allowances this sector currently receives).
- Starting from 2026, the emissions trading system will also be applied to road transport and buildings. This will be done in a separate system focused on upstream fuel suppliers.
- By 2030 sectors covered by the revised EU ETS must reduce their green gasemissions by 61% compared to 2005 level.

34. As regards the energy efficiency in the industrial sector, the Energy Efficiency Directive (2012/27/EU) on energy end-use efficiency and energy services is, as mentioned above, the European framework within which Member States legislate on their energy efficiency policies. The directive also mentions the industrial sector with article 8 of the directive that foresees mandatory audits and management systems for enterprises that are not SMEs. A piece of legislation that expressly refers to industrial contexts, including process efficiency, comes from Integrated Pollution Prevention and Control - IPPC Directive (96/61/EC). This directive is aimed at industrial sectors that have a particular impact on the environment, and includes energy among the environmental parameters considered. The directive has been updated various times and the current one in force is the Industrial Emission Directive (2010/75/EU) which incorporates 7 previously existing directives (including in particular the IPPC Directive). It contains references to energy efficiency in the industrial sector, but it does not set specific guidelines or objectives.

● FIG 13 → **The European Union decarbonization for the industrial sector governance**



N.B. → The targets in parenthesis refer to the new "Fit for 55" package.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

2.1.2 The issues related to energy transition governance and their impact on the sectors considered in Europe

35. Three **general issues** prevent an efficient and effective governance of energy transition at European level.

36. First of all, energy is among the competences that Member States and EU institutions **share**. This entails that both EU and EU countries are able to legislate and adopt legally binding acts, but this causes problems of inhomogeneity related to different aspects:

- The legal framework related to specific sectors (e.g., e-mobility and energy efficiency).
- The measuring mechanism for the achievement of the targets (e.g., energy efficiency in buildings).
- Standards across Member States related to the same sector for the achievement of the targets (e.g., for e-mobility one of the main problems is the lack of interoperability and the lack of defined standards for payments).

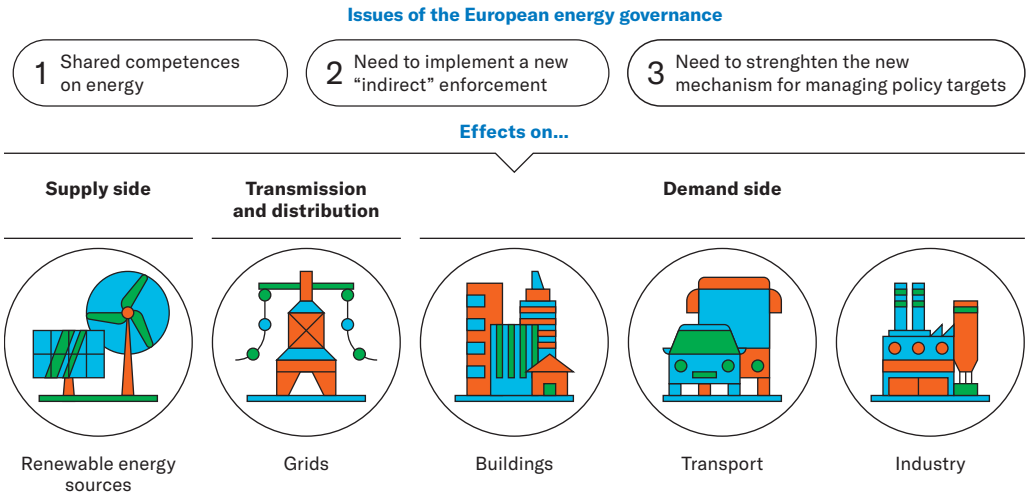
In addition to the lack of homogeneity, shared responsibility for energy often leaves gaps in regulations and guidelines, as in the case of investments in distribution and transmission grids. It is indeed necessary for the regulation of grid remuneration to be aligned in all European countries with the best practices to encourage investments.

37. The second issue is related to the **need to implement a new "indirect" enforcement**. From a system based on binding EU-wide targets and non-binding Member State targets (with the exception of GHG reduction, binding also at Member State level) matched with an indirect enforcement system, through the Recovery Plan the EU is progressively turning to a system where the Member States are responsible for making good use of the huge resources provided by the Commission. This requires **urgent and coordinated action** by Member States to lay out and implement one of the biggest investment programmes in history, assuring timely coordination of various public and private actors, while at the same time addressing the inefficiency of the current system.

38. The last issue is connected to the **need to strengthen the new mechanism for managing policy targets**. The current mechanism for managing policy targets and transpositions into National Plans is still based on a pre-Recovery Plan vision, which has led to some inefficiencies. The RES and energy efficiency targets set out in the "2030 Climate and Energy Framework" are not binding at Member State level, but only at the level of the EU as a whole, while the target for GHG emissions is also directly binding for Member States. As a consequence, EU targets are **not adequately addressed by all Member States** and their results are very uneven and unsatisfactory. Member State targets - and actions to attain them - must be quickly aligned with the opportunity offered by the available resources of the Recovery Plan.

39. The issues identified at governance level result in a cascade of **consequences** that slow down the energy transition in the identified sectors: renewables, transmission and distribution grids, buildings, transport and industry. The transmission and distribution grids in particular are key enabling factors for the deployment of RES, energy efficiency in buildings, e-mobility and the decarbonisation of the industry.

● FIG 14 → **The issues of the European energy transition governance and their consequences**

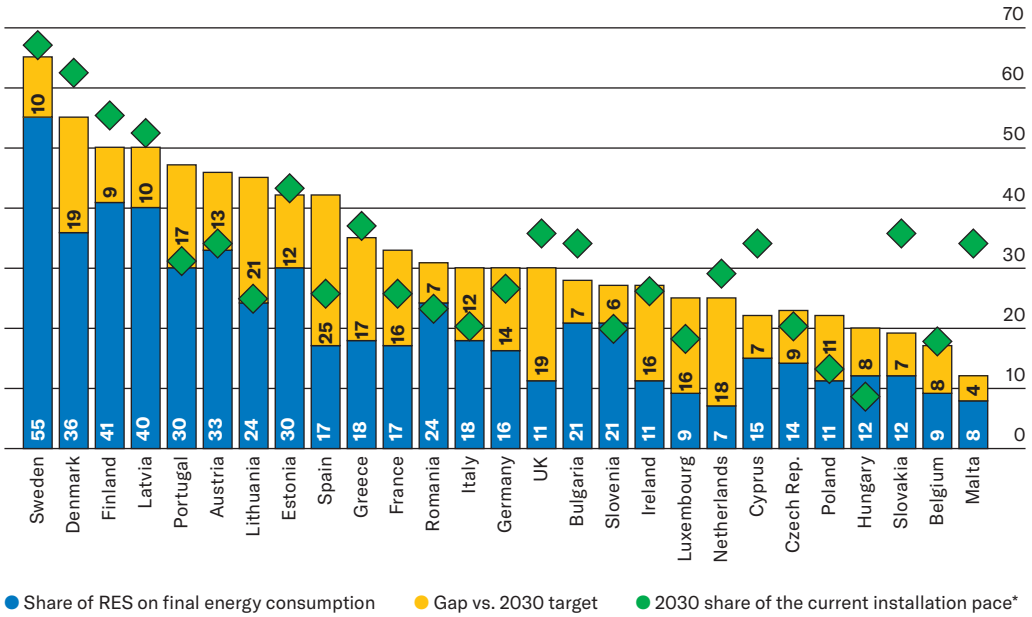


Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

40. As the **RES policy targets** are not binding for individual Member States, but only for the EU collectively, they are **not adequately and equally addressed by all Member States**.
For the RES, Member States show very different targets - even though they are based on the Annex I governance formula of the European regulation and criteria dictated by the European Commission - but also very different levels of progress with respect to the targets. For example, although it must be taken into account that the availability of RES is far from homogeneous, Sweden, which has set itself an ambitious target of reaching 65% of RES in its final energy consumption in its national plan, is well on track as highlighted in the figure below. On the contrary, not only do Poland and Hungary have a much lower targets of RES in their final energy consumption (22% and 20%), they will also fall short if they continue to proceed at the current pace. As shown in Part 1, the European Union is facing a great challenge to reach the objectives considering the upcoming updates in the "Fit for 55" package, so shared efforts from all Member States are fundamental.

Please refer to **Part 1** for a detailed description of the current performance of Europe and Italy in the achievement of the policy targets

● **FIG 15** → **Share of RES on gross final consumption and policy effort for 2030, reference year in national plans and 2030** (% values)



*The analysis highlights the share of RES in the gross final energy consumption that will be achieved by member countries if the RES installations continue to have the same annual growth rate recorded in the 2015-2019 period in the coming years, i.e. the trend.

Source → The European House - Ambrosetti and Enel Foundation elaboration on Eurostat and IEA data, 2021.

→ **41.** The development of the **electricity transmission and distribution grids** represents a crucial enabling factor for the integration and penetration of renewable energy sources in the energy system. In particular, distribution grids in the EU27+UK are expected to require 375-425 billion Euros of investments in the period 2020-2030, representing an increase of 50-70% with respect to historical values. Thus, it is important to highlight that the **"European Clean Energy Package" does not recognise the current and future importance of the role of Distribution System Operators**. In particular, there is a lack of development of the principles concerning a long-term EU cybersecurity strategy to allow secure data management at power system level and an EU data management framework conformable to the specific needs of Member States, in order to develop DSO responsibilities and capabilities.

42. Also related to the flexibility issue, as the legislation at European level is currently still in a phase of evolution, the development of **interconnectors** is affected as a consequence. Interconnectors transport energy across countries from the production site to where there is a demand for energy and represent a relevant solution to the problems

of intermittence and the regionally disparate potential of renewable energies. The European Union set a target of **at least 10%**[36] of interconnection by 2020, to incentivise Member States to connect their installed electricity production capacity. However, 8 Member States have not met the target for 2020 yet, namely Ireland, Spain, France, Italy, Cyprus, Poland, Portugal and Romania[37]. The main challenges regard **cross-jurisdictional issues** and difficulties in understanding which national laws apply, possible political changes, and remuneration mechanisms not fully harmonised between different countries.

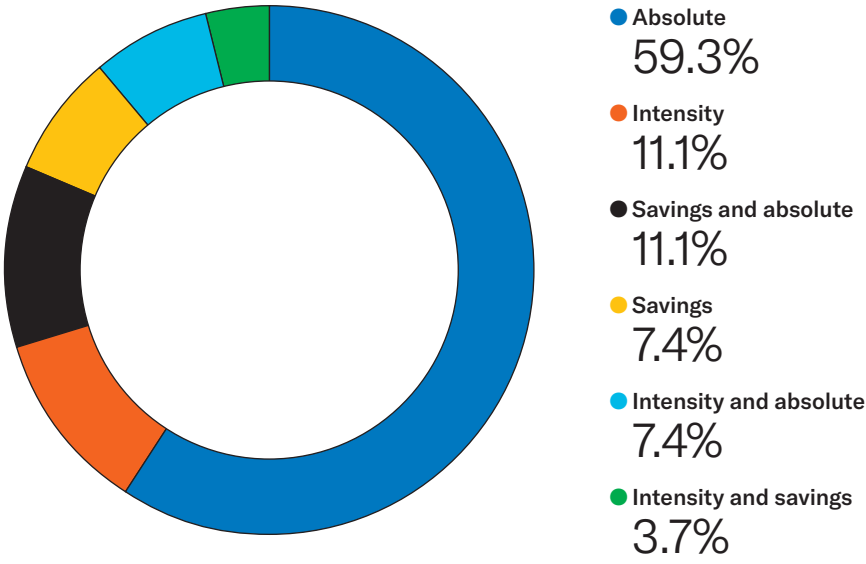
43. As regards the **energy efficiency dimension**, the related **objectives are not adequately addressed** with policies and measures by all Member States:

- A mixture of **1,400 different policies and measures** have been identified in the National Energy and Climate Plans (NECPs). However, almost 20% of all the policies and measures present an implementation status that is "Not available", "Unclear" or "Provisional".
- The NECPs present incomplete reporting of the expected quantitative impact of the policies and measures. About **44%** of the Member States have not reported the quantification impact, **37%** have reported an unclear impact and just **19%** have reported a clear quantification.
- Some NECPs present unclear underlying assumptions in the calculation of the WAM and WEM scenarios[38], as evaluated by the JRC in the "National Energy and Climate Plans for 2021-2030 under the EU Energy Union. Assessment of the Energy Efficiency Dimension".
- Some NECPs lack adequate identification of the wider economic and societal benefits (e.g., on GDP, jobs, environment) of energy efficiency measures.

44. Member States are **free to choose the metrics to assess energy efficiency target performance**. Indeed, Member States were free to set their 2030 EED Article 3 contributions on either primary or final energy savings, primary or final energy consumption, or energy intensity. Therefore, the methodological approach used by Member States may differ. Czech Republic, Lithuania, Hungary, Sweden, and Malta chose their contributions to the EED Article 3 in energy intensity, Portugal, Slovenia, Estonia, Ireland and Latvia in energy savings, while all the others in absolute consumption. Moreover, 7 Member States decided to adopt two different approaches at the same time.

36 It means that each Member State should have in place electricity cables that allow at least 10% of the electricity produced by its power plants to be transported across its borders to neighbouring countries.
37 Source: "2020 report on the State of the Energy Union pursuant to Regulation (EU) 2018/1999 on Governance of the Energy Union and Climate Action", European Commission, 2020.
38 "WAM": With additional measures and "WEM": With existing measures.

● **FIG 16** → **Difference in methodological approach to set the energy efficiency target at 2030 among Member States, 2030** (% values)



Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission Data, 2021.

45. Member States are free to design the calculation method for the Energy Performance Certificates, thus leading to a situation where comparable buildings in different countries, or even regions within a country, can be classified differently. The EPBD (EU Directive 2010/31) on the energy performance of buildings leaves Member States the freedom to design EPCs at national level. While Annex I of the EPBD provides a common general framework for the calculation of the energy performance of buildings, data collection and reporting (national or regional databases), the calculation methods differ significantly among Member States, as does the **skills and qualifications** required for experts conducting energy performance certifications.

46. The EU energy **labelling and ecodesign** legislation helps to improve the energy efficiency of products on the EU market. Ecodesign sets common EU-wide minimum standards to eliminate the least energy performing products from the market. Even if the EU energy label categories will be gradually adjusted to reintroduce the simpler A to G scale, at present a huge variety of different energy label scales exist (from A to G, A+++ to D, etc.), making it more difficult for customers to find their way.

47. Moreover, when it comes to energy efficiency technologies for buildings, incentives are defined in a way that does not take into account the **different contribution to decarbonisation** of different technologies. Tax credits, as they are outlined today, do not provide an incentive to buy more efficient technologies.

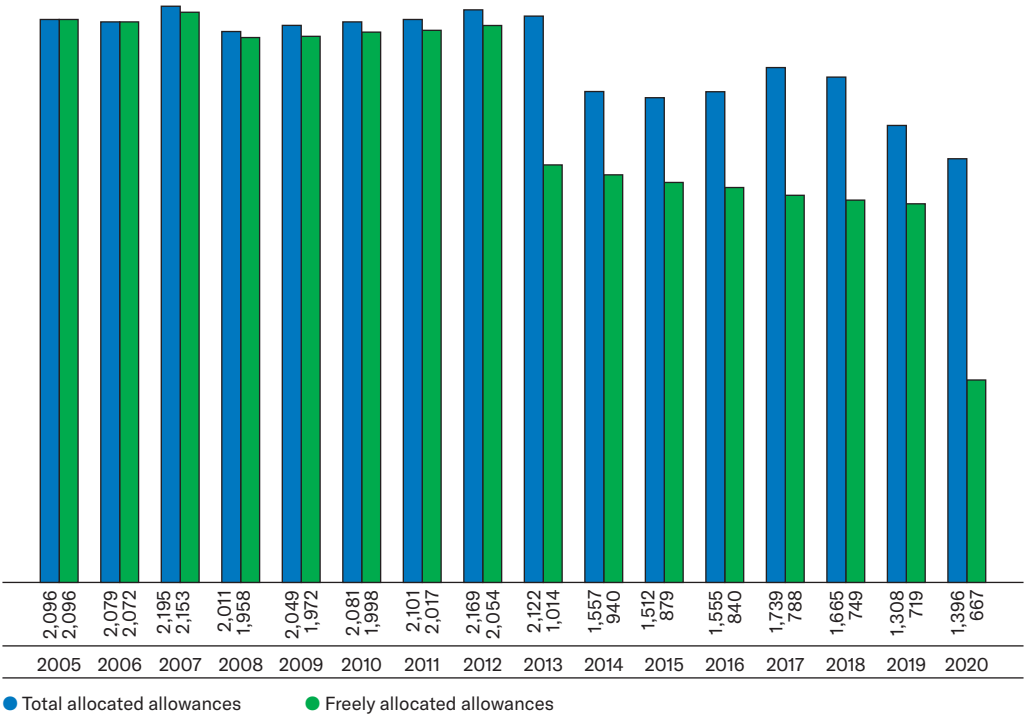
48. As regards the **transport sector**, several issues derive from the fact that the alternative fuels infrastructure is a trans-national challenge, but individual Member States do not have the necessary tools for **pan-European coordination**. The Commission currently lacks common standards to ensure interoperability, coordinate and support Member States' deployment of electrical charging infrastructure and monitor progress. In general, there are no minimim requirements for harmonised payments systems and user information neither there are clear and coherent charging infrastructure targets:

- The DAFI leaves room to Member States to define **criteria for public accessibility** and does not distinguish between different types of electric vehicles. As a consequence of such a broad definition, some Member States define public charging points as being located in public spaces and accessible 24 hours a day and "semi-public" charging points as being accessible only at certain times and subject to restrictions on use (for example, the use of an associated car park, hotel, or shopping centre), while others make no specific distinction and define public charging points to be all those that are not private. As regards the different electric vehicle requirements, the DAFI fails to distinguish between battery electric vehicles and plug-in hybrid electric vehicles, which have very different charging patterns and carbon footprints.
- There **are no clear and coherent EU-wide charging infrastructure targets**: as a matter of fact, the DAFI establishes that Member States should deploy "appropriate charging points", without specifying what "appropriate" means. This also contrasts with the TEN-T Directive, which defines the distance between the charging points in the core network, defined as most important connections linking the most important nodes, and is to be completed by 2030.
- Widely adopted **plug standards** have been defined at European level. However, there are **no minimum requirements for harmonised payment systems and user information**, making travel across the European Union with an electric vehicle quite complicated. In many cases, electric vehicle users may require multiple contracts and use different payments methods to charge their vehicles because the enabling infrastructure for electromobility (charging system) involves multiple actors that need to interact with each other. In particular, charging point operators (overseeing the installation and maintenance of the charging points), mobility service providers (providing users with a range of mobility product or services), vehicle manufacturers, grid operators, and electric vehicle users are directly involved and must interact with each other at different moments in time and at different levels. The DAFI stipulates that charging point operators should be allowed to provide electric vehicle charging services to customers on a contractual basis, including on behalf of other service providers. In order to do so, "roaming" technology between charging point operators and mobility service provider is required to allow drivers to charge using a single identification or payment method, and stations to communicate equally with all kinds of electric vehicles. This exchange of information implies a contractual agreement among all the entities concerned, the

charging points to be equipped with an internet connection, a card reader or a remote activation function, and interoperable communication protocols. However, currently there is no single standard for connection and the communication exchange among the different actors is still complex as it involves a series of communication protocols. This translates into the lack of a harmonised roaming system actually capable of enabling electric vehicle users to use a single contractual agreement. Moreover, the DAFI requires that all public charging points must provide for the possibility of "***ad hoc***" **charging** (without a contract): this function has been implemented in very diverse ways throughout the EU, adding to the complexity and lack of harmonisation.

49. As regards the **industrial sectors**, in Europe there are several issues mainly related to the ETS system. This mechanism entails the risk of **carbon leakage**, defined as firms seeking to reduce their costs by relocating their activities to countries with less stringent climate rules. Carbon leakage is counterproductive to the process of reducing emissions. Also, it entails the loss of jobs within the bounders of ETS countries. To overcome the carbon leakage risk, and reduce the risk of business relocation, the European Union gives ETS allowances for free to industries operating at risk of carbon leakage. Until 2012, all sectors received most of their allowances for free. With the Phase 3 of the ETS system (2013-2020), on average the freely allocated allowances covered around **50% of GHG emissions**, a still high percentage.

● **FIG 17** → **Total allocated allowances and freely allocated in ETS sectors, 2005-2020** (Mt of CO_2 eq.)



Source → The European House – Ambrosetti and Enel Foundation elaboration on EEA data, 2021.

50. Europe is clearly caught in a sort of strategic catch-22. It cannot eliminate free allowances because it cannot risk the relocation of entire productive sectors, and on the other hand, it cannot fully tackle industrial emissions through the ETS system. This underlines the global and strategic dimension of the energy transition, which requires to go well beyond national or European boundaries. Partnering and negotiation with non-EU countries also on **global trade and competitiveness** is paramount to effectively achieve a successful energy transition.

51. Moreover, although some industrial sectors demonstrate high electrification potential thanks to existing and applicable technologies, it is crucial to work on the **deployment of investments**. An improvement of the guidelines for European Union or national mechanism could be useful to encourage investments in green technologies.

52. Finally, another governance issue is related to energy taxes. It involves all sectors but it is particularly relevant in the industry sector given that the price of commodities has an impact on the decarbonisation potential of some production chains. **Energy taxes** on different energy carriers can have an impact on the full deployment and

electrification of the industrial sector. As a matter of fact, it is worth noting that from 2008 to 2018 the average EU tax rate for electricity increased by 140% (from 13.4 Euro/MWh to 32.1 Euro/MWh) compared to a 20% increase of fuel oil and 19% of natural gas[39]. Moreover, it should be considered that taxes and levies account for 45% of the price of electricity but for just 29% of the price of gas. This difference does not provide an incentive for industrial representatives to make the switch to decarbonisation solutions as they are not financially attractive for industry owners. Moreover, there is a lack of harmonisation of the fiscal and para-fiscal components of the energy carrier prices among Member States. It should be clarified that the high level of taxes and levies on the electricity bill represents an incentive to **consume less electricity**, and hence to "decarbonise" through energy efficiency, but not an incentive to switch from oil/gas to electricity, a carbon-free vector also thanks to generation from renewables.

The "Fit for 55" Package forsees new measures for energy taxation

The tax system for energy products must both preserve the internal market and support the green transition by setting the right incentives. For this reason, a revision of the Energy Taxation Directive (2003/96/EC) is proposed to align the minimum tax rates for heating and transport fuels with EU climate and environmental objectives, while mitigating the social impact. The new rules will remove outdated exemptions, for example in aviation and maritime transport, and other incentives for the use of fossil fuel, while promoting the uptake of clean fuels.

The announced proposal aims at the following objectives:

- Providing an adapted framework contributing to the EU 2030 targets and climate neutrality by 2050 in the context of the European Green Deal (aligning taxation of energy products and electricity with EU energy, environment and climate policies thus contributing to the EU efforts to reduce emissions).
- Providing a framework that preserves and improves the EU internal market by updating the scope and the structure of rates as well as by rationalising the use of tax exemptions and reductions by Member States.
- Preserving the capacity to generate revenues for the budgets of the Member States.

Source → The European House - Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

39 The presence of subsidies for fossil fuels have impact on this competition.

2.2 Governance of the decision-making and implementation process of the energy transition in Italy

53. In the part on European governance, the analysis scheme followed the different levels identified and related to the EU dimension, i.e., strategic, legislative, and support. In this part of the analysis relating to Italy, the **implementation** level of the European governance scheme is explored by firstly analysing all the actors involved in the energy transition process and then focusing on the governance of the sectors (RES, grids, buildings, transport and industry).

→ ACTORS OF THE ITALIAN ENERGY TRANSITION

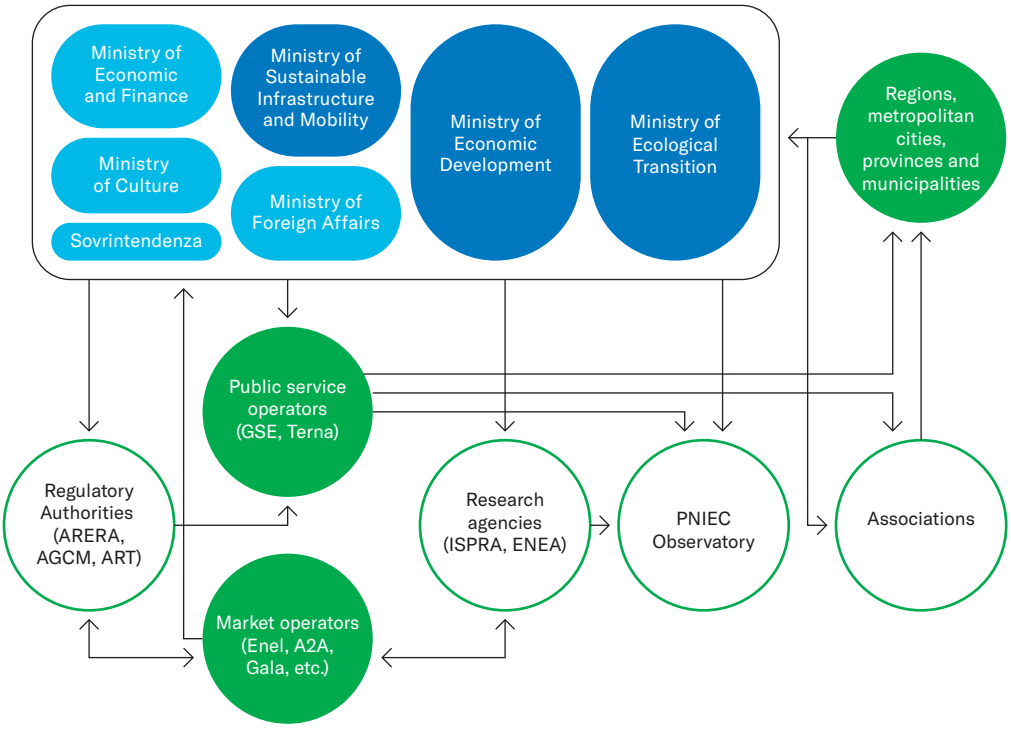
54. The analysis of the governance of the Italian energy transition starts from the **mapping of the actors** involved and their roles, for which a summary scheme has been followed to group competences:

- **Decision-making power** lies within the Ministry of Economic Development (in charge of guaranteeing safety in mining and energy activities, as well as granting permits for the construction and operation of large power plants), Ministry of Ecological Transition (responsible for the protection of land and water and for energy) and the Ministry of Sustainable Infrastructure and Mobility (responsible for the policies for transport and infrastructure).
- The **enabling function** is played by the Ministry of Economy and Finance (in charge of the allocation and management of budgets), the Ministry of Culture (involved in the assessment of the impact for RES plants, on which it has veto power), Sovraintendenza (which is a local office of the Culture Ministry also involved in the assessment of RES plants) and the Ministry of Foreign Affairs (which plays a crucial role in the diplomatic arena representing the Italian external energy dimension)[40].
- **Implementation** is left to the regional and local authorities at different levels (metropolitan cities, provinces and municipalities) that are responsible for formulating the policy objectives at local level, developing and exploiting local resources, issuing hydroelectric concessions and guaranteeing safety and territorial compatibility. A fundamental role in the implementation phase is played by technical administrative public bodies (such as GSE) that are in charge of managing and monitoring the RES assignment mechanism through auctions and the creation of the PNIEC monitoring platform. Finally, public energy and infrastructure providers are those actually involved in the deployment of investments.

40 In particular an important role is played in this context by the Interministerial Steering Committee on Energy, Environment and Climate Change chaired by the Deputy Minister.

- The **support role** is played by:
  - ○ Regulatory authorities that are responsible for the protection of consumers and for ensuring the efficiency and dissemination of services with adequate levels of quality.
  - ○ Research agencies that, besides carrying out research, monitoring and evaluation activities, are in charge of verifying the emission targets deriving from national, European and international rules.
  - ○ The PNIEC Observatory, which is responsible for the definition of implementing rules and transposition decrees, simplification of reforms for permit procedures, monitoring and progress of the objectives of the PNIEC, development of plants, electricity grid and storage systems, coordination within the framework of general national rules, and the verification and elaboration of improvement proposals.
  - ○ Associations that are responsible for the protection of different categories, consumers, companies.

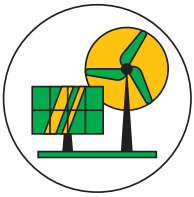
● FIG 18 → **The actors involved in the energy transition governance scheme at Italian level**



Role of actors → ● Decision-making ● Enabler ● Implementation ○ Support/consultation

Source → The European House – Ambrosetti and Enel Foundation elaboration on various sources, 2021.

55. The analysis of the governance of the energy transition at the Italian level follows the same conceptual scheme as the European model (legislation, actors and relations). However, in Italy, legislative references for the residential, transport and industry sectors often overlap and fall within the energy efficiency dimension. Thus, for the Italian governance context, the considered sectors have been looked at from the RES and energy efficiency points of view. As regards the legislative context, it is important to mention the relevance of the "European law" (legge europea), which represents, together with the "European delegation law" (legge di delegazione europea), the rules of direct implementation aimed at ensuring the adaptation of the national system to the European system, with particular regard to cases of incorrect transposition of European legislation.



→ RENEWABLE ENERGY SOURCES

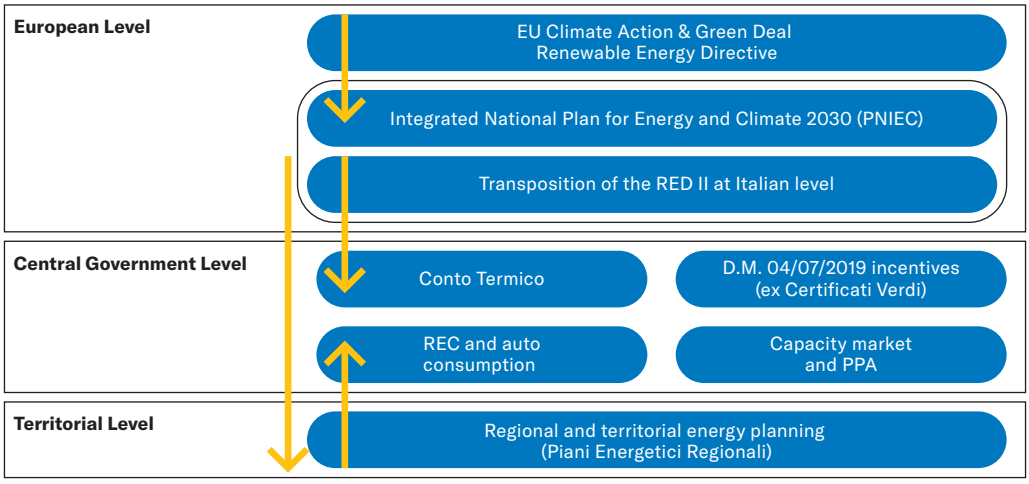
56. As regards the Italian legislation related to the **renewable energy sector**, in 2011 Legislative Decree no. 28[41] implemented the Renewable Energy Directive I, setting a national target of 17% of renewables in energy consumption by 2020. In 2012, the Ministerial Decree 15/03/2012[42] defined the so-called **burden sharing**, which refers to the definition of regional objectives regarding renewable energy sources. The transposition of the Renewable Energy Directive II at Italian level at the moment of writing had not yet been implemented.

57. About the Italian renewable energy governance scheme, the guidelines from the European level are transposed nationally in the Integrated National Plan for Energy and Climate 2030 (PNIEC), which sets a target of **30% of renewables**[43] in gross final consumption by 2030. At the central government level, there are different measures related to the renewables sector. For example, the incentives for renewables are regulated by the Ministerial Decree 04/07/2019[44], which aims to promote, through economic incentives, the spread of small, medium and large sized electricity production plants from renewable sources. The **Conto Termico** encourages interventions to increase, along with energy efficiency, the production of thermal energy from renewable sources for small plants. The beneficiaries are mainly public administrations, but also companies and individuals, who will be able to access funding of 900 million Euros per year, of which 200 for public administrations.

41 "Decreto legislativo 3 marzo 2011, n. 28. Attuazione della direttiva 2009/28/CE sulla promozione dell'uso dell'energia da fonti rinnovabili", 2011.
42 "D.M. 15-3-2012. Definizione e qualificazione degli obiettivi regionali in materia di fonti rinnovabili e definizione della modalità di gestione dei casi di mancato raggiungimento degli obiettivi da parte delle regioni e delle provincie autonome (c.d. Burden Sharing)", Ministero dello Sviluppo Economico, 2012.
43 These targets are currently being updated, in light of the more ambitious objective of reducing greenhouse gas emissions by 2030 recently ratified by Member States (-55% compared with emissions in 1990). With reference to the electricity sector, this update will reasonably translate into an increase in the targets for new renewable capacity to be installed by 2030.
44 D.M. 04/07/2019, Ministero dello Sviluppo Economico, 2019 (in continuity with D.M. 06/07/2012 and D.M. 23/06/2016).

58. With the Ministerial Decree 28/06/2019 the capacity market regulation, endorsed by the European Commission, has been modified and it will be possible to immediately integrate new stringent environmental requirements for emissions by operators into the system, with the aim of anticipating the implementation of the new European standards aimed at decarbonisation adopted as part of the "Clean energy for all Europeans" package. The central government level then relates with the territorial level (i.e., municipalities, provinces and regions) which operate according to the principle of "burden sharing" of the national long-term objectives. In particular, local authorities, in addition to be responsible for the regional energy planning, have a pivotal role for the deployment of investments and issuing of authorisations (especially for the RES plants) as well as the involvement and education of local stakeholders towards the energy transition.

● FIG 19 → The Italian renewable energy governance scheme

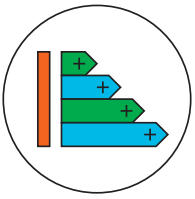


Source → The European House – Ambrosetti and Enel Foundation elaboration on various sources, 2021.

59. Several actors are involved in Italian renewable energy governance. Among the central government institutional actors (including Ministries of Sustainable Infrastructure and Mobility, Economic Development, Ecological Transition, and Economy and Finances, and the Interministerial Committee for the Ecological Transition – CITE), it is worth mentioning the role that the Ministry of Culture has in the authorisation of plants, in particular referring to its veto power in procedures. This is strictly correlated with the role of the Sovrintendenza (i.e., territorial representations of the Italian Ministry of Culture) among the territorial institutional actors, which also include regions, provinces and municipalities, the Conferenza Stato-Regioni[45] and the Italian Association of Municipalites. Moving from the institutional lev-

45 A body for political coordination and discussion between the presidents of regions and autonomous provinces.

el, other actors are represented by regulators, market operators, R&D operators and private companies. At the association level, there are associations of the renewable energy sector, trade associations representing industries related to the construction of renewables plants, professional associations and environmental protection associations. Finally, the citizens' level comprises citizens associations and self-consumer groups and renewable energy communities.



→ ENERGY EFFICIENCY

60. The **energy efficiency governance framework** is composed of three different levels. The European level embeds the key targets and directives defined in the European Union, specifically the Energy Efficiency Directive. According to the Governance Regulation, Member States must develop integrated national energy and climate plans and establish specific measures and laws to transpose the EED and the EPBD. In Italy, first the D.Lgs. no. 48, 10th June 2020 transposed the Directive (EU) 2018/844 on EPBD, then the D.Lgs. no. 73, 14th July 2020 implemented the EU Directive 2018/2002 on EED. In order to reach the energy efficiency target set by the PNIEC (**43%** improvement in energy efficiency by 2030), the Government adopted a series of policies and measures, cutting across the transport, industrial and buildings sectors, such as Certificati Bianchi, Ecobonus, Conto Termico 2.0, Impresa 4.0, etc. Finally, the territorial level includes the Piani Energetici Regionali, the main tool through which the regions can plan and direct interventions, including structural ones, in the energy field within their territories.

Certificati Bianchi: what are they and what are they for?

The Certificati Bianchi mechanism, in force since 2005, is one of the main tools for promoting energy efficiency in Italy.

The certificates are negotiable securities that certify the achievement of savings in the final uses of energy through projects aimed at increasing energy efficiency. One certificate is equivalent to one Ton of Oil Equivalent (TOE) energy saving.

Also called Titoli di Efficienza Energetica (TEE), the certificates are the main incentive mechanism for energy efficiency in the industrial sector, network infrastructures, services and transport, but can also be applied to actions carried out in the civil sector and behavioural measures.

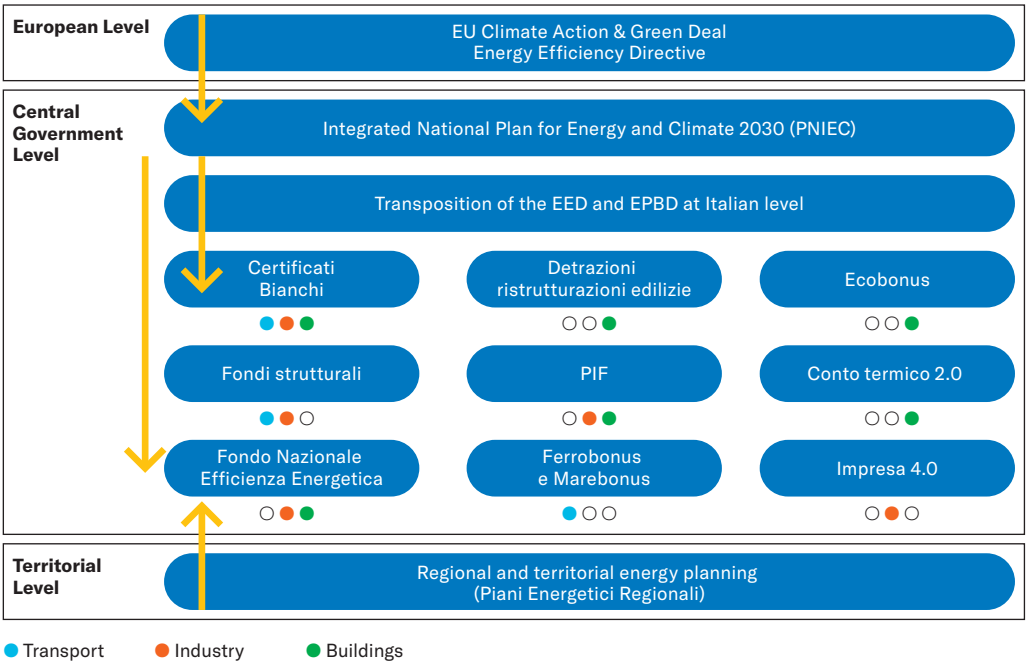
The GSE (Gestore dei Servizi Energetici) grants a certificate for each TOE of savings achieved thanks to the implementation of the energy efficiency project. Upon indication of the GSE, the certificates are then issued by the GME (Gestore dei Mercati Energetici) on specific accounts.

Certificati Bianchi can be exchanged and valued on the market platform managed by GME or through bilateral negotiations. To this end, all the actors admitted to the mechanism are included in the GME's Electronic Register of Energy Efficiency Certificates. The actors that can participate in the mechanism for the assignment of the Certificati Bianchi are private stakeholders, firms, public administration, and DSOs.

The economic value of the securities is defined in the market trading sessions.

Source → The European House - Ambrosetti and Enel Foundation elaboration on GSE and GME data, 2021.

● FIG 20 → **The Italian energy efficiency governance scheme**



Source → The European House – Ambrosetti and Enel Foundation elaboration on various sources, 2021.

61. When it comes to the **actors involved**, the governance of **building** energy efficiency features some peculiarities. Besides the institutional actors already cited for renewable energy sources governance, the main territorial institutional actor is the Associazione Nazionale Comuni Italiani (ANCI). In addition, there is a number of actors that are involved in the development of energy efficiency technologies in the market. The real estate associations, such as Azienda Territoriale per l'edilizia residenziale pubblica (ATER), Federcasa, Confedilizia, Federazione Italiana Agenti Immobiliari Professionali (FIAIP), etc, the trade associations, such as Associazione nazionale costruttori edili (ANCE), Assoimmobiliare, Assovetro, Assotermica, etc, and the professional associations, such as CNA Ingegneri, CNA Architetti, Collegio Periti, Collegio Geometri, etc. represent the necessary workforce made of designers, professionals, installers, maintainers and managers to support the full deployment of energy efficiency in the building sector. Finally, consumers are represented by associations and trade unions, like Federconsumatori, Adiconsum, Sindacato Unitario Nazionale Inquilini ed Assegnatari (SUNIA), etc.

62. As regards the actors involved in the **governance of transports**, there are some peculiarities worth pointing out. First of all, the National Observatory on transports, specialised in public transport, is in charge of collecting national and regional transport data, monitoring of the sector's development and ensuring the completion of the reform

process. The regulatory body of the transport sector in Italy is the Autorità di Regolazione dei Trasporti, which is in charge of monitoring the sector, establishing tariff schemes for the public transport sector and defining the tender system. The development of sustainable mobility in Italy also involves specific market operators for infrastructure as well as for means of transport, but also IT operators, in the light of the evolution of mobility towards increasingly connected and smart forms.

63. As regards the actors involved in the governance of the **industrial sectors**, a pivotal role is played by the National and Territorial Industrial Associations (i.e., Confindustria), as well as their affiliates in specific sectors.

2.2.1 The issues related to energy transition governance and their impact on the sectors considered in Italy

64. The analysis of the legislative context, the actors and their roles shows **five issues** at the governance level that limit a successful energy transition in Italy. First of all, in Italy the competences related to the various sectors of the energy transition (installation of RES plants and energy efficiency in buildings, transport and industry) are **fragmented and shared** among a number of actors at different levels of governance and between the central government and local institutions (regions, metropolitan cities, provinces and municipalities). Each of the actors involved has a different area of responsibility, and the existence of veto powers (as in the case of the Italian Ministry of Cultural Heritage within the authorisation process for RES plants) or more in general of discretional and negotiating power, strongly limits the effectiveness and efficiency of the process. As a matter of fact, each actor involved protects its own interest, thus making the processes complex and systematically long. For example, this happens in the case of the authorisation of RES plants or the mechanism for issuing Certificati Bianchi, which will be explained more in detail below. Additionally, different actors have competences on the same matter thus creating possible institutional conflicts that further complicate the process.

65. Secondly, since some competences related to the various sectors of the energy transition belong to **territorial actors** (regions, metropolitan cities, provinces and municipalities), which apply their regulations that often impose stringent constraints on the development of renewables in the territory, resulting in territorial differences and **non-uniform application of national laws at local level**. This adds to the uncertainty of the procedures and gives rise to potential discretionary behaviour by competent authorities. Examples of these territorial discrepancies are represented by the **authorization processes that apply to RES plants** following different schemes in the various regions or by the differences in the cooperation mechanism between local authorities on the one hand, and Distribution System Operators and Charge Point Operators on the other (this case will be analysed in depth in the following paragraphs).

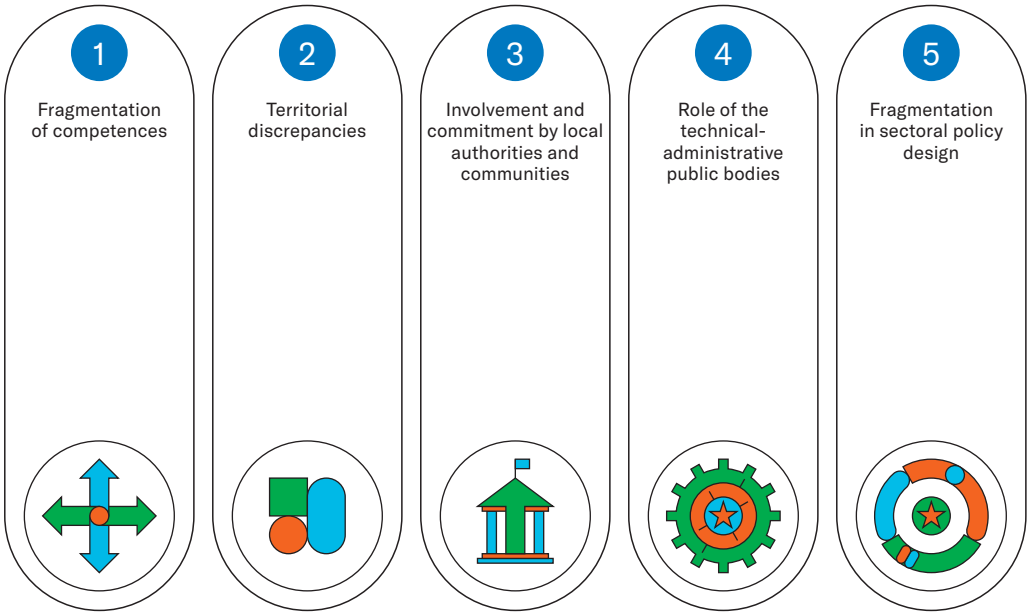
66. Multi-level governance and regional differences also lead to the issue of **social acceptability**, which is not adequately addressed by local authorities due to **lack of effective commitment in energy transition**, leading to poor involvement of local communities. As a matter of fact, local public administrations often block or slow down investments in the territory. The problem of social acceptability mainly derives from the **lack of a mechanism** to efficiently engage local stakeholders – for consultation, mitigation of adverse effects and distribution of the benefits throughout the territory - to prevent the "NIMBY" syndrome. To the same end, also the **lack of a measurement system**, through which the benefits of the investments implemented could be better understood and communicated to local communities, further increase the difficulty of carrying out the investments for the energy transition. Finally, a **more effective and active involvement of local authorities** in the decarbonisation process (e.g., regions) could be one of the enabling factors to enable the country to achieve its energy transition goals. This commitment could be guaranteed, for example, by **stringent minimum targets** for renewable capacity to be authorised at regional level each year, a mechanism that is currently lacking.

67. It is worth pointing out the role of **technical administrative public bodies**. The successful energy transition depends not only on well-defined targets, but also on the ability to **efficiently deploy the necessary investments**. In the Italian context, technical administrative public bodies have important roles, among others, in the provision of incentives for energy efficiency and screening of the projects. This has a **strong influence** on the credibility of the investments ("investibility"), on their timing, and, ultimately, in the actual possibility of carrying them out. However, these technical administrative public bodies show inefficiencies due to understaffing, unmet skills requirements, lack of appropriate professional figures for RES authorisation processes and to the complicated regulatory frameworks within which they must operate.

68. Finally, there are some **fragmentation in sectoral policy design**. Among these issues, it is worth pointing out:

- The incoherence of the legislative framework and the absence of long-term targets for energy efficiency limit a long-term vision and action and the consequent implementation at national level. The result is a proliferation of independently adopted, uncoordinated regional legislations.
- The presence of **complex and highly articulated processes to gain access to energy efficiency incentives** (e.g., Certificati Bianchi and Superbonus 110%).
- The fragmentation of the **cooperation mechanism** between local authorities on the one hand and Distribution System Operators (DSOs) and Charge Point Operators (CPOs) on the other for the development of recharging infrastructure.

● **FIG 21** → **The issues of the Italian energy transition governance**



Source → The European House - Ambrosetti and Enel Foundation elaboration on various sources, 2021.

69. As in the European case, the issues identified at governance level lead to a cascade of **consequences** that slow down the energy transition in the sectors considered: renewables, transmission and distribution grids, buildings, transport and industry.

70. One of the main issues related to the **renewable energy** sector is the inefficiency of national **permitting procedures** regarding renewables plants, in particular utility-scale ones. In Italy, the permitting procedures for RES plants are divided into Request for Single Authorisation (AU), required for PV systems above 20kW and for wind above 60kW (so-called utility-scale) and simplified authorisation schemes (Simplified Authorisation Procedure - PAS and Communication to the Municipality) for plants below these thresholds. Regions have the right to broaden the scope of the simplified procedures, thus creating territorial differences and increasing the complexity. For example, the Simplified Authorisation Procedure - PAS - can be extended to power plants up to 1MW. Non-uniform application of laws at local level is an issue adding to the sharp territorial differences, causing further uncertainty on the procedure and giving rise to potential discretionary behaviour by the competent authorities. In addition to the strong territorial differences, there are other aspects that impact on the authorisation process, such as the different competences for the authorisation process, which include the municipality in the case of simplified procedures (PAS and Communications) and the regions, but with possible delegation to the provinces, for the Single Authorisation.

With respect to utility-scale plants, the most substantial and longest phase of the procedures is the so-called "endo-procedimenti" in the AU[46] and the environmental authorisations. The governance responsibilities for these two items are divided between regions for the AU and the ministries for some environmental authorisations (Ministry of Ecological Transition and Culture).

Due to the un-allocated capacity, Italy misses investment opportunities

Analyzing the allocated capacity in the 5th bid of the Ministerial Decree 04/07/2019 which took place on 28th May, 2021 it can be observed that the allocated capacity out of the total available corresponds to only 5% (73.7MW out of 1.58GW available). The assigned capacity has been bid by 17 participants with activites in several regions in Italy (Piemonte, Liguria, Emilia Romagna, Umbria, Veneto, Trentino Alto Adige, Puglia, Sicilia). 2 out of 17 bidders have operations abroad and can reallocate their investments elsewhere. This means that in a single auction Italy has potentially lost between 1.4 and 1.8 billion Euros of investment, corresponding to the value of the unallocated capacity, due to inefficiencies of permitting procedures that discourage operators to participats in bids.

Source → The European House - Ambrosetti and Enel Foundation elaboration on GSE and GME data, 2021.

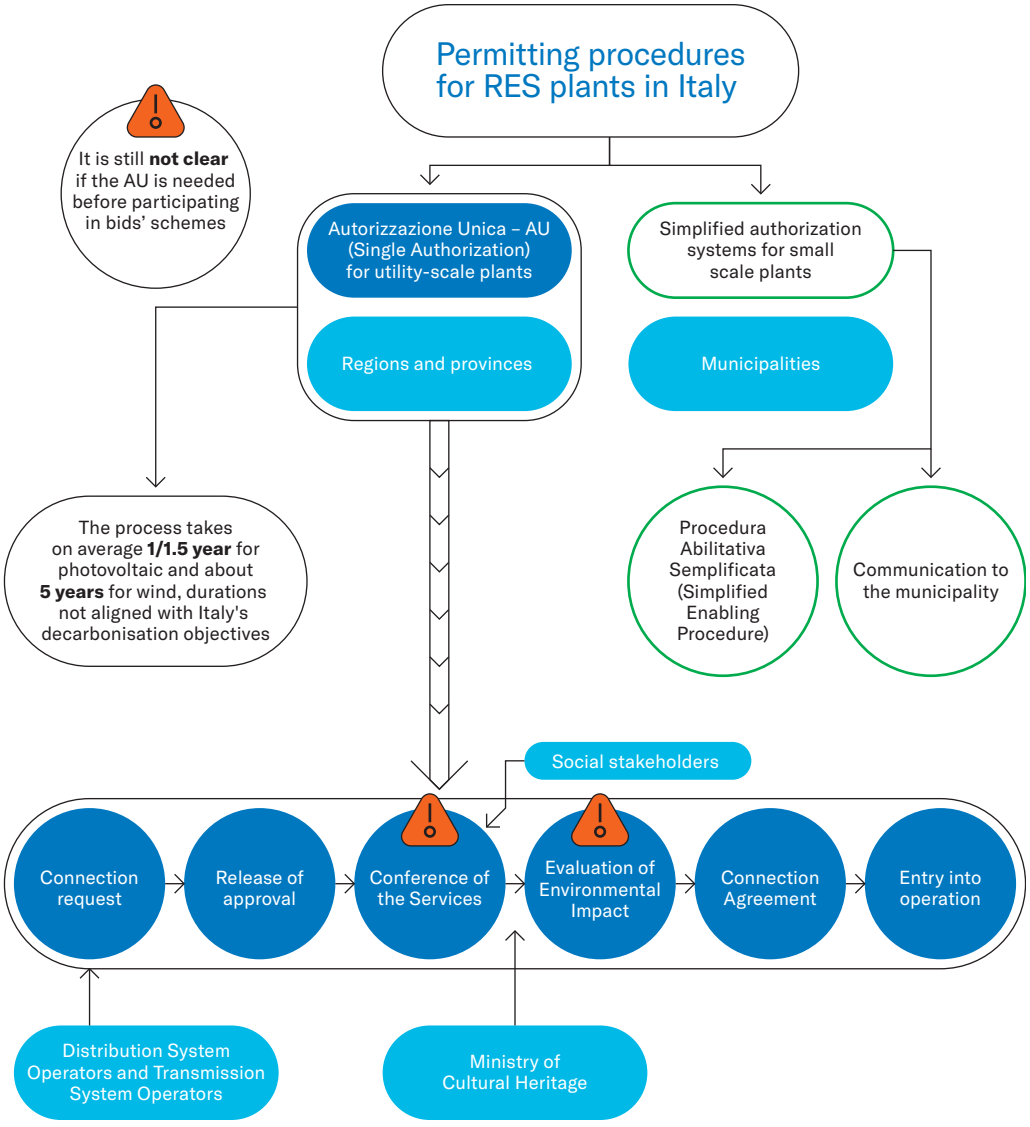
71. Moreover, the authorisation procedures involve more than 30 entities, often with governance and responsibility schemes that are not clearly defined. One of the main entities involved in the authorisation process is the **Ministry of Cultural Heritage**, which can exercise a **veto power** related to the interest of landscape preservation, representing a specificity of the Italian context. On the contrary, **there is no authority representing the public interest** related to the development of renewables (an environmental interest which has never been defined in Italy), so there is no balance with the interest represented by the Ministry of Cultural Heritage. Indeed, faced with requests for the extension of the Environmental Impact Assessment (EIA), the Ministry of Cultural Heritage requires the renewal of the merit assessment procedure and issues negative opinions. In this respect, it is relevant to mention the Environmental Impact Assessment Directive (2014/52/EU), which entered into force on 15th May 2014 to simplify the rules for assessing the potential effects of projects on the environment. The EIA Directive gives Member States a mandate to simplify their environmental assessment procedures, the implementation of which could significantly improve and simplify the process in Italy. However, as at today, this EIA Directive has not been transposed in Italy. As a matter of fact, all the mentioned inefficiencies in the procedures result in long authorisation time. Even when defined as "peremptory", the legal deadlines are seldom met, creating uncertainty both on the outcome of the procedure and on the overall time. In Italy, the time needed to authorise new photovoltaic systems is approximately be-

46 Individual administrative steps, falling under the responsibility of different offices, which converge in the single procedure and represent a necessary provision to carry out the procedure of which they are an integral part

tween **one year and one and a half years**, while the time to authorise new utility-scale wind projects is equal, on average, to about **5 years, with peaks of up to 9 years**. This implies that, even if a wind project eventually obtains the authorisation, the technology in the authorised project would be surpassed by more performing and efficient technologies, which in the meantime have become available on the market. In this context, it is worth noting that the procedure for requesting and authorising a technological variant of an authorised – but not completed – wind project, if considered of a "substantial" nature, requires the process to be restarted almost from the beginning. These timescales are thus significantly misaligned both with respect to the time envisaged for the country's energy transition process and with respect to international benchmarks. In Europe, for example, the time needed to issue permits for wind technology is on average around 24 months.

72. It is worth mentioning that the art. 18 of the "**Decreto Semplificazioni**" establishes that the works, plants and infrastructures necessary for the realisation of the strategic projects for the energy transition in Italy included in the PNRR constitute interventions of public utility, undifferentiated and urgent. However, this is **potentially only a step** in the right direction, but not yet sufficient. Further fundamental steps towards RES plants installation (thanks also to simplifying authorisation procedures) might be found in the legislative decrees to be issued to transpose the RED II and Internal Energy Market directives. This need is even more important if one considers that the renewable targets in the Italian PNRR are already more ambitious than those in the PNIEC. Therefore, in light of the volumes of new renewable capacity that must be realised by 2030 - compared to the current rate of authorisation and penetration of renewables - it becomes extremely urgent to introduce measures to streamline and increase the efficiency of authorisation processes in order to support the achievement of these targets.

● **FIG 22** → **Permitting procedures for RES plants in Italy**



Source → The European House – Ambrosetti and Enel Foundation elaboration on Politecnico di Milano and other sources, 2021.

73. The inefficiency of permitting procedures causes a **progressive decline in the participation in bidding schemes** for renewables, causing their inefficiency both in terms of capacity assigned with respect to availability and the final price of the energy. Indeed, following the aforementioned joint Ministerial Decree of the Ministry of Economic Development and Ministry of the Environment (4th July 2019), a first round of assignment allocated the entire available capacity (500MW), but subsequent calls for tenders have recorded a progressive decline in participation and an increase in the unassigned capacity. Only 73.7MW were allocated in the 5th call for bids with respect to an offered capacity of 1.58GW, only **5%**. Looking at the final price of energy, comparing the results of Italian procedures with those of European renewable energy auctions reveals a significant difference in allocation price, particularly marked for photovoltaic technology, driven by the low participation in the tender procedures. The inefficiency of permitting procedures has been recognized also as a major issue by the Minister for Ecological Transition, as declared on 16th March 2021.

● **FIG 23** → **Comparative analysis of competitive procedures for bidding scheme in selected European Union countries, 2020**
(price, allocated capacity and producibility)

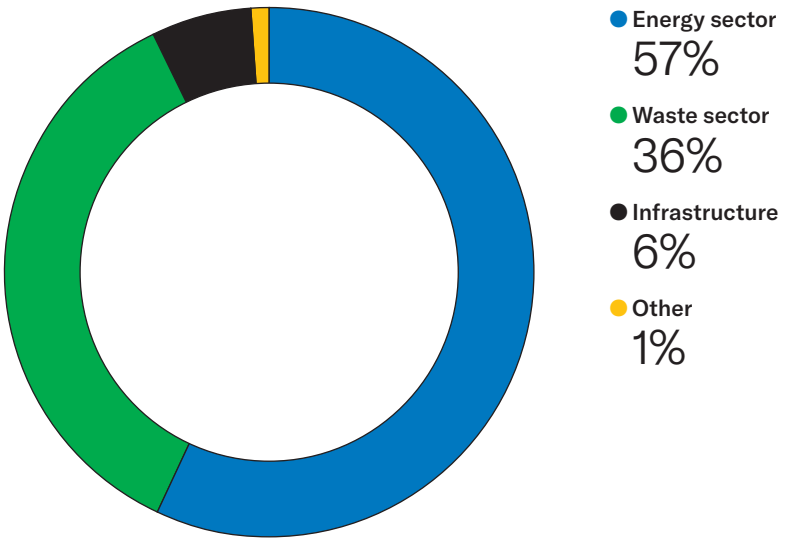
Countries	Photovoltaic technology			Wind technology		
	Price	Capacity	Producibility	Price	Capacity	Producibility
	Euro/MWh	MW	Hour/year	Euro/MWh	MW	Hour/year
Italy	**67.2**	**140**	**1,345**	**62.9**	**1,394**	**2,882**
France	57.4	332	1,133	59.7	258	5,291
Germany	51.7	1,299	1,095	61.2	3,860	2,978
Spain	24.5	2,036	1,643	25.3	997	3,758

Source → The European House – Ambrosetti and Enel Foundation elaboration on Gestore dei Servizi Energetici, Politecnico di Milano and Confindustria data, 2021.

74. The **lack of communication** to local communities on the benefits and impacts of renewables and of the energy transition on the territory also represents a relevant issue, which generates difficulty in **social acceptance** of the deployment of renewable energy technologies. Indeed, it is important to communicate to local communities that achieving the decarbonisation targets represents a **unique opportunity to enable investments** throughout the supply chain, with direct and indirect benefits for the territory and for the economy as a whole (see also Part 1 for the economic, social and environmental benefits of the energy transition). Moreover, there is also a **lack of a measurement mechanism** that can clearly demonstrate to local stakeholders the net impacts the investment can generate on the territory. Indeed, technologies that are technically and economically feasible in a given context may not be successfully implemented due to social resistance and lack of awareness of the technology. In fact, public opposition often delays or obstructs the implementation of renewable energy projects. In 2018, there were 317 disputes[47] in Italy (compared to 190 in 2014) and the energy (considering the whole sector) was the most contested one, accounting for **57%** of total disputes. Indeed, there is a high risk of appeal on the authorisation titles issued, given the fact that there is a time window of 120 days for an appeal from the date of publication of the authorisation title. Moreover, beyond the time window for countering authorisation processes, it is also possible to challenge the implementation phase of the authorised project. Finally, as stated above, poor social acceptance and involvement are also due to the **lack of effective understanding and commitment in energy transition** by local authorities. As a matter of fact, local public administrations often block or slow down investments in the territory. This is due to the **absence of mechanisms for the direct involvement and accountability** of local authorities (such as stringent minimum targets for renewable capacity to be authorised at regional level each year).

47 The number refers only to disputes related to plants to be constructed, namely infrastructures (bridges, highways, railway lines), waste plants and energy plants.

● **FIG 24** → **Sectoral distribution of disputes in the planning or construction phase that are subject to political, environmental or popular challenges in Italy, 2018** (% values)



Source → The European House – Ambrosetti and Enel Foundation elaboration on NIMBY Forum data, 2021.

How to encourage the involvement of local communities in the construction of major infrastructures and projects: the case of the Débat Public in France

The correct and effective information of local communities and territories is a necessary but not sufficient condition for overcoming the NIMBY syndrome, which requires the involvement and active participation of citizens in the design process of the works.

Among the national legal systems that first introduced instruments of participatory democracy, it is worth mentioning the case of the French Débat Public. The Débat Public was established in France with *loi no. 95-101* of 2nd February 1995, the so-called "Loi Barnier". The relevance of this law transcends the national sphere, having risen to a real model of participatory democracy for other countries as well.

The *loi no. 95-101* provides that all large infrastructure projects of national interest to the State or local communities, before possibly starting an environmental impact assessment or public inquiry, must be subjected to Débat Public, a debate concerning the objectives and main features of the projects. It is organised by an independent body, the Commission Nationale du Débat Public (CNDP).

The goal is to provide correct information and give all those who feel involved and impacted the opportunity to express their opinion.

A successful example of the engagement of local communities through the Débat Public is represented by the project for the Grand Lille high-speed railway, which thanks to the dialogue with local communities was approved after less than two years from the starting of the formal procedures. In contrast to this, the high-speed railway line connecting Italy and France is still not finished after more than 20 years given the strong public opposition.

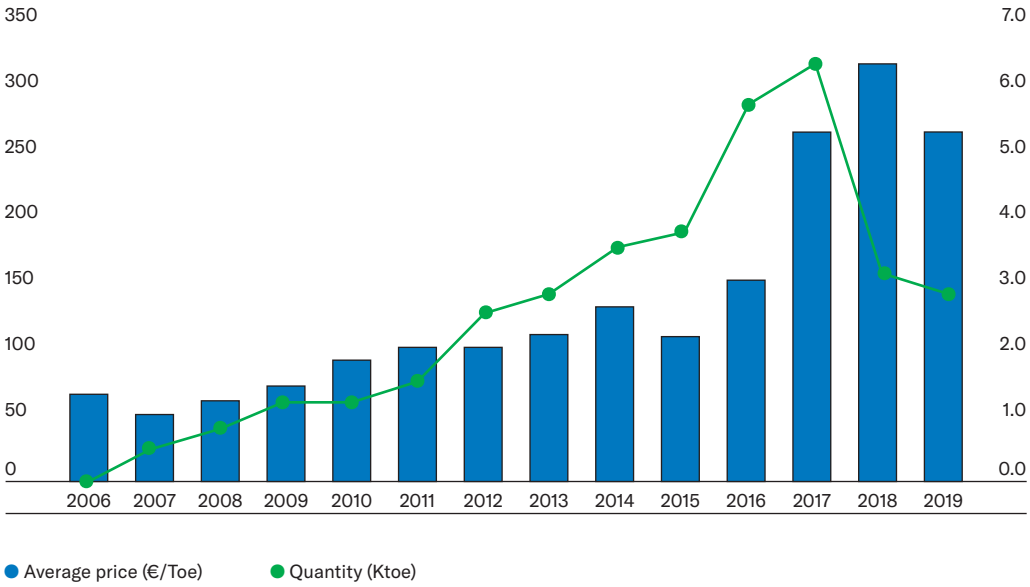
Source → The European House - Ambrosetti and Enel Foundation elaboration on Commission Nationale du Débat Public data, 2021.

75. Apart from solving the aforementioned issues, it is important to highlight that a full deployment of renewables also requires relevant investments in the national **electricity transmission and distribution grid**, to ensure that greater amounts of RES power can be connected to them. The PNIEC estimates that an additional 16 billion Euros is needed in the electric system compared to the baseline scenario (defined as the policies in place before the release of the PNIEC in 2019). Nevertheless, **bureaucratic delays** in local permits or environmental authorisations related to grid investments must be addressed to facilitate the transition.

76. About the **energy efficiency dimension in the building sector**, first, the national energy efficiency objectives are not adequately addressed with policies and measures in the National Energy and Climate Plan, as stated by the European Commission. Indeed, there is uncertainty regarding the timing of implementation and the duration of the current measures for buildings.

77. The Decree of 11th January 2017 has made the rules for calculating **energy savings of Certificati Bianchi more stringent**, aiming at improving the quality of data and reducing the risk of fraud. However, the tightening of the rules has created less offer, also leading to an increase in the prices of certificates on the market. As a consequence, their prices increased dramatically, especially in 2017, settling in 2019 at around **260 Euros**, while the quantities traded collapsed. Moreover, the mechanism establishes primary energy saving obligations for electricity and natural gas distributors (DSOs) with more than 50,000 end customers, the so-called "Obligated Parties", and assigns, for each year, specific targets to be achieved. Therefore, some DSOs are obliged to save energy and can do so in two ways: either by directly implementing energy efficiency projects admitted to the mechanism or by purchasing certificates from other entities admitted to the mechanism. As they are obliged to buy certificates, if the price rises, DSOs may record losses, eroding their turnover.

● **FIG 25** → **Average price (left axis) and quantities (right axis) of Certificati Bianchi in Italy, 2006-2019** (€/Toe and Ktoe)



Source → The European House – Ambrosetti and Enel Foundation elaboration on GME data, 2021.

78. Still on the subject of energy efficiency interventions, it should be noted that the **financial framework is ineffective**. As a matter of fact, the lack of an intermediary (third-party financing body) taking the risk of the investment makes the financial framework ineffective, due to onerous and lengthy procedures for obtaining resources. In fact, financial institutions usually evaluate the creditworthiness of the applicant and not that of the project[48].

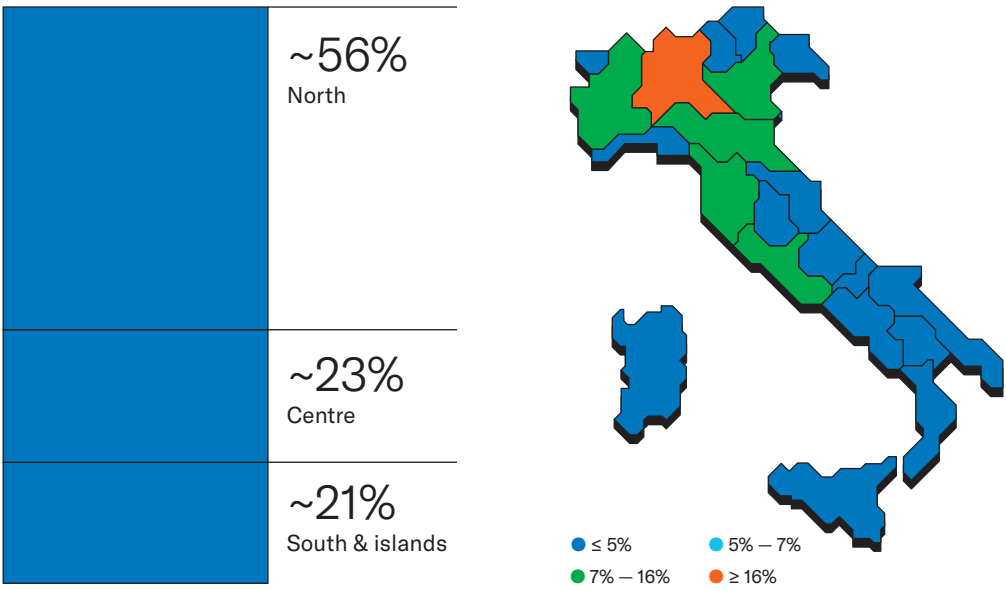
79. Finally, the energy efficiency sector of buildings faces **non-economic barriers**, namely a lack of adequate communications and culture:

- The market is not ready yet to respond to the various specificities required by the new regulations and many stakeholders, such as commercial operators, feel the need to obtain more and better information in order to guide their technological choices, implement the continuously evolving regulations and have the guarantee of product, process and result quality.
- The users and final consumers are not made fully aware of the existence of energy efficiency opportunities. Moreover, the technical aspect of the intervention makes it more difficult for them to take the proper decision. Finally, there is no adequate information on how much these opportunities are worth quantitatively.

48 In an effort to solve these issues, the Italian Government introduced in 2020 the so-called Ecobonus and Cessione del Credito (L. 30.12.2020 n.178). Thanks to this mechanism, it is possible to expand the number of subjects entitled to benefit from tax deductions on energy efficiency interventions.

80. About the transport sector, the deployment of electric vehicles is linked to the development of a proper infrastructure which, in turn, is stimulated by the development of an electric mobility market. Italy needs to multiply the number of recharging stations by 4 to **45,000** by 2030 and overcome territorial inhomogeneities (currently, **56%** of charging points are located in the North, **23%** in the Centre and **21%** in South). A revision of the PNire (the revision has been under discussion for a year) is needed to respond to the **recent evolution of the market**. Moreover, the collaboration mechanism between local authorities (municipalities and regions) on the one hand, and DSOs (Distribution System Operators) and CPOs (Charge Point Operators) on the other, for identification of recharging point sites and charging needs should be enhanced and made homogeneous at national level[49]. The collaboration should be functional to identify recharging points and charging needs based on mobility flows (e.g., high traffic roads) and on the points where the network can benefit the most from the presence of charging infrastructure leverages on a plurality of framework agreements, pilot projects, etc. but a single, homogeneous framework, which could help to facilitate the deployment of a recharge infrastructure, is lacking.

● **FIG 26** → **Distribution of public recharging infrastructure, 2020**
(regional shares out of the total in Italy - % values)



Source → The European House – Ambrosetti and Enel Foundation elaboration on Politecnico di Milano and Motus-E data, 2021.

49 The proposal to simplify the procedures for building infrastructures for recharging electric vehicles, recently approved during the conversion of the "Decreto Semplificazioni" 77/2021, should help to overcome this critical issue.

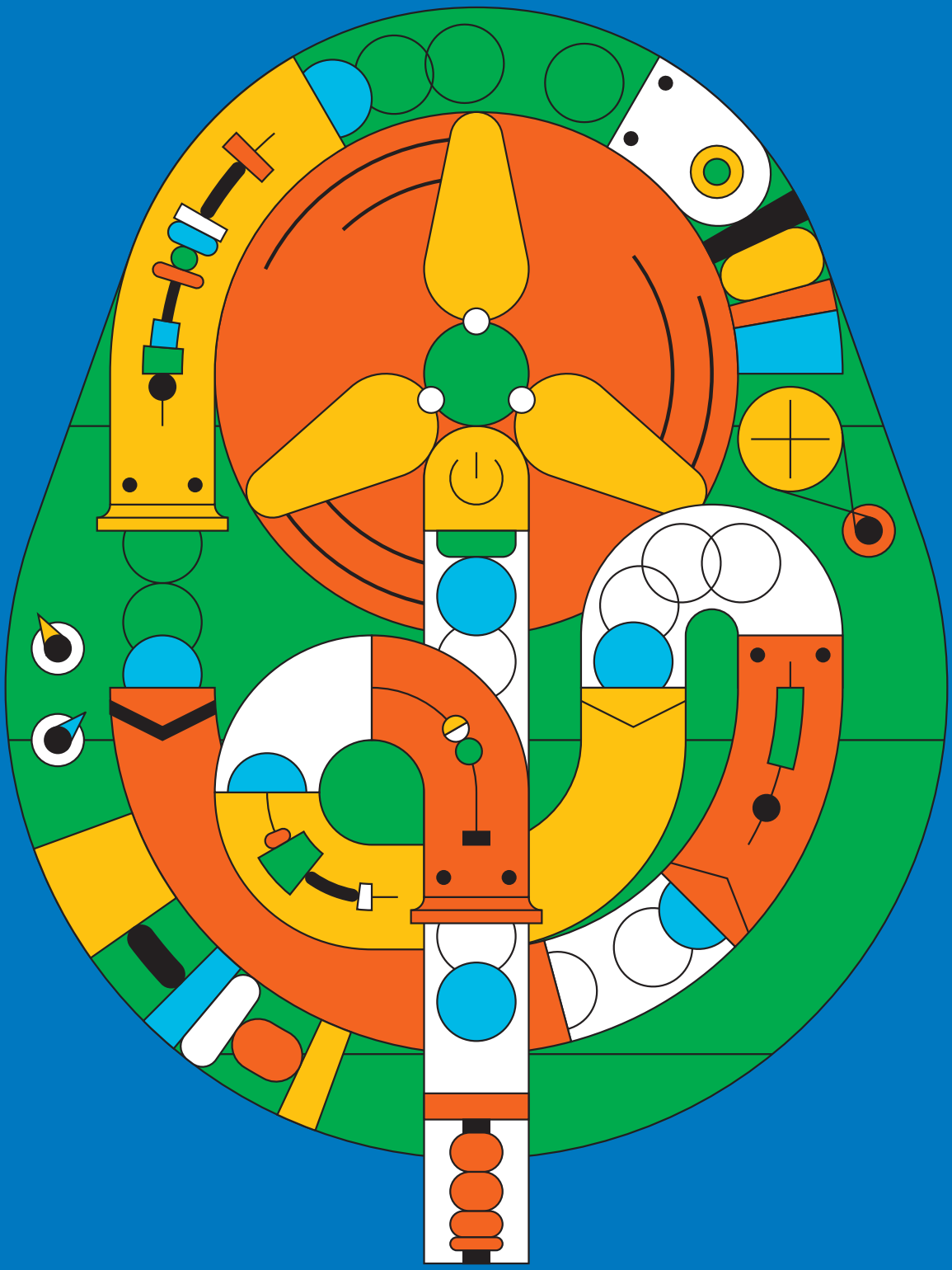
81. As far as the **industrial sector** is concerned, first of all, the same problem related to the Certificati Bianchi highlighted in the building sector affects this sector too. Moreover, the presence of a **complex process to gain access to the incentives** for energy efficiency prevents the firms from engaging actively in improving their energy use. Currently, there is a lack of categorisation of the incentives with many convergences, (e.g., for energy efficiency, incentives can be managed either with Certificati Bianchi, tax credits or Conto Energia[50], etc.), and this creates confusion and a risk of overlapping. Overall, the process is complicated and costly because of:

- Costs for the bureaucratic procedures.
- Costs for the preliminary investigation.
- Time required for the procedures.
- Uncertainty of the legislative framework.

82. Another important issue for the industrial sector in Italy is that the national **legislative framework** for the full deployment of the ESCOs needs to be improved. For this reason, currently only a limited number of ESCOs have the technical and financial resources needed to perform long-term EPC contracts in Italy. There are several barriers for the deployment of the ESCOs:

- **Legal barriers**: in Italy there are 1,500 companies registered as Energy Service Enterprises but not all of them can be classified as ESCOs under the standard UNI CEI 11352, which demands companies to have carried out at least one EPC project.
- **Institutional barriers**: local authorities face a very restrictive process to have access to funds to implement EPC projects.
- **Technical competences**: in some circumstances, there is a low technical background in municipalities, which represent the main public actors involved in EPC projects.
- **Standards**: the lack of standardised measurement and verification practices for energy saving in the country implies that each agent uses its own criteria in the process.

50 Conto Energia was introduced in Italy with EU Directive 2001/77/EC and then implemented with the approval of Legislative Decree 387 of 2003. This mechanism became operative with the coming into force of the Interministerial Decrees of 28/07/2005 and 06/02/2006 (First Energy Account) which introduced the system of financing for electricity production. It aims at incentivising the production of electricity from solar power plants connected to the grid. It is a mechanism designed to accelerate investment in renewable energy technologies by offering long-term contracts to renewable energy producers.



Part 3

International examples of actions aimed at facilitating the governance of energy transition

Key messages

1

→ International policy objectives place **increasing attention on the energy transition**, putting it at the centre of the debate for a decarbonised future and the goal of being climate neutral in Europe by 2050. As a consequence, many countries have recently introduced measures for improving the governance of the energy transition.

2

→ Various countries have implemented governance measures or policy tools to foster energy transition in the sectors analysed:

- **Renewable energy sources:**
  - **Spain:** the **Spanish 2018 New Regulation** and the "**pay as bid**" mechanism for auctions introduced in 2020 created a favourable framework for investments in RES plants thanks to attractive conditions for bid participation, efficient permitting procedures with a limited number of actors involved and streamlined access to funding schemes.
  - **Germany:** the 2021 amendment to the **Erneuerbare Energien Gesetz (EEG)** aims to speed up and streamline investments in RES plants through more frequent and rigorous monitoring of targets and a sharing benefits mechanism for territorial stakeholders aimed at increase social acceptance.
- **Buildings:**
  - **France:** the French public-private initiative, **Île-de-France Énergies** offers a turnkey service giving multifamily apartment co-owners support and, in particular, it is a pioneer in **third-party financing** of the energy renovation of residential apartment buildings, compensating for the lack of initiative from the private sector in this area, and leveraging on energy savings to pay for the investments.
  - **Lithuania:** the Government of Lithuania introduced a structured programme for the renovation of multifamily buildings in the form of loan schemes and it offers attractive financing conditions, **relieving the citizens of the need to pay** up-front the capital to carry out the energy renovation.

- **Transport:**
  - **California:** the **Low Carbon Fuel Standard** (LCFS) introduced a credit system that encourage investments in recharging infrastructure also by subsidizing the sheer availability of the recharge point, reducing investment risk for operators.

- **Industry:**
  - **Denmark:** the **Copenhagen Cleantech Cluster** (CCC), represents an example of collaboration between private and institutional stakeholders, highly supported by the public, for the deployment of greener industrial solutions.
  - **Sweden:** the Swedish policy Industriklivet aims to foster a green approach to industrial policy in the country and supported the creation of HYBRIT (Hydrogen Breakthrough Ironmaking Technology), a revolutionary initiative to decarbonize steel production.

International examples of actions aimed at facilitating the governance of energy transition

1. International policy objectives place **increasing attention on the energy transition**, putting it at the centre of the debate for a decarbonised future and the goal of being climate neutral in Europe and abroad by 2050. As a consequence, many countries have recently introduced measures to tackle the challenge of the energy transition in terms of supply (deployment of RES and grids) and demand (transport, building and industry).

2. This chapter analyses a set of case studies, looking into the strategies, governance measures and policies that individual countries have devised to foster the deployment of renewable energy sources and the decarbonisation of end-use sectors. The understanding of the different strategies and policies launched at national level is geared towards identifying elements useful to inspire policy proposals for Italy. In particular, for each sector analysed in the study, the international case studies have been individuated to provide food for thought to accelerate the energy transition in Italy. Since the countries considered are not exempt from the typical issues preventing a full-speed energy transition, the case studies are not to be considered best practice, but rather examples – either in term of new **governance mechanism** or of **policy tools** – of how very specific problems have been dealt with.

3. In the next few pages, an overview of the strategies and policies launched in some European and non-European countries is presented. Different countries have been considered for each sector:

- RES and grids: Spain and Germany.
- Energy efficiency in the building sector: France and Lithuania.
- E-mobility: California (USA).
- Industry: Denmark and Sweden, these cases represent private initiatives favored by a supportive public framework.

In this Part, also the Italian case of **green guarantees issued by SACE** to support domestic projects that aim to facilitate the transition towards a decarbonized is presented.

● **FIG 1** → **Summary of the main case studies presented**

Countries	Policy	Take away
Spain	Simplification of RES authorisation process	Efficiency in authorisation processes leads to an optimal functioning of the auction mechanism and, consequently, to an **efficient deployment of investments**.
Germany	Stakeholders engagement mechanism	Introducing **benefit-sharing mechanisms** can be a tool of increasing the social acceptability of investments in RES plants.
France	Public-Private Partnership acting as a third party financing company	The mechanism reduces the complexity of the incentive system, making the **understanding easier for the end customers**.
Lithuania	Multi-apartment buildings renovation Programme	The Program **relieves the citizen of the need to pay up-front the capital** to carry out the energy renovation.
California	Introduction of Low Carbon Fuel Standard (LCFS)	Standards allow the recharging infrastructure to be also **subsidised just for the availability** (under a certain threshold) of charging points, reducing the investment risk for operators.
Denmark and Sweden	Industrial clusters for clean technologies	Industrial clusters promote the **pooling of local expertise** for the development of decarbonisation technologies.

Source → The European House – Ambrosetti and Enel Foundation, 2021.

3.1 Renewable energy sources

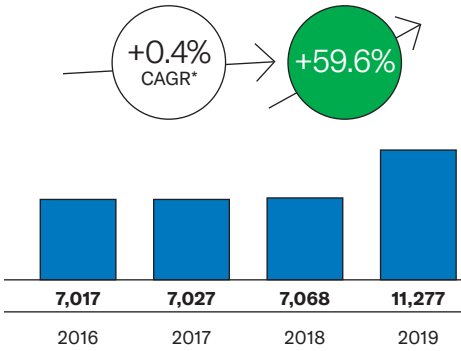
4. Before introducing the specific case studies, it is important to highlight that the rules and laws relating to the authorisation procedures in force in other countries are difficult to compare with the Italian framework, thus making it difficult to "import" or apply the specific case studies to the Italian system without adapting them to the peculiarities of the country. Observing the annual volumes of new renewable capacity installed abroad, however, it is clear that the rate of issuance of authorisation certificates in some countries is significantly better than in Italy. This highlights the need for the urgent introduction of measures to ensure simplification and greater efficiency and effectiveness of authorisation procedures and adequate commitment by all stakeholders (including local authorities) to energy transition goals.

→ SPAIN

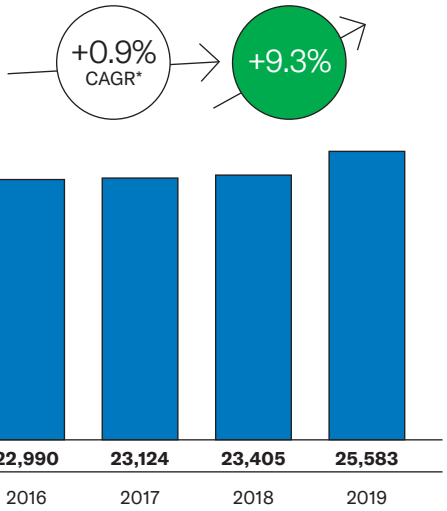
5. Spain has recently seen a significant increase in the **deployment of investments in renewables**. Indeed, solar PV and wind installed capacities in Spain grew significantly between 2018 and 2019, with a **+59.6%** increase for solar power (+4,209MW) and **+9.3%** for wind power (+2,178MW), while the compound annual growth rates between 2016 and 2018 were 0.4% and 0.9% respectively. For the sake of comparison, electricity production capacity in Italy grew by only 3.8% for solar power and 4.4% for wind power between 2018 and 2019. The reason for this stagnation of the installed capacity lies in the current rate of issuance of authorisations and the duration of the process itself, which is not in line with Italy's decarbonisation objectives.

● **FIG 2** → **Electricity production capacities for solar (left) and wind (right) in Spain, 2016-2019** (MW)

Electricity production capacities for solar in Spain, 2016-2019 (MW)



Electricity production capacities for wind in Spain, 2016-2019 (MW)



*Compound annual growth rate.
Source → The European House – Ambrosetti and Enel Foundation, prepared using Eurostat data, 2021.

6. As a matter of fact, **auctions for renewables** in Spain have recently seen a **boom in demand**. Indeed, demand at the January 2021 renewables auction was three times higher than supply, with 82 participants and 32 winners. All the 3GW available capacity were awarded, of which 2GW of photovoltaic and 1GW of wind. For the sake of comparison, in Italy the quota made available for tender in the latest rounds of auctions was not saturated due to lack of offers. In the fifth round in May 2021, there was an offer equal to only 5% of the available quota. The efficiency and effectiveness of the **governance model** of the renewable energy sector in Spain, involving both a favourable incentivising mechanism and an efficient plant authorisation process, may be some of the reasons behind the positive figures in Spain.

7. Renewables in Spain have been regulated under various **support schemes**, following on from one another in the last decade. The support scheme known as the "**Régimen Especial**" operated until the end of 2011 and was suspended at the beginning of 2012. The Régimen Especial established a price regulation system with a domination of Feed-in Tariffs (FITs) and provided a total payment per kWh of electricity from RES generated, paid in the form of guaranteed prices, and combined with a purchase obligation by the utility companies.

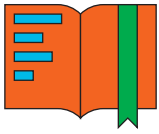
8. In June 2014, a new support scheme (the "**Régimen Retributivo Específico**") was established, with the aim of creating a specific payment scheme based on installed capacity for new renewable energy installa-

tions. A procurement auction mechanism for RES was introduced, with the auctioneer buying the RES electricity from the bidder offering the best bid, namely the lowest support level. It is worth analysing the **two auctions** carried out by the Spanish authorities in **May 2017 and in July 2017** under the Régimen Retributivo Específico, which allocated more than 8GW of renewable energy generation capacity. A Ministerial order published in advance of the auction contained the initial investment values and other remuneration parameters, such as operating costs per MWh, number of operating hours, lifetime and compensation for investments. The return-on-investment costs established in Spanish Royal Decree 413/2014 for new facilities (7.503%) was guaranteed. For both auctions, winning projects would have to be operational by 31st December 2019, something which established a **tighter schedule** for completion of projects, with penalties for non-delivery raised to €60/kW. In order to encourage efficient projects, recently commissioned renewable energy source facilities were used by the Spanish authorities as benchmarks for the reference compensation parameters applicable in the auctions, setting the reference operating hours for photovoltaic and wind facilities according to the top performing facilities in Spain (around 4-5% of the total installed photovoltaic/wind capacity).

9. With the **new regulation** approved in October 2018, RES self-consumption is exempt from charges on capacity and generation levels, while the procedures for RES self-consumption have been simplified. RES operators are entitled to grid connection and priority dispatch. Furthermore, a plant operator is entitled to request a grid expansion, if the expansion is necessary for its plant to be connected to the grid (i.e. the grid operator is obliged to reinforce the grid, if it is necessary for connecting a plant). However, if the plant operator is the only beneficiary of the expansion, it shall bear the costs of the expansion. Furthermore, in 2020 the Spanish Government further modified the mechanism, introducing "**pay as bid" auctions**, namely discriminatory auctions, characterised by participating companies paying for each accepted power block, equal to the bid price for that same block. In other words, participants bid the price they are willing to charge for the energy generated by the plant, without receiving any price "correction" incentives, which were granted in the previous mechanism. This mechanism works because the technological price of panels or wind turbines is going down, allowing renewable energy to be produced at costs below the market price. This lower cost makes the incentives granted under the previous auction mechanism, when the costs of producing electricity from renewable sources were higher than the market price, unnecessary.

10. Unlike Italian auctions, in Spain it is allowed to bid a project even before it was granted a permit. Once awarded, RES projects in Spain are given a tight deadline to get final permits and be put in operation. A strong commitment from both institutional bodies and developers helps to get everything finalised in light of the auction results. In Italy, even if the GSE allowed participation in auctions without permits, at present few investors would be likely to take the risk on permitting, because investors and developers are not confident to obtain a permit in a reasonable time, re-

gardless of the quality of the project itself. In Spain, meanwhile, investors participate in auctions without permits because they know that the risk of failure or delay in obtaining the permit is low, as the autonomous communities and the central government (depending on the type of project) are efficient, non-discretionary and prone to attract investment. Together with the incentive mechanism described above, it is important to take into consideration that the Spanish **authorisation process** for RES plants seems to be effective and **efficient**, at least more than the Italian one, for the following reasons.



Please refer to **Part 2** for the Italian permitting framework

11. The **number of stakeholders involved** in the authorisation process is small: the Spanish Ministry for Ecological Transition, the Competition Authority (i.e. the independent regulator), the grid operator and the regions are involved, while the Spanish Ministry of Culture is not involved (which may represent the main difference with the Italian permitting framework). In Italy, as outlined in Part 2, there are many actors (10) involved both at the central decision making level (Ministry of Cultural Heritage, Ministry of Ecological Transition and of Economic Development) and at the local decision making level (regions, provinces and municipalities), as well as the regulathory auhtority, the technical administrative bodies and the operators. The authorisation process requires the following administrative permits:

- A preliminary administrative permit, managed together with the environmental impact assessment, establishing the time frame for requesting approval of the project.
- Administrative authorisation for construction, which allows the construction of the plant and can be managed and obtained together with the preliminary administrative permit, while the environmental impact assessment should be granted prior to administrative construction authorisation.
- Authorisation for exploitation, allowing plants to be connected to the grid and the commencement of commercial exploitation.

12. For plants with a capacity over 50MW or exceeding the regional limits of an autonomous region, authorisation must be granted by the Spanish Directorate-General for Energy Policy and Mines (DGPEM), part of the Ministry for Ecological Transition. In all other cases, the relevant autonomous regions grant the authorisation. For authorisations granted by DGPEM, the deadline for issuing the relevant authorisations is **one year**, while it is **six months** for those granted by the relevant autonomous regions. If the permit is not issued by the deadline, the request will be considered denied. This could represent a point of attention but it must be considered that installation rate observable in Spain suggests that these deadlines are generally respected or in any case are in line with the authorisation process of the renewable capacity expected to achieve the country's objectives.

13. Another important aspect to take into consideration, not specifically related to RES but still having some important implications, is **Spanish Royal Decree-Law 36/2020**, published on 30th December 2020 and entered into force on 1st January 2021. The Royal Decree-Law includes

measures to **streamline the execution** of the funds from the **2021-2027 Multiannual Financial Framework** and the implementation of Next Generation EU. Among other topics, it creates the concept of PERTE (Strategic Projects for Economic Recovery and Transformation), according to which a project (including an energy-related project) may be declared a PERTE when it is of a strategic nature and highly capable of driving economic growth, employment and competitiveness. The aim is to boost public-private partnerships and address investment gaps due to potential risks that could otherwise lead to market failures. The Royal Decree-Law also simplifies procedures for incentive programme and for accessing the corresponding grants, by:

- Speeding up the procedures for publication of incentive programmes and unifying otherwise separate stages.
- Increasing the threshold for which access to grants can follow a simplified process up to 100,000 Euros.
- In cases where an economic report is required to have access the grant, the commitments contained can be made more flexible (i.e. the budgeted item can be substituted with one another).
- Creating a single web portal for the Recovery, Transformation and Resilience Plan to centralise and disseminate all the information for the different stakeholders and agents.

14. The Royal Decree-Law also includes measures to streamline public contracting, such as standard specifications, simplified procedures, more flexible subcontracting criteria and increased payback on investments in energy services and supply, among other aspects. Finally, the Royal Decree-Law has also amended Act 21/2013 of 21st December on **environmental impact assessment** to facilitate the processing of projects financed by the European Plan, when they constitute modernisations of or improvements to already existing plants that improve environmental conditions.

→ GERMANY

15. Germany's amendment to the Erneuerbare Energien Gesetz (EEG)[1], entered into force on 1st January 2021, is a targeted package of rules aimed at accelerating and simplifying procedures for renewable energy plants. The reform firstly increases green capacity targets for 2030. Photovoltaics will have to reach 100GW (up from around 52GW today), onshore wind 71GW (up from 55GW today), biomass 8.4GW and offshore wind 20GW. A rigorous monitoring process will be employed each year to verify that the different sources are growing at the necessary rate.

16. The German law also includes new tenders: 500-850MW of renewables will be offered annually in the so-called "innovation auctions". The law **improves payment conditions** for large rooftop photovoltaic plants, introducing different auction segments for solar facilities on buildings and in open space, recognising that the construction of solar facilities on buildings is more expensive than in open space, which makes solar facilities on

1 Germany's renewable energy law.

buildings not competitive in general auctions. Moreover, the law extends from 110 metres to 200 metres the strip of land alongside motorways and railways that can be used as space for the construction of solar plants.

17. One of the objectives of the new EEG is also to **foster acceptance of renewable power plants**. Indeed, Germany has a major problem with public disputes, especially for wind power, added to which is the fact that permits may be challenged in court once they have been issued, which creates great uncertainty and additional court procedures that often involve lengthy lawsuits (the same situation can also be found in Italy). To counter this problem, the law introduces the **possibility for municipalities to benefit financially** from wind power plants in their regions, by guaranteeing to communities that allow wind parks to be built in their region a share of the park's income amounting to €0.2/kWh for 20 years. For the sake of comparison, in Italy the law sets out *compensazioni* as a way to pay municipalities when environmental impacts are considered by the regions as not totally mitigated by the operator. This approach could lead spontaneously to an attitude of opposition from municipalities from the outset of the permitting process, instead of one of co-participation in the project, with constructive and proactive involvement.

18. To incentivise wind expansion in southern Germany, the new EEG introduces a "**quota for the south**" (15% of successful tenders must come from the south of Germany between 2021-2023 and 20% from 2024 on), with the idea of reducing the imbalance in generating capacity between the north and south of the country. Concerning the impacts of the overall policy tool, when comparing the latest auctions of 2021 with those of previous years, there is no evidence of improvement regarding greater participation in them, since participation in solar auctions already stood at 100% while wind was already at about 50%, suggesting that it is probably too early to see improvements on the wind side.

Incentive mechanisms to support innovation initiatives in distribution grids in the UK

In some European countries, national energy regulators adjust the revenues of distribution system operators by providing an extra allowance to offset the risks involved in testing new technologies and processes. In December 2009, OFGEM – the independent energy regulator for Great Britain – launched a funding mechanism (Low Carbon Networks Fund or LCNF) of 580 million Euros over the period 2010-2015 to support competitive tenders for "large-scale trials of advanced technology including smart grids", only applicable to electricity distribution companies. In 2015, the LCNF was replaced by a new funding scheme, called the Network Innovation Competition (NIC), aimed at providing incentives to Distribution System Operators for implementing smart grid solutions. The NIC was designed to stimulate innovation in the way network companies design, plan and operate their networks, while delivering high quality and value for money services to customers. The NIC provides funding to encourage network licensees to run trials of new technology and different commercial and network operating arrangements. In the 2020 Network Innovation Competition, 81 million Euros of funding was available.

Source → The European House - Ambrosetti and Enel Foundation, prepared from various sources, 2021.

3.2 Buildings

→ FRANCE

19. The French case study on buildings relates to **Île-de-France Énergies**, previously called **Energies POSIT'IF**. This measure was created in 2012 as a public-private partnership (*société d'économie mixte* or SEM) by the Île-de-France region.

20. In Île-de-France there were 4.7 million dwellings, of which 72% were collective buildings. The priority target for the regional administration was to renovate the 1 million buildings in the region rated in **energy classes E, F and G** (230 to 450KWh/m^2/annum)[2], representing **47%** of the total residential houses in those classes. At that time, however, several constraints were affecting renovation programmes:

- Non-professional management of buildings (co-owners).
- Long decision-making processes.
- Financing schemes not adapted to long-term payback investments (over 15 years).

21. The initiative was therefore created to promote, organise, support and implement the energy transition of buildings in the Île-de-France region. The organisation acts as a **public ESCO** and an **integrated service provider**, offering technical design, implementation and operations, financing and insurance services to owners of multifamily residential apartment buildings and reducing transaction costs (information, strengthening the capacity of homeowners, feasibility studies, quality control, follow-up, etc.).

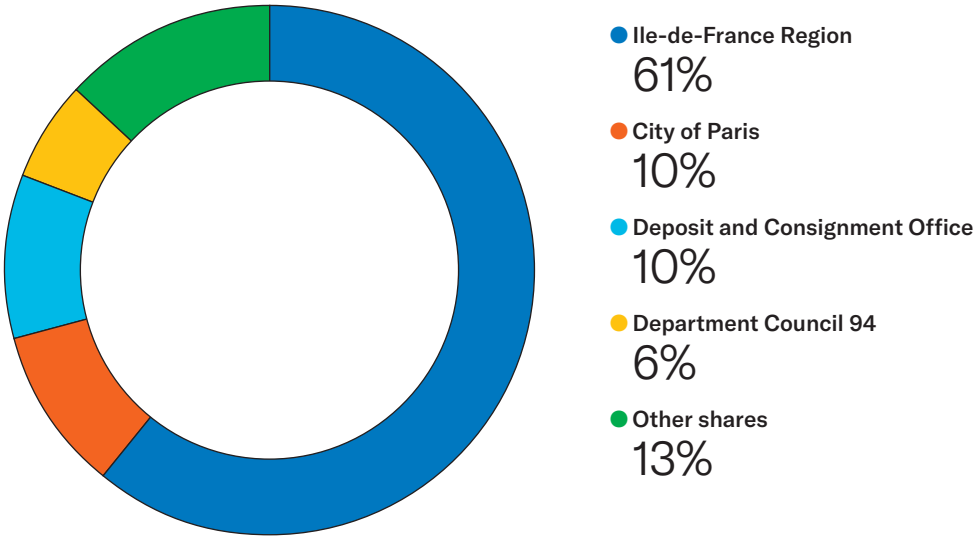
22. The project is a pioneer in **third-party financing** of the energy renovation of residential apartment buildings, compensating for the lack of initiative from the private sector in this area, and leveraging on energy savings to pay for the investments. The project is supported by the European Commission through its MLEI-PDA (Mobilising Local Energy Investments – Project Development Assistance) programme, now called the Horizon 2020 programme.

23. By January 2013, the project had raised **5.3 million Euros** of capital from different shareholders. As of today, Île-de-France Énergies holds capital of **9.9 million Euros**, distributed across the region, the cities of

2 The average consumption of the housing stock is 220 kWhpe/m^2/year (heating and domestic hot water) and 330 kWhpe/m^2/year including cooking and specific electricity.

Paris and Créteil, private and public banks, and several local communities of municipalities. It works as a joint enterprise, with **85% public shareholders** and **15% private shareholders**.

FIG 3 → **Île-de-France Énergies shareholders** (% values)



Source → The European House – Ambrosetti and Enel Foundation, prepared using Île-de-France Énergies and European Commission data, 2021.

24. The principles on which Île-de-France Énergies works are to:

- Offer a turnkey service giving multifamily apartment co-owners support with all technical, financial and insurance aspects.
- Mobilise and secure a supplementary financial resource, namely future energy savings.
- Assist the co-owners in organising the financial plan of the operation.
- Relieve co-owners from the need to pre-finance whole or part of the energy saving investment.

25. The Project Development Unit offers the following services:

- **Energy audit** to identify the energy savings potential and financial implications.
- **Establishment of a mandate** from the co-owners to the property management association. In this sense, Île-de-France Énergies is mandated to act as an integrator of energy efficiency projects and provides financial advice and engineering.
- **Establishment of a contractual agreement** with the condominiums that covers the energy renovation project.
- **Outsourcing** to architects, engineering companies, energy service companies (where performance guarantees are required) and contractors.
- Offering of a **number of options**:

- Follow-up on energy performance.
- Maintenance.
- Repair.
- Performance warranty.
- Third-party financing option.

- Assistance with financial structuring, including loans at low or zero interest rates, subsidies (from the French National Housing Agency, *Agence National de l'Habitat*, from the French national energy agency ADEME and from local authorities), white certificates and bank loans.

26. In terms of financing, there are **two cooperation models** between condominiums and Île-de-France Énergies:

- In the first operational model, Île-de-France Énergies provides its **financial engineering services** to condominiums. It develops a global financing plan for the building energy renovation, which consists of individual financing plans adapted to each home owner. Individual financing plans can include self-financing of apartment owners, grants and subsidies (national, regional or local) for which they are eligible and a bank loan. Condominiums can also take a collective loan involving all interested home owners. The condominiums are in direct relation with the banks via a globally structured contract. They pay Île-de-France Énergies for the renovation works as well as a fee for its services. Île-de-France Énergies acts as an intermediary between the condominiums and technical partners that perform the renovation works (e.g. the Île-de-France Énergies pays the suppliers for the works). It does not, however, provide any additional financial sources.
- In the second operational model, Île-de-France Énergies, in addition to what was previously described, provides **additional financing sources** to the condominiums. In this case, Île-de-France Énergies seeks **third-party financing sources** (in the form of a bank loan) on behalf of the condominiums and provides them with additional financial sources from its own budget. It acts as an intermediary between the condominiums, technical partners and banks. The condominiums are in direct contact only with Île-de-France Énergies, they pay monthly (or six-monthly) instalments and a service fee to Île-de-France Énergies. It then pays back to the banks.

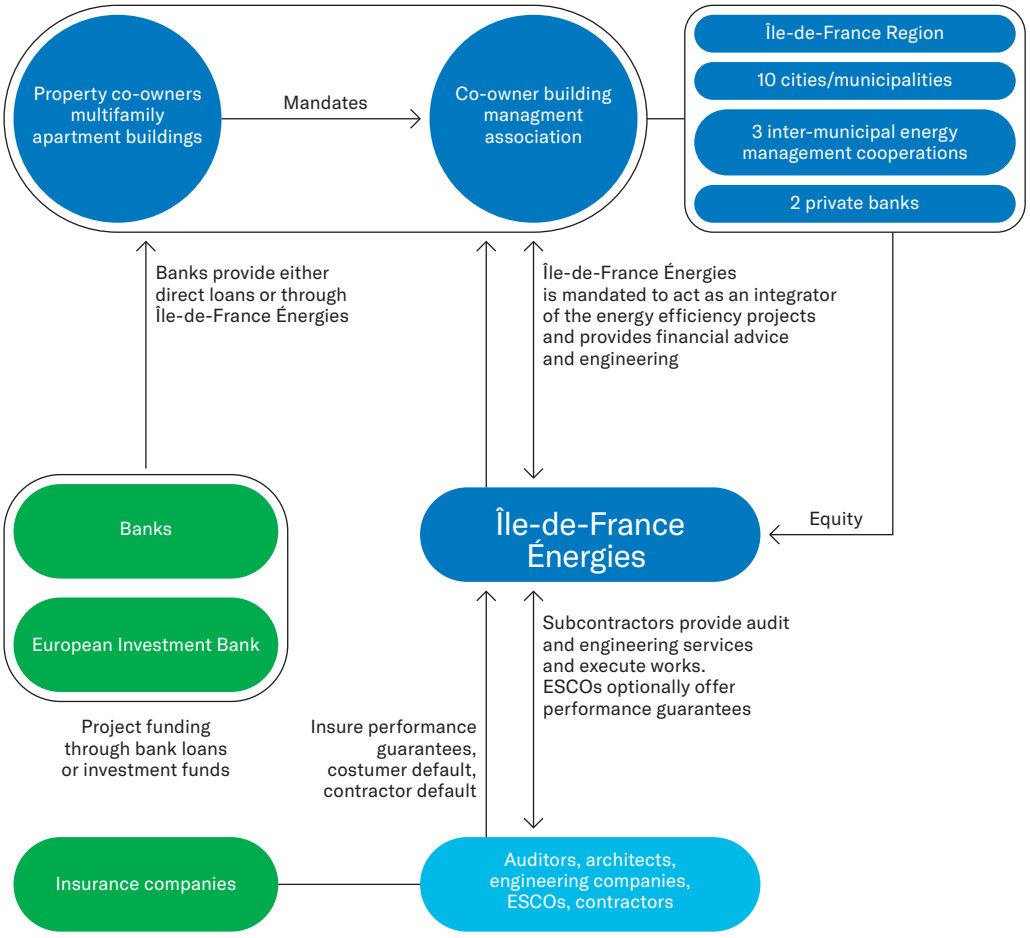
27. The third-party financing is the peculiarity of the project. It consists of financing the cost of the energy retrofitting through the energy savings generated in the long run. The third-party financing company conducts the project and provides the investment needed to implement the renovation works. After the works, the condominium repays the company over the long term.

28. In the end, the beneficiaries reimburse the renovation costs through regular payments (instalments) which take into account the financial savings generated thanks to reduced energy consumption. However, the payments are not always equal to or lower than the financial savings achieved. Condominiums may decide to pay higher instalments and so

shorten the pay-back period or, in some cases, the instalments are high due to too high renovation costs that include measures that do not generate (or generate too few) energy savings.

29. In 2017, Île-de-France Énergies worked with **41 blocks of flats**, representing **5,800 homes**, of which 2,100 voted in favour of work being conducted, giving a total investment of over 50 million Euros. Moreover, a total of **4,560 tonnes of CO_2** emissions have been avoided per year. On average, the refurbishments allowed a **47%** energy saving compared to the previous energy consumption level.

● FIG 4 → Mechanism of functioning of Île-de-France Énergies



Source → The European House – Ambrosetti and Enel Foundation, prepared using Île-de-France Énergies and European Commission data, 2021.

→ LITHUANIA

30. With a population of approximately 3 million inhabitants, 66% of Lithuania's population lives in multi-apartment buildings built before 1993 (more than 800,000 apartments in more than 38,000 multi-apartment buildings, 97% of which are privately-owned). Moreover, **65%** of buildings are supplied by district heating system.

31. The residential sector was affected by several issues:

- **Old construction standards** and effects of **little maintenance**.
- **Inefficient heating systems** and engineering equipment.
- **Poor quality** windows, roofs and seals between panels.
- Big **energy losses**.

32. In light of this, the Government of the Republic of Lithuania approved a **multi-apartment building renovation (modernisation) programme** in 2004. The policy lay at the centre of the 2020-2050 National Energy Independence Strategy, which aimed to reduce GHG emissions by 5% and annual expenditures on imported energy corresponding to 3-4% of national GDP by 2020.

33. The case study is worth mentioning because of the **leaner and easier process for building renovation** for end customers due to the appointment of renovation **administrators** who manage the financial aspects and due to payments from **national funds** to all parties involved. Another important governance aspect to consider is that until 2012, the programme was implemented only on the initiative of home-owners. Since 2013, the **municipalities** have been introduced into the programme with the following roles:

- Selection of the most inefficient buildings, organisation and preparation of energy audits and investment plans.
- Preparation of energy efficiency programmes for selected building renovation, approval by the City Council, appointment of a programme administrator (namely a legal body, controlled by the municipality).
- Appointment of a programme supervision committee (municipal administration).
- Supervision of project implementation, new inefficient building selection, incorporation into the municipal programme, delegation of new project implementation to the appointed administrator, etc.

34. There are two different management methods for the modernisation of buildings:

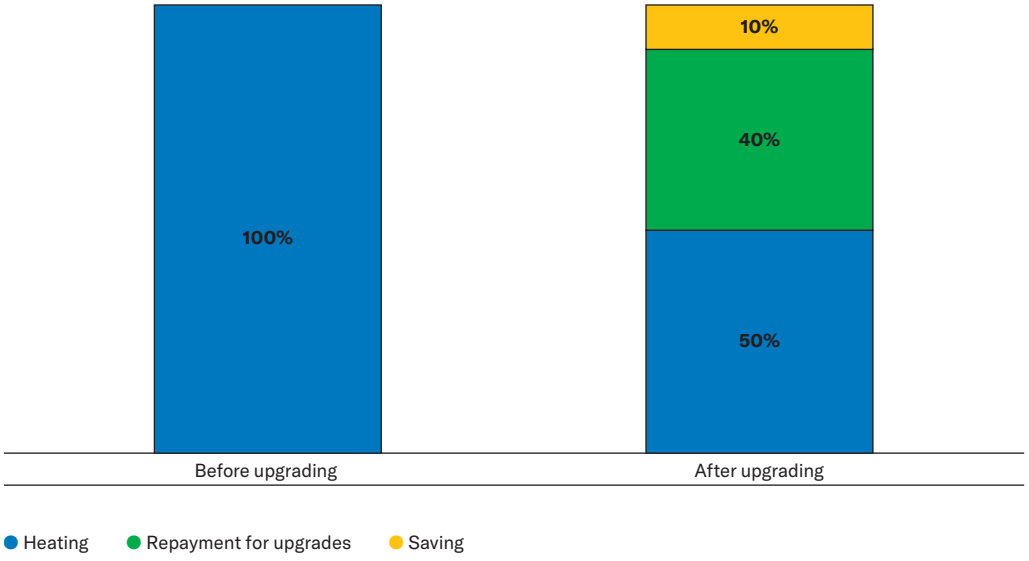
- Home owners, on their **own initiative**, prepare investment projects, take out loans and implement modernisation. The issues related to this option are the lack of home owner initiatives, fear of taking out a loan and mistrust of the results after upgrades.
- Investment projects are implemented based on the **energy efficiency programmes approved by the municipalities**. In this case, investment projects are prepared on the initiative of the municipality, the projects are implemented by the programme admin-

istrator appointed by the municipality, the loan is taken out by the programme administrator and the programme administrator organises procurement, taking all responsibility for implementation and financial management.

35. The residential building modernisation programme in Lithuania is a good example of a **structured programme** for the renovation of multi-family buildings in the form of **loan schemes**. Indeed, the programme offers attractive financing conditions to the end beneficiaries:

- A fixed interest rate for the entire loan period (the loan is tied to the apartment and not to the owner).
- Maturity up to 20 years.
- The option to write off part of the loan when energy savings reach a certain energy class.
- Self-financing, with the bank possibly requiring a down payment (not more than 5%).
- No loan insurance requirements.
- No third-party guarantee requirements.

FIG 5 → **Distribution of costs to consumers before and after renovation**
(% values)



Source → The European House – Ambrosetti and Enel Foundation, prepared using Lithuanian Environmental Protection Agency (EPA), Lithuanian Government and European Commission data, 2021.

36. The programme became extremely **successful** when the following measures were introduced:

- Municipalities were involved by drawing up a list of the worst-performing buildings and mandating them to appoint renovation administrators, who could do off balance borrowing on behalf and in favour of apartment owners.
- The absolute majority of apartment owners voting in favour of the modernization project, in order to start its implementation.
- Payment of monthly loan instalments can be allocated to indigent apartment owners.
- Technical and financial support are paid from national funds to all related parties for project preparation and implementation.

37. In terms of results, since 2012 more than **3,000 projects** concerning multi-apartment buildings have been completed, currently approximately **73,000 apartments**, investments of **680 million Euros**, energy savings of around **744GWh** and reduction of CO_2 emissions of **170,800 tonnes**. Due to the inclusion of municipalities in the programme, the number of projects completed has risen from **479** (in the period 2004-2012, with no inclusion of municipalities) to **2,460** since 2012.

38. The Ministry of Environment has also estimated that the programme has contributed to the development of **300 construction companies** in the country, an increase of 20%-25% in the value of apartments in the modernised buildings and the creation of around **14,000 jobs**.

Green guarantees for energy transition investments, a best practice by SACE

SACE is an Italian insurance and financial agency specialized in supporting Italian companies that grow both in Italy and abroad and export to approximately 200 foreign markets. With a portfolio of insured transactions and guaranteed investments amounting to 156 billion Euros, SACE serves over 26,000 companies, mainly small and medium enterprises, and facilitates their access to credit.

Thanks to the "Decreto Semplificazioni"[1], SACE has become one of the main actor of the Green Deal in Italy, thus significantly expanding its traditional role in supporting exports and internationalization of companies. In fact, through a new program of 'green' guarantees to enable the national ecological transition, SACE's action is aimed at relaunching Italian competitiveness in a sustainable manner and with a medium-long term strategic horizon. The **agency can issue guarantees assisted by the Italian State**, up to a maximum of 80% of the loan amount, **to support domestic projects that aim to facilitate the transition towards an economy with a reduced environmental impact** and that envisage, for example, production cycles with low-emission technologies or sustainable mobility initiatives. It should be noted **that this is the only case in Europe where a government assigns such a mandate for domestic support to an Export Credit Agency**.

The green guarantee programme is open to all companies, regardless of size, as long as the financed investment is made in Italy. The eligibility of initiatives is assessed by SACE itself on the basis of the taxonomy defined by the European Union. In particular, projects must produce a significant benefit to at least one of the following environmental objectives, without harming the others:

- Climate change mitigation and adaptation.
- Sustainable use and protection of water and marine resources.
- Transition to a circular economy.
- Prevention and reduction of pollution.
- Protection and restoration of biodiversity and ecosystems.

From the start of this operation (December 2020) to 30th June 2021, SACE met more than 300 potential beneficiary companies of its green guarantees, 75% of which are small and medium-sized enterprises. The green guarantees issued so far by SACE have allowed mobilization of financings for a total amount of ca. 1.2 billion Euros. These transactions have enabled the conversion of industrial processes to reduce polluting emissions (e.g. in the steel and manufacturing sectors), support to circular economy initiatives and smart mobility (e.g. through the upgrading of new high-speed or electric-powered railway lines) and increased production of electricity from renewable sources, such as solar and wind power.

Moreover, by assigning a 'transaction green rating' to the supported transactions, activity which is normally carried out by specialized agencies, SACE is at the forefront of the international financial scene. This rating is both based on the creditworthiness of the counterparty, and on the contribution of the planned investments to the achievement of the environmental objectives set by the European taxonomy. Such rating has a direct impact on the pricing of the SACE cover: in fact, by assessing the positive environmental impact of the financed investment, **pricing is reduced compared to transactions with the same creditworthiness but without green connotations**. The result is an improvement in the overall economic conditions of the loan covered by the SACE green guarantee.

1 Law Decree No. 76 of 16th July 2020, converted with amendments into Law No. 120 of 11th September 2020.

Source → The European House – Ambrosetti and Enel Foundation, prepared using Spanish government data, 2021.

3.3 Transport

→ CALIFORNIA

39. The California case study highlights a specific policy tool in place to address the barriers related to the deployment of **e-mobility**. In particular, offering purchase rebates has been effective in increasing the deployment of electric vehicles, but not enough to deploy e-mobility. California administers several incentive programmes for e-mobility, including the Clean Vehicle Rebate Project (CVRP), which is funded through cap-and-trade auction proceeds that have not kept pace with increasing sales volumes. As a result, California has scaled back the CVRP rebate amount and number of qualifying vehicles. At the same time, the Federal Tax Credits have already begun phasing out for some EV manufacturers.

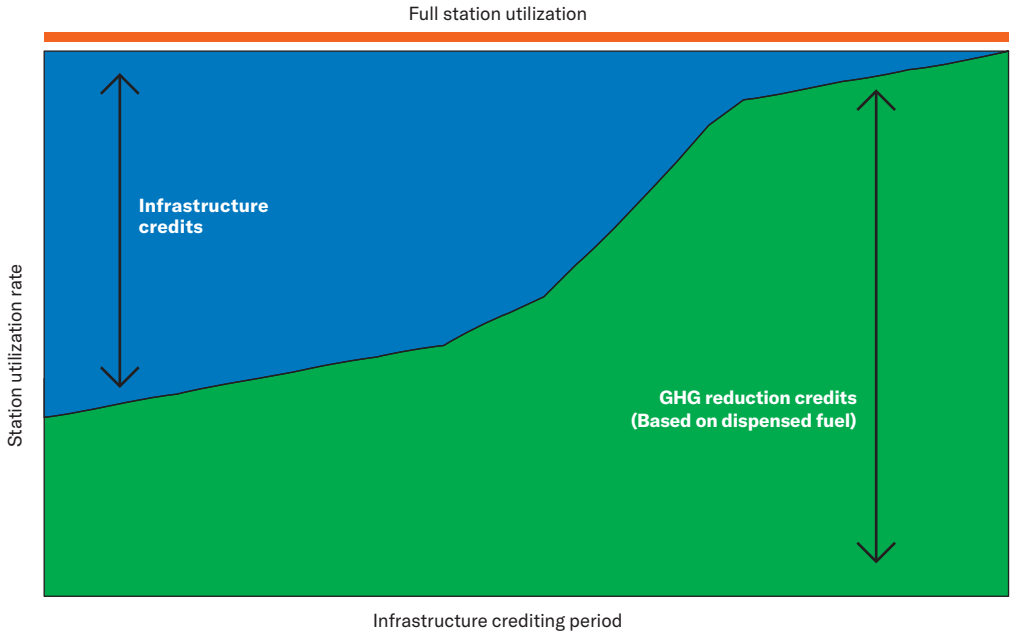
40. Given that these programmes have a more short-term approach, a longer-term approach can be seen in **California's Low Carbon Fuel Standards** (LCFS). The LCFS incentive is in addition to any value received from other incentives such as the CVRP and the Federal Tax Credits. The Low Carbon Fuel Standards are a market-based programme focused specifically on reducing the carbon intensity of fuels used in California. It was created in 2011 by the California Air Resources Board as part of several California Global Warming Solutions Act of 2006 (AB32) measures to reduce greenhouse gas emissions throughout the state by 20% by 2030 and 80% by 2050. From 2011 to 2018, the Low Carbon Fuel Standards achieved their aims of reducing carbon intensity. Within the LCFS programme, all fuel-producing entities must achieve the annual benchmark for each unit of fuel produced in that year or suffer non-compliance penalties.

41. California's standards require a reduction over time in the carbon intensity of fuels from using a unit of fuel supplied to the transportation sector. Typically, regulated parties (RPs) such as refiners, petroleum importers and wholesalers are the ones generating credits and/or deficits. Alternative fuel producers can opt into the programme as regulated parties, if they choose to do so. Each regulated party along the fuel supply chain either generates LCFS credits or deficits as they bring fuel into the state of California. Generally, alternative fuels generate credits based upon their lifecycle greenhouse gas savings compared to conventional petrol and diesel, and these credits can then be bought and sold.

42. Electricity supplied to electric vehicles is eligible for such credits, and these are generally awarded to the electricity supplier. The number of credits awarded is calculated based on the carbon intensity of

the electricity grid and the volume of electricity sold. Base credits are awarded to utilities for home charging based on their average carbon intensity. Owners of public charging infrastructure can also generate and sell credits for EV charging. It is important noting that **for the first 5 years, owners of public charging points get credits not only for the delivery of electricity but also for being available**. This provides a level of revenues for 5 years, reducing the investment risk as well. Even it is not used, a public charging point will receive a minimum fixed number of credits as the sum of availability and energy supply, until a threshold is reached, after which only credits corresponding to supply will apply.

● FIG 6 → **Relation between station utilization rate and infrastructure crediting period in California**



Source → The European House – Ambrosetti and Enel Foundation on Clean Transportation and California Air Resource Board data, 2021.

43. Starting in 2019, a portion of these credits which are generated from residential EV charging has been directed to state-wide point-of-purchase rebates for EVs through the Clean Fuel Reward programme. BEVs and PHEVs are able to generate credits and qualify for rebates under the programme. The proportion of revenue from the credits that utilities must contribute toward the Clean Fuel Reward Program depends on whether they are investor-owned or publicly-owned, and on the volume of electricity they sell annually. The remaining revenue is intended to provide funding for broader electrification projects, such as building public charging stations or electrifying public transit, fleets and school buses. On average, it has been estimated that a BEV owner's residential charging could generate around **420 Euros** of LCFS credits annually, including roughly 254 Euros worth of credits for the rebate programme, and save around 3 tonnes of CO_2 emissions each year.

Spanish efforts to support the deployment of e-mobility

The case study presented is an example of a specific policy tool put in place in Spain to promote the deployment of private charging points. One of the main challenges in Spain – as with anywhere else – for the deployment of electric mobility is the lack of appropriate charging infrastructure, both public and private. To this end, the government has launched a simplified process for the installation of private charging points without the need to reach a quorum in a condominium, which can sometimes be a problem for the installation process. The first final provision of Law 8/2013 on urban renewal drafted Article 17 of the *Ley de Propriedad Horizontal* (Horizontal Property Act) denoted as one of its key elements the installation of an electric vehicle charging point for private use in building car parks.

The main aspects included in the law (in particular in Article 17(5)) are:

- Provision for the charging point to be located in an individual parking space, only the condominium community will require prior notice.
- The cost of installation and the corresponding electricity consumption are completely charged to the owner or person directly involved.
- If the requirements set forth in the law are met, the community may not deny the installation of an electric vehicle charging station.
- In case of ownership of a garage, it is the owner's right to install a charger, as long as he/she bear the cost of installation and consumption.
- Given that the installation may affect shared premises and technical issues must be foreseen, such as the installation of new meters and wiring to the recharging point, the person who wishes to install the charging point in their individual parking space must communicate with the community. The community cannot oppose the installation, however, it is advisable to convene meetings beforehand, to discuss any interventions that may affect shared elements.

Source → The European House – Ambrosetti and Enel Foundation, prepared using Spanish government data, 2021.

3.4 Industry

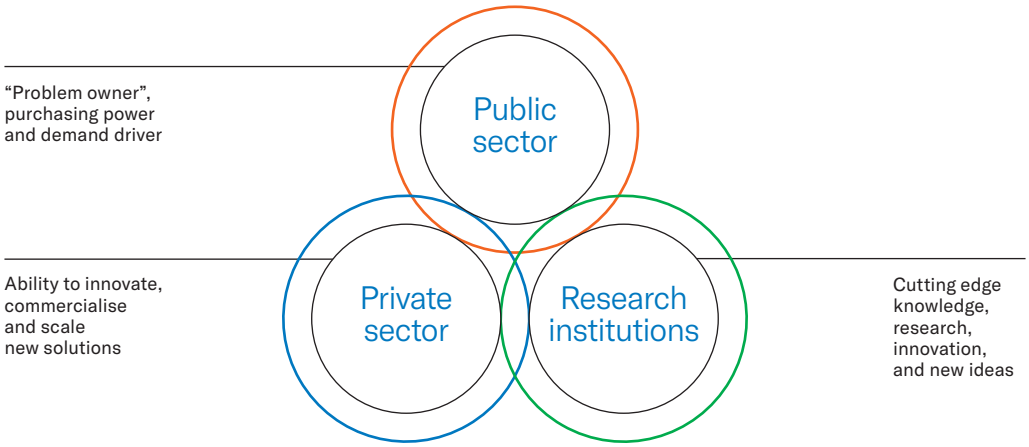
→ DENMARK

44. In Denmark, starting from 2006, the government has begun to embrace the green growth agenda, preparing for Copenhagen to host the COP15 at the end of 2009. Copenhagen became a focal point for combating climate change, and promoting green energy solutions. This attention favored the City's efforts to support a more coordinated approach to clean-tech initiatives. The foundation of the Copenhagen Cleantech Cluster (CCC) in 2009 is representative of a new era of more deliberate and ambitious green growth policy making and branding. It represents an example of a private collaboration supported by the public sector for the decarbonisation of the industrial sector.

45. The CCC was founded as a partner-driven project with **11 partners** from Copenhagen City, including universities, technical advisors, an industry association, a business council, business associations and an entrepreneur organisation. It is a **non-profit organisation** that receives its funding from multiple sources, such as the European Union Regional Development Fund and the Danish private, public and research sectors.

46. The CCC aims to include various Danish technologies in the cleantech sector on a common platform and thus facilitate the process of **co-creating** integrated solutions. The CCC's **vision** is to be the leading cleantech cluster in the world and contribute significantly to the growth of the Danish cleantech sector through **innovation and internationalisation**. As a matter of fact, the CCC works with a national and an international focus. CCC members span the **public**, **private** and **knowledge** sectors.

● **FIG 7** → **Copenhagen Cleantech Cluster organisation**



Source → The European House – Ambrosetti and Enel Foundation, prepared using CCC data, 2021.

47. Companies' close cooperation with each other and research institutes is **fruitful for innovation**. The project is recognised as one of the world's leading cleantech clusters by organisations such as the OECD and UNCTAD, having hosted many international conferences and events.

48. In the first five years after its creation, the cluster showed a positive impact on the economic development of the region by creating **over 1,000 new jobs**, supporting 126 start-ups, 64 research and company co-operations and 38 new co-operations between companies, and a formalised co-operation with 15 leading clusters in the International Cleantech Network. The CCC represents an example of collaboration between different stakeholders for the deployment of greener industrial solutions, however the results of its activities are limited to the area of Copenhagen and mainly relevant at international level in terms of the co-operation.

→ SWEDEN

49. The example presented here relates to a specific policy adopted by Sweden, the **Swedish Industriklivet**, promoted by the government to favour a **green revolution of the industrial sector**, fostering pilot projects for the decarbonisation of steel production.

50. In 2017, the Sweden Parliment adopted a new climate policy framework. Among the targets, Sweden is engaged to have zero net greenhouse gas emissions by 2045 at the latest, and achieve negative emissions thereafeter. To support the change, the government has decided on the long-term Industriklivet initiative, a series of policies related to the decarbonization of the industry. In Sweden, industry accounts for about a third of energy usage and greenhouse gas emissions, as well as a large part of

electricity and heat production. Industry accounts for a large part of export earnings and contributes to jobs and welfare in society. Industry thus plays a very important role in society's transition to a sustainable energy system and the goal of net zero greenhouse gas emissions by 2045.

51. The challenges presented in the industrial sector, however, are great. Achieving climate targets will require significant **investment in new technologies** that are often not commercialised. Within Industriklivet, grants can be awarded for feasibility studies, research, pilot and demonstration projects, as well as investments for:

- Measures that help reduce industry's greenhouse gas emissions.
- Measures contributing to permanent negative emissions.
- Strategically important initiatives in industry that contribute to address climate change in the rest of society.

52. Industriklivet comprises approximately 750 million Swedish krona (73 million Euros) in 2021 and can finance projects that will last until 2028, when the new annual budget will be decided. Through the Regulatory Letter for 2018, the Swedish Energy Agency was assigned responsibility for Industriklivet. From 2019, within Industriklivet it is possible to contribute to measures to achieve negative emissions.

53. In this context, together with its partners, the Swedish steel company SSAB aims to create a fossil-fuel free supply chain across the entire steel value chain, from mine to end product using fossil-free electricity and green hydrogen, thus minimising carbon dioxide emissions throughout the value chain. In 2016, SSAB, LKAB (Europe's largest iron ore producer) and Vattenfall (one of Europe's largest energy companies) joined forces to create **HYBRIT (Hydrogen Breakthrough Ironmaking Technology)**, an initiative to replace coking coal, traditionally needed for the production of steel, with electricity and green hydrogen.

54. The company's goal is to become the first the **world's first fossil fuel-free steel producer**, with a virtually non-existent carbon footprint. This commitment is challenging, considering that steel is one of the industries with the highest CO_2 emissions, making up 10% of Swedish carbon dioxide emissions.

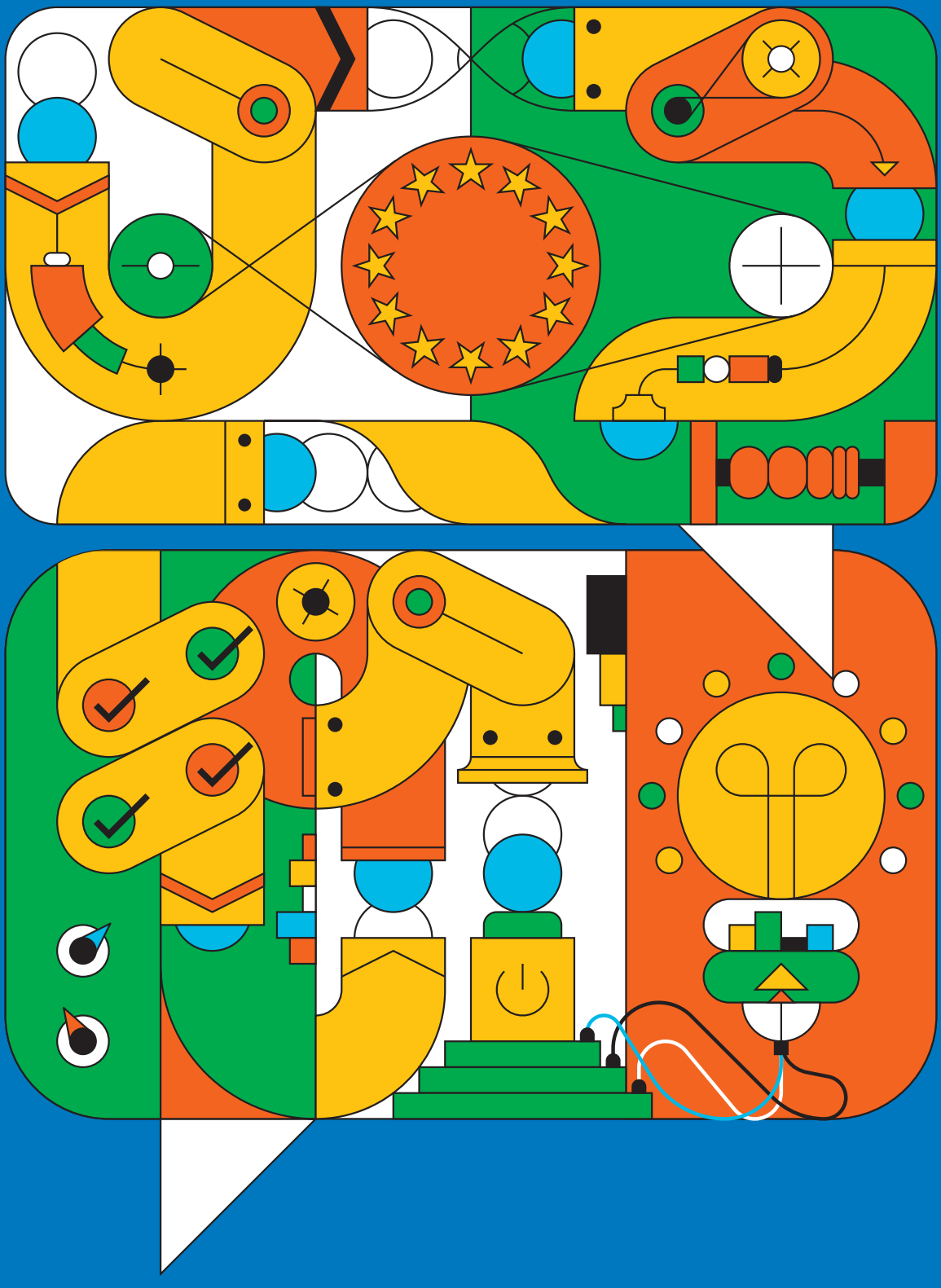
55. Sweden has unique conditions for this type of project, with good access to electricity from renewable sources, the availability of high-quality iron ore and a specialised steel industry. As a matter of fact, the Swedish iron and steel industry is already climate-efficient by international standards, but this commitment aims to reach even higher standards. SSAB has also started studying the possibilities of extending the initiative to Finland.

56. HYBRIT is conducting trials on the direct reduction of iron ore pellets using hydrogen in the pilot plant in Luleå, Sweden. The plant has a direct reduction shaft, where reduction takes place, and a number of electrolysers for the production of hydrogen using fossil-free electricity. In the HYBRIT process, water and fossil-free electricity are used

to create hydrogen. When hydrogen reacts with iron oxide, water is formed instead of carbon dioxide. The water can then be reused for electrolysis in hydrogen production. The HYBRIT pilot plant in Luleå, Sweden has completed test production of sponge iron and demonstrates that it is possible to use fossil-free hydrogen gas to reduce iron ore instead of using coal and coke to remove the oxygen. This is the first time ever that hydrogen made with fossil-free electricity has been used in the direct reduction of iron ore on a pilot scale. The technological breakthrough in the HYBRIT initiative eliminates around 90% of emissions in conjunction with steelmaking and is a decisive step on the road to fossil-free steel.

57. With this project, SSAB commits to reducing its CO_2 emissions in Sweden by **10% by 2025** by converting the blast furnaces in Oxelösund to an electric arc furnace. Between 2030-2040, the plan includes the conversion of the blast furnaces in Luleå, Sweden, and Raahe, Finland, to eliminate most of the remaining CO_2 emissions. The company also plans to convert its overseas operations to renewable energy by 2022, offering fossil fuel-free steel products from 2026 and using sponge iron developed with HYBRIT technology in Sweden.

58. At the same time, SSAB has started the process of phasing out the fossil fuels used in rolling mills and heat treatment plants throughout the company, in order to achieve the **elimination of fossil fuels by 2045**.



Part 4

Proposals for an effective governance of the energy transition

Key messages

1

→ The energy transition entails several economic, social and environmental benefits. Nevertheless, to take full advantage of the opportunities offered by the transition, some outstanding issues must be addressed. To this end, **7 proposals** have been identified to tackle the existing challenges. The proposals have been grouped into 2 different levels according to the sphere of action: European (internal and external dimensions) and Italian.

2

→ European level - Internal dimension

1. Implementing a **stronger form of cooperation** in the governance of the energy transition, officially recognizing its critical role.
2. Adopting a **regional approach** to enhance EU market integration.

3

→ European level - External dimension

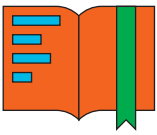
3. Encouraging internationally the **Carbon Border Adjustment Mechanism (CBAM)**.
4. Promoting more effective mechanisms to ensure that **Nationally Determined Contributions** are **consistent** with the objectives of the **Paris Agreement**.

4

→ National level (focus on Italy)

5. Simplifying the **authorization procedures** for RES plants and favouring **energy efficiency interventions**.
6. Creating a **homogeneous and standardized mechanism of interaction** between local authorities on the one hand, and Distribution System Operators and Charge Point Operators on the other, in order to facilitate the development of the charging infrastructure.
7. Promoting a full integration of **districts** and **clusters of companies** at local level, **ecosystems of innovation** and **energy communities** with the national distribution grid.

Proposals for an effective governance of the enegy transition



Please refer to **Part 2** for the details of the issues related to the governance of energy transition

1. As illustrated in the previous parts of the report, EU Member States are called upon to fill a large investment gap to achieve the 2030 energy and climate targets. However, several issues with the current governance of the energy transition (outlined in Part 2) are slowing down the process. It is therefore necessary to introduce mechanisms that can compensate for the inefficiencies in the governance of the energy transition. With this goal in mind, **7 proposals at European (internal and external dimension) and Italian level** have been identified.

EUROPEAN LEVEL - INTERNAL DIMENSION

Proposal 1

Implementing a stronger form of cooperation in the governance of the energy transition, officially recognising its critical role

Rationale →

2. As already mentioned throughout the present report, energy is a **shared competence**, so both the European Union and EU countries can legislate and adopt legally binding acts, resulting in a lack of standardisation (for example, a mixture of 1,400 different policies and measures are related to energy efficiency) hindering the effective deployment of energy transition.

3. Our current understanding and way of studying the governance process is strongly based on the **Treaties**, which define the different competencies of the Member States and of the European Union, the sphere of action of the actors, their interactions and the legislative framework at European level. However, the COVID-19 emergency has demonstrated that some topics (i.e., healthcare, which is a responsibility of single Member States) can be managed in a different way, balancing cooperation and single Member State competences.

4. In fact, the EU and its Member States have developed a **common and comprehensive approach** to manage the crisis, in particular with regard to the vaccine campaign, the coordination of testing strategies and the supply of protective and medical equipment across Europe. Member States and European leaders continue to meet regularly to exchange strategies and coordinate the EU's collective effort to limit the spread of the virus and support our healthcare systems.

EU4Health

With the aim of promoting strong coordination and increasing investments in this field, the Commission has proposed an ambitious new standalone health programme for the 2021–2027 period: the EU4Health programme, which will make a significant contribution to the post-COVID-19 recovery by making the EU population healthier, strengthening the resilience of health systems and promoting innovation in the health sector. This new programme will also fill the gaps highlighted by the COVID-19 crisis and ensure that EU health systems are resilient enough to face new and future health threats. Through the EU4Health programme, the Commission proposes to invest 9.4 billion Euros in strengthening health systems.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

5. Although the limitations of this approach have become apparent, due to the continued circulation of the virus, the coordination carried out during the emergency by the European Union, which went above and beyond its usual way of proceeding, probably helped to produce better results than individual Member States would have achieved on their own. Enhancing preparedness and cooperation between EU countries, as well as accelerating the vaccination effort and promoting European solidarity, remain key in the fight against COVID-19.

6. The current emergency has therefore demonstrated that the EU needs: **a greater level of coordination between Member States** during a health crisis, greater capacity at EU level to prepare for and to combat health crises and increased investment in health systems to make sure that the Member States are ready for the challenges of tomorrow.

7. The health crisis has stimulated the European Union to cooperate and coordinate in new and unprecedented ways, beyond the formal division of competences resulting from the Treaty. The **energy transition** is key to tackling climate change and is a matter of **great urgency**. It is therefore natural to wish that similar forms of coordination can effectively be applied to the management of the energy transition.

8. According to the **subsidiarity principle**, the EU should not act where Member States, regions or cities can deliver, but the European Union should step in where national actions are not sufficient and the European Union could do better. In areas in which the European Union does not have exclusive competence, the principle of subsidiarity, laid down in the Treaty on European Union, defines the circumstances in which it is preferable for action to be taken by the Union rather than Member States. The principle of subsidiarity is, together with the principle of proportionality, one of the fundamental principles of the European Union. Subsidiarity was introduced at the 1991 Maastricht conference as a principle of European governance[1].

9. However, one obstacle to EU action is the perception of "**Brussels overreach**", that the European institutions have too much power compared to national authorities. This, for example, makes it politically difficult for the European Commission to propose more ambitious energy efficiency regulations.

Proposal →

Learning from the experience of COVID-19, and recognising the critical role of climate action, a **new form of governance** must be adopted for the energy transition. This new form of governance must:

- Envisage closer **cooperation and coordination between MSs and EU institutions** with different actors assigned different roles.
- Formally appraise the relevance and the contribution of the **private** sector in the policy making.
- Guarantee that the enforcement of the upcoming new **State Aid** framework incentivizes investments in energy transition ensuring that the Next Generation EU funds are spent.
- Enrich the **current mechanism** of national parliamentary participation in the definition of European treaties and legislation by introducing a "**Green Card**" to national parliaments so they can proactively step up and ask the EU to take action.

10. This new form of governance must foster new relationships between Member States and the European institutions. Given the relevance of such a change (it will affect the European Union at Treaty level), the discussion should be highlighted also in the **Conference on the Future of Europe**[2] in order to lead to a new consensus on governance at European level.

11. The new model of governance must assign **different roles to different actors**, from the European Commission to all the other European institutions. The conceptualization of new roles for the European institutions is particularly relevant for the European Commission, starting with the management of the Recovery Plans. As a matter of fact, the Commission will be required to oversee how the governance of Recovery Plans at national level in all Member States is managed. The European Commission will monitor how funds are spent and will eventually have enforcement powers if the funds are not spent properly. This governance mechanism allows individual Member States to ask the European Commission to monitor another country's allocation of funds if there is a perception that promises are not being kept.

1 Article 5(3) of the Treaty on European Union (TEU) and Protocol (No 2) on the application of the principles of subsidiarity and proportionality.

2 The Conference on the Future of Europe is a unique and timely opportunity for European citizens to debate Europe's challenges and priorities. No matter where you are from or what you do, this is the place to think about what future you want for the European Union.

12. A new form of **time-efficient monitoring and enforcement** should be therefore envisaged, leveraging on the existing role of the European Commission in the monitoring phase reinforced by the experience of the Resilience and Recovery Plans in which the conditionality of funds becomes an indirect tool for enforcement having the aim to maximize the benefits and ensure the achivement of the EU common interest. Moreover, the time-efficient monitoring and enforcement should introduce a positive momentum for those who move first, by defining reward mechanisms.

A new form of EU policy enforcement

The funds of Next Generation EU represent a huge opportunity but the conditions related to their use effectively constitute a new form of indirect enforcement.

Article 24 of "Regulation (EU) 2021/241 of the European Parliament and of the Council establishing the Recovery and Resilience Facility" sets out the details on the Rules on payments and the suspension and termination of agreements regarding financial contributions and loans:

- Upon completion of the relevant agreed milestones and targets indicated in the recovery and resilience plan, the Member State concerned shall submit to the Commission a duly justified request for payment of the financial contribution and, where relevant, of the loan.
- The Commission shall assess on a preliminary basis without undue delay, and at the latest within two months of receiving the request, whether the relevant milestones and targets have been satisfactorily fulfilled.
- Where, as a result of the assessment, the Commission establishes that the milestones and targets have not been satisfactorily fulfilled, the payment of all or part of the financial contribution and, where applicable, of the loan shall be suspended.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

13. Among the stakeholders of this new form of governance, the **private sector** is emerging as an important new actor as it is becoming involved in the formal governance process, setting standards and driving legislation. As a matter of fact, regulations and laws define the behaviour required by governments - they are not voluntary - and the regulators are public authorities. However, in a broader sense, regulations are the formal rules or standards that dictate what behaviour is acceptable and required, putting limits on what is permissible. Self-regulation occurs when those being regulated, in this case the private sector, design and enforce the rules themselves. The rules that govern their behaviour are adopted voluntarily, either going beyond current regulatory requirements or establishing new standards in areas in which government rules or standards are lacking. Although they are adopted voluntarily, the rules may be backed up with a variety of formal and informal enforcement mechanisms including written agreements among companies or between companies and other groups.

14. For instance, companies have increasingly adopted sustainability standards as instruments to improve social and environmental practices in their supply chains and to communicate these sustainable sourcing practices to their customers. In this context, voluntary

sustainability standards (VSS) specify requirements that producers, traders, manufacturers, retailers or service providers may be asked to meet, relating to a wide range of sustainability metrics, including respect for basic human rights, worker health and safety, the environmental impacts of production, community relations, land use planning and others. These standards can be set by NGOs, governments, and companies or through multistakeholder initiatives. Because of the increasing complexity of global supply chains, traditional forms of state-centric environmental governance that are implemented at national scale by public authorities have lost some of their ability to promote sustainability standards at global level.

15. Moreover, with EU public debt running at an all-time high of close to 90% of GDP, it will increasingly fall to the private sector to make the critical investments in smart new energy infrastructure that will bring energy access and resilience to people. That is why some of the largest energy companies are working collaboratively with academia, regulators and governing boards to establish new regulations and standards and speed up the energy transition in the EU. In fact, the private sector is becoming a relevant actor in the governance process at different levels also in the energy field, so it is important to formalise its role within the European legislative framework. The private sector is becoming the protagonist in standard setting and is leading the jurisprudence to respond to its needs.

16. Another aspect to highlight is that it is necessary to guarantee that the enforcement of the upcoming new **State Aid** framework incentivizes investments in energy transition ensuring that the Next Generation EU funds are spent.

17. Finally, the subsidiarity control mechanism, which defines the rules for the relationships between national Parliaments and the European institutions, currently applies in areas where the EU shares competences with Member States. In cases where national Parliaments consider that European **draft legislative acts do not comply with subsidiarity**, they can send a reasoned opinion to the Commission within eight weeks.

18. The effect of the reasoned opinions on the legislative procedure depends on how many national parliaments react and how many votes they represent. Each of the 27 national parliaments is allocated two votes. If there are two chambers, each has one vote. When reasoned opinions represent at least one third of all the votes allocated to the national parliaments, the Commission must review its proposal. This threshold is lower for draft legislative acts related to justice, freedom and security – one quarter. In both cases, the Commission can decide whether to maintain, change or withdraw its proposal. The Commission must give reasons for its decision. This is known as the **"yellow card" procedure**.

19. When reasoned opinions represent a majority of the votes and the draft act falls under the ordinary legislative procedure, the Commission must review its proposal and decide whether to maintain, change or withdraw it. If the Commission decides to maintain its proposal, it must justify its decision to the European Parliament and Council, stating why the proposal complies with the principle of subsidiarity. This is known as the **"orange card" procedure**. If a simple majority of members of the European Parliament, or 55% of Council members, find that the proposal breaches the principle of subsidiarity, the proposal will not be given further consideration.

20. Giving Member States a more proactive role would require enriching the current mechanism of participation of individual Member States. This could be done by allowing Member States to take part in the definition of European Treaties and legislation with the introduction of a "**Green Card**" for national parliaments so they can proactively step up to ask the EU to take action with regard to Treaties and legislation. In particular, with the Green Card, the national parliaments do not respond with reasoned opinions to a draft published by the European Commission, as is the case with the "yellow" and "orange" cards, but can proactively propose new measures to be adopted. The mechanism should link the proactiveness of Member States with the achievement of greater benefits for the European Union as a whole. For instance, witnessing the impact of air pollution on their constituents and public health spending, national members of parliament may act together to ask the European Commission to propose better air pollution standards. The proposed updated mechanism will require changes to governance at European level, not only with regard to the energy dimension.

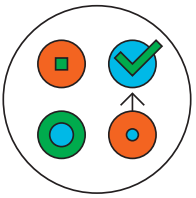
Proposal 2

Adopting a regional approach to enhance EU market integration

Rationale →

21. As already pointed out, energy is among the competences that Member States and EU institution share, and this entails that both the European Union and EU countries can legislate and adopt legally binding acts. However, this results in a **lack of standardisation** in the legal framework related to specific sectors (e.g., e-mobility and energy efficiency), in the measuring mechanism for the achievement of the targets (e.g., energy efficiency in buildings), in standards (e.g., for e-mobility one of the main problems is the lack of interoperability and the lack of defined standards for payments). Additionally, it leaves "gaps" in regulation and guidelines, as in the case of investments in distribution and transmission grids. Overall, the lack of homogeneity and of an equally shared approach can undermine the achievement of a successful energy transition.

Proposal →



Creating **regional hubs** among neighboring Member States (still in compliance with the Single Market and in accordance with the concept of regional cooperation included in the Regulation on the Governance of the Energy Union) by:

- Creating **common standards**, assuring coordination to ease successive scale up to European level.
- Favouring a greater **role of cities** and direct reporting to the Commission.
- **Institutionalising forms of cooperation** between neighbouring countries or regional hubs.

22. Cooperation on key areas (energy, ICT, transport and logistics), structured in small and flexible groups of neighbouring European countries and regions – in compliance with the Single Market and in accordance with the concept of **regional cooperation** included in the Regulation on the Governance of the Energy Union – can:

- Accelerate decision-making processes, streamlining procedures compared to those of the entire European Union, and make Europe better equipped to address the specific energy transition challenges in the macro-region concerned.
- Serve as an intermediate step in the gradual process of achieving full EU Single Market deployment, with regard to key priorities for the Energy Union (connectivity, efficiency and sustainability).
- Leverage on some initiatives already launched across the EU with the aim of better integrating markets with similar energy mixes and finding common solutions (e.g., cross-border exchanges, secure supplies and integration of renewables).

23. Such collaboration could create a common ground for the adoption of **common standards** by a group of States and private companies, overcoming the different energy efficiency measuring mechanisms and creating a positive dynamic. Moreover, such a mechanism can act as a driver for scaling up **standards** at European level, such as in the case of e-mobility and energy efficiency. It is important to stress that the creation of regional clusters must be a functional step towards European harmonisation of standards and rules. This requires constant coordination between regions.

24. Member States and regional hubs should consider new specific **market designs** for the massive deployment of renewable energy sources, at a centralised and decentralised level. For example, regional hubs could be envisaged with market designs based on decentralised RES obligations (e.g. final customers or suppliers), aggregation of distributed resources, development of PPAs for industrial customers, long-term standard products, auctions and socialisation of guarantees. In addition, regional approaches could be envisaged for the deployment of new market products for the integration of renewables in the electricity system. For example, Member States could assign, through auctions, long-term products for the construction and operation of electrical storages used for allowing the optimisation of production and consumption of different RES power plants (i.e. time-shifting), also at cross-border level.

25. In this enhanced regional approach, another important aspect is the recognition of the **role of cities**. Cities are protagonists at the local level of the energy transition and can play an important role in the dialogue with citizens and their engagement in the energy transition. The role of cities should be recognised and formalised by making them accountable for their achievements at local level. This can be done by favouring the direct formal reporting of what is achieved by the cities to the Commission to strengthen their engagement in the transition.

26. It is important to emphasise that this proposal about the regional approach is intended as a **"building block" for broader European integration**, aligned to high standards of ambition.

An example of European regional approach

The Pentalateral Energy Forum was created in 2005 by Energy Ministers from the Netherlands, Belgium, Luxembourg, Austria, Germany and France, with Switzerland as a permanent observer, to promote collaboration on the cross border exchange of electricity.

As current chair of this 15-year-old regional energy cooperation, Belgian Energy Minister Tinne Van der Straeten aims to achieve concrete results with her colleagues from Central Western Europe on a couple of specific issues.

Against the background of the increasing share of renewable energy, the countries belonging to the Pentalateral Energy Forum will work on:

- Future proof infrastructure.
- Measures to prevent electricity crises.
- Coordination of their energy policy visions towards a carbon neutral 2050 electricity system.

The energy transition requires policy makers to make decisions that require a scale or cross border infrastructure that goes beyond national borders. By working on this joint vision, the Pentalateral Energy Forum aims to reduce the risk of stranded investments.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

EUROPEAN LEVEL - EXTERNAL DIMENSION

Proposal 3

Encouraging internationally the Carbon Border Adjustment Mechanism (CBAM)

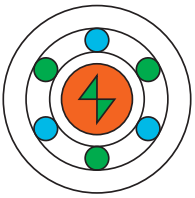
Rationale →

27. In the EU, the carbon price for energy-intensive industry sectors is determined by the market through the EU Emission Trading Scheme (EU ETS). The EU ETS works on the 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by installations covered by the system. Within the cap, companies receive or buy emission allowances which they can trade with one another as needed. This mechanism entails the **risk of carbon leakage**, defined as firms moving their activities to countries with less stringent climate rules to control costs. Carbon leakage distorts the trading system and is counterproductive to the process of reducing emissions. To overcome the carbon leakage risk, the European Union

started giving some free ETS allowances to industries at risk of carbon leakage. This is still happening as in 2020, **50%** of allowances were given for free, relieving the most carbon intensive sectors from the need to curb their emissions. However, this mechanism is not sustainable in the medium-long run and is not compliant with the 2030 energy and climate targets.

28. The competitiveness-GHG curbing trade off looks like a sort of strategic catch-22 for Europe. It cannot eliminate free allowances not to risk the relocation of entire production sectors, but on the other hand it cannot fully tackle industrial emissions through the ETS system. This underlines on one hand the need to quickly transform the industrial sector according to the energy and climate targets, and on the other, the global and strategic dimension of the energy transition, which must go well beyond national and European boundaries. Partnering and negotiation with non-EU countries also on **global trade and competitiveness** is paramount to effectively carrying out a successful energy transition.

Proposal →



Encouraging internationally the **Carbon Border Adjustment Mechanism** (CBAM).

- **Strengthen the current EU ETS competitiveness safeguards** in coordination with the Carbon Border Adjustment mechanism recently proposed by the European Commission, and initially ensure for the funding of innovative projects and new sustainable industrial solutions.
- Support **global agreements in the industrial sectors**, also to accelerate technology innovation.
- **Redistribute revenues** generated by decarbonisation policies.
- Introduce a **European financing programme** to support the **decarbonisation of the ETS industry** through the **deployment of zero carbon technology** to accompany it on the path to net-zero emissions.

29. The balance between reducing emissions from the industrial sector and the competitiveness of European companies is a **central issue** in the debate on the energy transition and decarbonisation. Free allowances lead European companies to under-commit to decarbonisation and therefore, while recognising their inefficiency and suggesting that they should be eliminated in the medium to long term, it is necessary to include mechanisms that balance the competitiveness of European production in the international context.

30. It is therefore recommended to encourage the **Carbon Border Adjustment Mechanism** internationally and support **cross-sector collaboration at global level** to achieve the goal of decarbonisation through dialogue with the WTO and Europe's trading partners. In particular, the CBAM should consider the WTO agreements and give developing countries preferential access to the European market while not making excessive distortions to trade. Furthermore, the Carbon Border Adjustment Mechanism cannot be a purely coercive mech-

anism but must be part of a broader negotiation scheme in order to avoid trade wars.

31. The introduction of the Carbon Border Adjustment Mechanism should therefore take into account several aspects:

- **Strengthening the current EU ETS competitiveness safeguards** in coordination with the Carbon Border Adjustment mechanism recently proposed by the European Commission, and initially providing for the **remuneration of innovative projects** and new sustainable industrial districts, to foster green investment by European companies.
- If imports from **developing countries** are not to be undermined, it is also true that those countries would not be discouraged from decarbonising their economies. The carbon price on their products should be linked to the level of development. It is in the EU's interest to ensure that a CBAM does not unfairly penalise developing country exporters, fully or partially exempt those countries' exports from its CBAM. Accommodating developing countries could also ensure that the CBAM does not come into conflict with the EU's development objectives. From a legal perspective, there is a precedent for discriminating in favour of developing countries. The EU already uses the flexibility afforded by the WTO General Agreement on Tariffs and Trade's (GATT) so-called enabling clause to unilaterally grant developing countries preferential access to its market under its Generalized Scheme of Preference. As developing countries' economies grow, or their exporters become more internationally competitive, they will graduate out of the exemptions. Their exports will then be subject to the carbon price mechanism unless they have an equivalent domestic carbon price or the goods are produced with greater carbon efficiency than EU equivalents.
- European Institutions should play a **leading role** in fostering global agreements in the industrial sectors and the introduction of a global carbon price mechanism for international trade, to avoid the "imposition approach" from Brussels Institutions towards non-EU countries.
- Revenues generated by decarbonisation policies (such as carbon pricing) should be redistributed to **reduce inequality**, for example, through:
  - Economic support to keep **costs of cleaner energy carriers to end users reasonably low** also through a redistribution of the tax burden.
  - **Lump-sum transfers** on per-head basis or lowering VAT/taxes on electricity to the general public.
- A **European financing programme** should be introduced to support the **decarbonisation of the ETS industry** through the **deployment of zero carbon technology** to accompany it on the path to net-zero emissions.

The "Fit for 55" Package of the European Commission announced the introduction of the Carbon Border Adjustment Mechanism

The legislative proposals of the "Fit for 55" package are backed by impact assessment showing that an over-reliance on regulatory policies would lead to unnecessarily high economic burdens and carbon pricing alone would not overcome persistent market failures and non-market barriers. The chosen policy mix is therefore a careful balance between pricing, targets, standards and support measures.

The European Commission announced the need to preserve climate ambition by avoiding that efforts by the European industry to cut emissions are undermined by unfair competition from abroad. To this end, the Commission proposes a mechanism to ensure that companies exporting into the EU have to pay a carbon price. The Carbon Border Adjustment Mechanism (CBAM) puts a price on imports of a limited number of high-polluting goods based on their carbon content. The role of the CBAM is to address the risk of carbon leakage and reinforce the EU ETS.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

Proposal 4

Promoting more effective mechanisms to ensure that Nationally Determined Contributions (NDCs) are consistent with the objectives of the Paris agreement

Rationale →

32. Climate change represents the key global challenge of our time, going beyond national borders and closely affecting all our lives. Indeed, notwithstanding the slight improvement over the past 10 years, the world is not doing enough to keep the temperature increase below 1.5°C compared to pre-industrial levels[3]. Global emissions must fall by 45% in 2030 vs 2010 to keep global warming below 1.5°C, and by 25% over the same timeframe to keep below 2°C. However, current pledges are off track in terms of avoiding the long-term target overshoot temperature: 2030 GHG emissions are predicted in a range between 59/53 $GtCO_2e$, while limiting global temperature increase will require global GHG emissions in a range between 41 $GtCO_2e$ (for the 2°C UNEP Scenario) and 25 $GtCO_2e$ (1.5°C UNEP scenario).

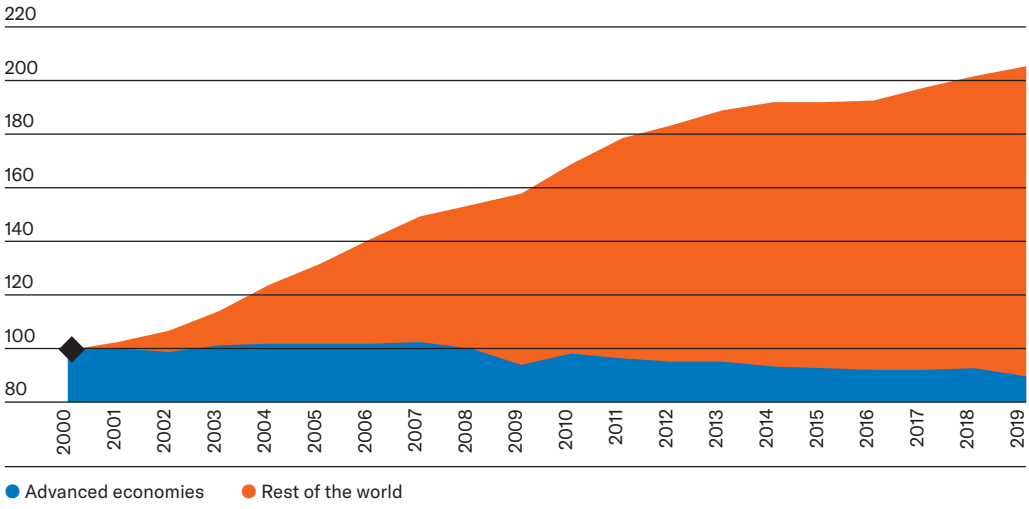
33. To accomplish this goal, UN Parties aim to reach global peak GHG emissions as soon as possible, and to achieve net zero emissions in the second half of this century. All Parties have to make ambitious efforts to reduce GHG emissions, following the principle of "common but differentiated responsibilities and respective capabilities", i.e. in line with their individual situations and the possibilities available to them[4]. Every five years all countries have to renew and upgrade their climate action plans ("Nationally Determined Contributions") and communicate them in a transparent way so that collective progress can be officially assessed through the "global stocktake" process, the first of which

3 As per the limit stated in the first universal agreement at the 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris.

4 It is worth mentioning the role of the ESR (Effort Sharing Regulation) in the EU as an example of a "burden sharing" instrument between countries with different degrees of economic development, demographic and social composition.

will take place from 2021 to 2023 and then every five years thereafter. The **Global Stocktake process** is designed to provide its results two years before new NDCs are due, allowing countries to take into account the outputs of the global assessment before formulating and submitting their NDCs. In particular, the most vulnerable, the Least Developed Countries (LDCs) and Small Island Developing States (SIDSs) should be supported both financially and via capacity-building. In fact, although on one hand it is paramount that the biggest GHG emitters (China with 29% of global GHG emissions, USA with 16%, India with 6% and Russia with 4.5%) change course quickly to ensure that the entire world can control the excessive rise in temperature, on the other hand it is important that Least Developed Countries (LDCs) and Small Island Developing States (SIDSs) are put in condition to develop a sustainable energy system, thus participating to the global effort. The Transparency framework is essential to build mutual trust between developing and developed countries: technology transfer, capacity-building and financial support provided/needed/received shall be declared in the NDCs by developing and developed countries respectively.

FIG 1 → **Change in global CO_2 emissions from 2000 to 2019**
(index year 2000=100)

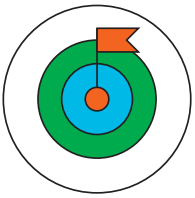


Source → The European House – Ambrosetti and Enel Foundation on IEA data, 2021.

34. The NDC Synthesis Report published by the UN Climate Change on 26th February 2021 shows that **governments are nowhere** near the level of ambition needed to limit climate change to 1.5 degrees and meet the goals of the Paris Agreement. As of today:

- 90 countries – EU and USA included - have submitted their 2020 NDCs. These countries represent 42% of global GHG emissions.
- **101 countries**, including China and India, **have not submitted their 2020 NDCs yet**. They represent **51%** of global GHG emissions.
- 68 of these 101 countries (including China) have announced their intention to raise the ambition of their NDCs. They represent 34% of global emissions.

Proposal →



Promoting more effective mechanisms to ensure that **Nationally Determined Contributions are consistent** with the objectives of the Paris Agreement

35. In order to make all countries more committed to presenting their NDCs and planning actions in the direction of achieving the Paris Agreement target, it is advisable to introduce more effective mechanisms, including:

- Support for developing countries in drafting their own national plans, not only through funding but also through mechanisms for **mentoring and knowledge sharing** by countries that are more advanced in terms of the energy transition.
- Introduction of mechanisms to highlight the **economic, industrial and social benefits** - in addition to climate benefits - associated with higher levels of ambition and more effective decarbonization and transition policies.
- The closer involvement of **stakeholders** at all levels, both public and private, in the development of NDCs to improve their understanding and consensus around the final content.

36. Within this context and the EU international strategy, it is of primary importance to strengthen relations between the European Union and non-EU countries. Firstly, European Union should continue to support the development of a decarbonized energy system in the African continent, through **financing and education/skill creation** programs. The European Union should also support the creation of adequate tools (focused on technological collaboration and transfer) for energy transition in developing countries, starting from **interconnections** with and within the African continent. It is also worth stressing the strategic importance of enhancing relations between Europe and the United States and between Europe and Africa in the energy field in order to **strengthen the competences** of countries with respect to energy technologies, fostering cooperation and technology transfer as well as sharing the **leadership and guidance of the global energy transition**.

The "Fit for 55" Package of the European Commission reinforced the need of EU external policy instruments

To enhance cooperation with European international partners and facilitate the global transition to a net zero economy, the full range of the EU's external policy instruments will be harnessed to align with these higher goals.

Within its external policy instruments in bilateral and multilateral relations, the EU will ensure consultation, explanation, assistance to its partners, while keeping the main objectives as laid down in the Paris Agreement in focus.

European Union will support climate finance to help vulnerable countries adapt to climate change and invest in reducing greenhouse gas emissions.

The EU and its Member States have been the world's largest contributor of public climate finance to low- and middle-income countries, and the European Commission confirms this commitment with particular attention to the needs of the least developed countries.

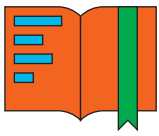
Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

NATIONAL LEVEL (FOCUS ON ITALY)

Proposal 5

Simplifying authorization procedures of RES plants and favouring energy efficiency interventions

Rationale →



Please refer to **Part 1** of the study for the detailed analysis of Italy's performance with respect to the RES target

Please refer to **Part 2** for further details on the Italian inefficiencies of the authorization procedures for RES plants

37. The **inefficiency of permitting procedures** for RES plants, especially for utility-scale ones, limits the full deployment of investments in renewables and consequently the installation of the capacity necessary to reach decarbonisation targets in Italy. On average permitting procedures for RES plants requires between 1 and 1.5 year for photovoltaic and 5 years for wind and these required times are not aligned for the achievement of decarbonisation targets. Indeed, as seen in Part 1 of this study, at the current rate of renewable energy capacity installation the objective established by the PNIEC is extremely difficult to achieve, and even more so considering that it will have to be updated following the review of the targets at European level.

38. As a matter of fact, permitting procedures for RES plants present several inefficiencies described in detail in Part 2 of the report. First, the procedures present **territorial differences**, since Regions have the right to broaden the scope of the simplified procedures to higher dimensional thresholds and laws are applied in a non-uniform way at local level, an issue that causes uncertainty around the procedure and gives rise to potential discretionary behaviour by competent authorities. Moreover, the process is further complicated by the high number of entities involved with different competences.

39. One of the main entities involved in the authorisation process of utility-scale plants is the Ministry of Cultural Heritage, which can exercise a **veto** in the interests of landscape preservation. This power is not balanced by an equivalent power representing other public interests in play. In particular, the development of renewable energy is

clearly a national interest because of its environmental and strategic nature. Nevertheless, this interest is not legally defined (as opposed to the interest of preserving the landscape and cultural heritage) and subsequently there is no authority representing it.

40. Moreover, it is important to point out that:

- The new titled Ministry, MiTE (Ministry for the Ecological Transition) lacks a clear statement, in the description of its competences, on the development of renewable energy. MiTE is also the competent authority for issuing Environmental Permits for large size renewable plants (more than 10MW for PV and more than 30MW for wind), even though the regions remain competent for the final permit required to build and operate the plant (i.e. Autorizzazione Unica).
- Neither the regions nor MiTE (the other 2 main competent bodies involved with the Ministry of Culture) are assigned with national goals or interests for the development of renewable energy.
- Although the Ministry of Economic Development is the competent Ministry for defining renewable energy plans (i.e. PNIEC), it is not involved at all in the authorisation process of PV and onshore wind renewable plants (only for offshore wind).

41. The above-mentioned inefficiencies in the procedures result in **long and uncertain authorisation times**, creating an issue of non-compliance with the legal deadlines, even when they are defined as "peremptory". In Italy, the Single Authorisation process for utility-scale plants should, by law, have a maximum duration of 90 days, to be summed with the duration of the Environmental Integrated Authorisation (EIA) procedure when required. However, the authorisation of a new photovoltaic system, when successful, takes between a year and a year and a half, while the authorisation of a new wind utility-scale projects takes, on average, about 5 years, with peaks of up to 9 years.

42. The inefficiency of permitting procedures also causes a progressive decline in the participation to bids' schemes of renewables, simply because the projects pipeline is not enough to fill in the available space, causing an enormous mismatch between the capacity assigned and the available one. Indeed, following the joint Ministerial Decree of the Ministry of Economic Development and Ministry of the Environment (4th July 2019), the first round of assignment allocated the entire available capacity, but successive calls for tenders have recorded a progressive decline in participation and an increase in the unassigned capacity. In the 5th call for bids, out of 1.58GW of offered capacity, only 74MW was allocated.

43. It is worth mentioning that the art. 18 of the 2021 "Decreto Semplificazioni" establishes that the works, plants and infrastructures necessary for the realisation of the strategic projects for the energy transition in Italy included in the PNRR constitute interventions of public utility, undifferentiated and urgent. However, it is potentially only a step in the right direction, but not yet sufficient. Further fundamental steps towards RES plants installation (thanks also to simplified authorisation

procedures) might be found in the legislative decrees to be issued to transpose the RED II and Internal Energy Market directives.

44. The installation of RES plants also suffers from public opposition, which often delays or obstructs the implementation of renewable energy projects, due to low **social acceptance**. In 2018 there were 317 active disputes in the planning or construction phase subject to political, environmental or popular challenges in Italy (with respect to 190 in 2014) and the energy sector was the most contested one, accounting for almost 60% of all disputes. Of this 60%, 73% of disputes concerned renewable energy projects. As for the opponents, 35% are citizens, 26% public bodies, 25% politicians, 10% environmental associations and 4% trade associations and trade unions. Indeed, there is a high risk of appeal against the authorisations issued because (in the 120 days[5] time window allowed) anyone - even entities that participated in the successful authorisation procedure - can unconditionally file an appeal. This level of social – and sometimes institutional - resistance is often caused by the **lack of awareness of local communities** regarding the benefits and impacts of renewables and of the energy transition on the territory, due to:

- The lack of a structured stakeholder involvement mechanism, like the French Débat Public.
- The lack of awareness and perception of the benefits and economic/social impacts of renewables and, consequently, the absence of proper communication activities for local communities.
- The lack of a benefits sharing mechanism.
- Inadequate committment to decarbonization targets achievement of local administrative bodies.

45. Examples exist of how the correct and effective education of local communities and territories, together with the involvement and active participation of citizens in the design process of the works, is essential and effective for overcoming the NIMBY syndrome. A successful example is represented by the French Débat Public, a debate concerning the objectives and main features of projects, to which all **large infrastructure projects** of national interest to the State or local communities must be subjected before an environmental impact assessment or public inquiry, with the goal of providing correct information and giving all those who feel involved and impacted the opportunity to express their opinion. For instance, the project for the Grand Lille high-speed railway was approved less than two years after the start of the formal procedures thanks to the dialogue with local communities through the Débat Public. However, it should be noted that the Débat Public must be consulted only for the largest projects, while it can voluntarily be consulted for projects of lesser impact. In particular, the Débat Public should be involved only for projects regarding motorways, railway lines, inland waterways, airports, port infrastructures, power lines, gas pipelines, nuclear installations, hydroelectric dams,

5 Starting from the date of publication of the authorisation.

water transport river basins, cultural and sporting infrastructures, industrial infrastructures. In general, the obligation exists only for projects above 300 million Euros.

46. Citizens and local communities should be not only informed about the benefits of private companies' investment but also the possible intervention they can realize for the energy transition and the revenues they can directly obtain. In Italy there are a number of different incentives related to the various dimensions of the energy transition and therefore for citizens and firms it is **difficult to have a clear picture** and understand all the possible incentives from which they can benefit.

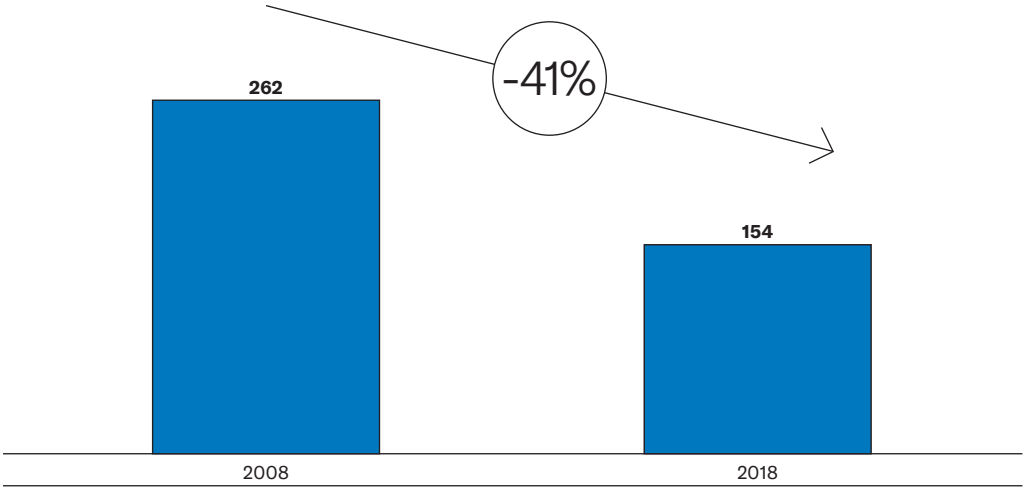
47. For instance, as regards energy efficiency in buildings, users and final consumers are not properly informed of the existence of energy efficiency opportunities and incentives related to them. Additionally, there is no adequate information on how much these opportunities and incentives are worth quantitatively. In this regard, it is also important to emphasise the role that ESCOs and integrated one-stop-shop services should play in effectively implementing new technologies in the (bureaucratically) correct way and offering professional consultancy services.

48. The deployment of investments in the installation of RES plants and assisting citizens with energy efficiency measures require also **competent personnel** in the involved Ministries and public bodies. The energy transition is a cross-sector process and requires expertise in energy, digital and sustainability issues as well as project management. Skill mismatch is a common issue in all European countries. In Italy, around 6% of workers are under-skilled while 20% are under-qualified for the job they do. In addition, the new generations are under-qualified compared to their European peers. In fact, Italy is at the bottom of the EU ranking with 29% of graduates in the 25-34 age group in 2020 compared to the European average (41%) and far from the 45% target set by Brussels for 2030.

49. Moreover, the Ministries and Authorities involved in issues related to the energy transition **lack specific training programmes on energy transition issues for personnel**. Indeed, the topics related to the energy transition (namely the deployment of renewables, the development and adaptation of national electricity grids and energy efficiency in buildings, transport and industry) require specific technical skills often lacking in the Ministries and Authorities that have to deal with these issues. In ten years, spending on the training of public personnel in the public sector has almost halved, falling by 41%. Today, Italy spends just €48 a year on training for each employee in public administration, with an average of just 1.02 training days per person per year. Moreover, the average age of the staff is 50.7 years, with 16.9% of employees over 60 and just 2.9% under 30.

It has been demonstrated that shorter public work timeframes are observed in administrations whose staff are characterised by higher levels of human capital, measured by the share of staff with a university degree[6]. Such findings corroborate the need for actions aimed at ensuring adequate levels of competence in the competent authorities.

● FIG 2 → **Investments in training in the public sector in Italy, 2008-2018**
(million Euros)



Source → The European House – Ambrosetti and Enel Foundation elaboration on FORUM PA data, 2021.

Proposal →

Simplifying the **authorisation procedures for RES plants** and creating a supportive context for energy transition by:

- Recognizing the status of national **public interest** to the "**development of renewables**" and **rethinking veto powers**.
- Making the authorisation procedures for RES **more efficient**.
- Increasing the **commitment of local bodies** and making the involvement of social stakeholders in the authorisation process effective.
- Creating a **single repository and interface** for Italian stakeholders to access detailed mapping of all existing incentives as well as of project permitting status and the achievement of decarbonisation targets.
- Increasing the **human capital** and guaranteeing the **upskilling and reskilling** of personnel working on the energy transition, starting with Ministries and public bodies.

6 Source: "Tempi di realizzazione delle opere pubbliche e loro determinanti", Banca d'Italia, 2019.

50. About the permitting procedures of RES plants, the **veto power of the Ministry of Cultural Heritage** must be reconsidered, defining mandatory boundaries that cannot be exceeded (e.g., only in case of areas with constraints related to Cultural Heritage). More generally, the competences of each Ministry shall be better defined by attributing and distributing power in a more efficient manner. Also, all national interests must be legally defined and represented by an appropriate institution to ensure the appropriate balance of different, and sometimes opposing, interests. Moreover, non-permissible/non-usable areas for renewable projects should be defined through **objective criteria, set and shared ex ante** at national level by all authorities involved, in accordance with decarbonisation targets and the safeguarding of projects under authorisation.

51. In particular, the **public interest in the "development of renewables" should be defined**, thereby recognising the pivotal role that renewables play in the energy transition and in combating climate change, something that is in everyone's interest. Since the permitting procedures involve different Italian institutions, it is necessary to evaluate for every single procedure which body is entitled to exercise the "public interest" in RES development. In this way, the interest promoted by the Ministry of Cultural Heritage (namely the interest in landscape preservation) would be properly balanced with the interest in renewables development, equally promoted by another institution. As a matter of fact, this would make it possible to correctly balance the two interests by evaluating the relative merits case by case.

52. Moreover, the introduction of a **"burden sharing" mechanism** is recommended with a minimum target to be achieved by each **Italian region**. This mechanism should also aim to commit Regions to achieving Italian decarbonisation targets via mandatory regional authorised renewable capacity targets (e.g. something similar to burden sharing, but with a binding nature). Such a mechanism could be useful for involving regional entities in the energy transition.

53. In order to remove territorial differences, **procedures** should be **standardised** and **digitalised** at **national** and **local level** and the application of laws at territorial level should be made uniform. Indeed, the dimensional thresholds according to which the simplified procedure or the Single Authorisation apply should be the same across the national territory, and the Regions right to discretionally broaden the scope of the simplified procedure should be eliminated. In this way, a plant of the same dimension would encounter the same treatment throughout the national territory, thus making the overall process easier to understand and removing discrepancies in treatment. Furthermore, it is necessary to harmonise the different applications of laws on a local basis (referring to a single law) and possible discretionary components in the assessment of renewable projects within the authorisation procedures. The requirements on documentation needed for authorization procedures and the interface for documentation exchange should also be standardized and digitalized.

54. The procedures and the governance scheme of the various entities involved should be simplified so to make the **authorisation process** of RES plants shorter and more efficient, while setting the conditions to **respect legally binding deadlines** and accelerating permit issuance times (e.g., through adequately staffed technical structures, rationalization of steps and reduction of obligations). Indeed, the number of entities involved must be reduced by centralising competences among a reduced number of actors. In this way, the different internal steps (pertaining to different entities) that constitute the overall procedure could be reduced with the final aim of streamlining the process. Moreover, the maximum duration of the Single Authorization and the Environmental Integrated Authorisation (EIA) should be defined as legally binding by introducing instruments aimed at clarifying the deadlines laid down by law to protect the applicant with the full involvement of the officials responsible for authorisation procedures. Such a measure, coercive in nature, must be balanced by an appropriate form of participation by relevant stakeholders in the authorisation process and by a method for rewarding virtuous territories and for benefit measurement, communication and sharing.

55. It is worth noting that at EU level the draft version of RED III seems to go in the direction of simplifying procedures. Indeed, with reference to permitting procedures, the EC foresees the development of proposals aimed at facilitating and standardising these procedures starting from 2024. RED II provides for a maximum of two years to obtain authorisation for the installation of renewable plants, and drastic reductions in Italy's timeframe are therefore desirable in light of the new EU targets that will be revised upwards.

56. Finally, it is suggested to establish a **national observatory**, which allows to monitor the state of the art on some key parameters (such as installed capacity and advancement status of authorization processes) with municipal granularity, and which allows investors to have a single digital portal for the requirements needed to have access to incentives.

57. To overcome public opposition arising even when plants have already been authorised, a framework for **increased commitment of local bodies** and for the **constructive and formal involvement** of the social stakeholders must be better defined. Indeed, in Italy public involvement is already envisaged at the start of the procedure with the opening of the phase of observations from the public and in the Conferenza dei Servizi, but appeals are allowed under no particular condition after the publication of the authorisation licence. The possibility of participating in the debate should be made clearer and more highly publicised and the debate should be defined as the only venue in which to possibly oppose the construction of infrastructures. Indeed, the **possibility of appeals** should be made conditional on participation in the debate and and on the **ability to prove** that something was not done regularly during the consultation procedure. Moreover, a **defined timeframe** should be established for appeals within the du-

ration of the authorisation process so that once the process is closed appeals are no longer allowed. This would prevent appeals from being made once the plant has already been authorised and would shorten the overall process, eliminating possible delays after the publication of the authorisation.

58. Moreover, to overcome social resistance and the NIMBY syndrome, local communities should be made more aware of the positive externalities that RES plants have both on the environment and on the creation of investments and job opportunities in the territory. To do this, a framework should be put in place to ensure **effective communications to local communities** involved in the construction of RES plants. In this direction, the effort made by the Italian Ministry of Sustainable Infrastructure and Mobility, which has recently introduced the National Commission for Public Debate (see the following box), should be applauded.

59. To create a more favourable environment for RES investments in the territories a **reward mechanism for virtuous territories** could be introduced. According to this mechanism, territories that are more favourable to the installation of RES plants would receive a reward from the central government in the form of economic resources to be spent on the territory for the benefit of local communities, which should be more motivated to take a cooperative approach. The mechanism should provide for benefit sharing directly for the municipalities where the plants are located, calculated using a single, non-negotiable national method, for example establishing a percentage of the profits generated by operators investing in the area (e.g. a small municipal tax measured on the production of the plant).

60. These policy proposals are also valid for all other European Member States facing similar resistance among local communities to the deployment of RES plants as Italy. For example, in Germany there are more than 1,000 protest groups campaigning against erecting new wind farms close to residences. In 2018, there was local opposition in France to the expansion of wind farms, with appeals lodged against 70% of new projects. In Germany, for instance, even obtaining a permit no longer creates legal certainty since most projects are contested by increasingly professional interest groups in court and already granted permits are often appealed. In France, although Débat Public exists, there is no benefit sharing mechanism for citizens and local communities, who can appeal continuously until the plant is built.

61. Thus, also in the light of the French case, it must be emphasised that community and citizen involvement alone is not enough. Local stakeholders, public and private, have to be made **aware** of the importance of decarbonisation targets and the related benefits associated with renewable energy sources, also through a benefit sharing mechanism. In addition, it is of paramount importance that there is a strong commitment from the regions to lead the country's energy transition process.

The National Commission for Public Debate of the Italian Ministry for Sustainable Infrastrucure and Mobility

The Ministry for Sustainable Infrastrucure and Mobility has favoured the creation of the National Commission for Public Debate: this measure represents a first step towards a structured and effective involvement of local stakeholders.

The "Codice dei contratti pubblici (art. 22)" has set out the criteria for identifying large infrastructural and architectural works of social relevance that have an impact on the environment, cities and territorial structure, broken down by type and size thresholds, for which the use of the Public Debate procedure is mandatory, as well as the procedures for carrying out the process and the deadline for concluding it.

The Commission is designed to be a model of participatory democracy for the most important infrastructure projects in the country. The Commission's objectives are:

- Making transparent the debate with the territories on public works, through procedures that guarantee the involvement of the communities concerned.
- Improving the quality of design of major public works.
- Simplifying the execution of works through well-considered choices, in order to reduce the burden of litigation.

The competences of the Commission are the following:

- Monitoring the correct conduct of the public debate procedure and compliance with public participation.
- Proposing recommendations for the proper conduct of the public debate.
- Guaranteeing that suitable and timely publicity and information are provided, also through publication on a specific section of the website of the Ministry of Sustainable Infrastructure and Mobility.
- Organising activities at local level with the active involvement of the local authorities involved in the construction of the work.
- Submitting to the to the parliament, by 30th June every two years, a report on the activities carried out in the previous two years.

Source → The European House – Ambrosetti and Enel Foundation elaboration on Ministry for Sustainable Infrastrucure and Mobility, 2021.

62. In order to enhance the uptake of behaviours in favour of energy transition by citizens and firms, the access to incentives related to the energy transition must also be simplified. To this aim, a **single digital repository and interface** for all Italian stakeholders (citizens, operators and local entities) should be created to provide access to a detailed mapping of all existing incentives for the energy transition related to the building, transport and industrial sector with a clear indication of the procedures to be followed to access them. The repository should also work as a tool for mapping RES projects permitting status and decarbonization target achievement.

63. The repository could, for example, be created and managed by the Ministry of Ecological Transition and should have the ambition of **reorganising the subject matter, rationalising the various incentives** in an organic way, making them readily available and easily accessible to the user, providing a step-by-step guide to all the items needed to access the incentives.

64. In addition, the website should contain a precise mapping of all renewable energy installation projects, each with its own progress report (authorisation phase, consultation, implementation, etc.) and an indication of the territories involved. At the same time, a monitoring of the achievement of targets (both at national and regional level) could serve as an information and engagement tool for all stakeholders involved in the energy transition process.

The Metropolitan One Stop Shop of Milan for the energy upgrading of buildings

ENEA and the Metropolitan City of Milan have signed an agreement for the creation of a "One Stop Shop" service to support the owners of public and private buildings in the energy upgrading process. The service is aimed at providing, through a dedicated platform, useful information on the characteristics of the building, from an estimate of consumption to the potential for energy savings, also providing information on the most widespread intervention technologies, the type of professionals to consult for each step of the upgrading process and the incentive mechanisms currently available.

Source → The European House – Ambrosetti and Enel Foundation elaboration on ENEA, 2021.

65. Finally, as said, energy transition requires also **competent staff** working on the related topics, which implies that the **human capital** working on energy transition in public bodies should be **increased**, starting from the personnel in the Regulatory Authority, and the **upskilling and reskilling** of personnel must be guaranteed to ensure that employees have the right skills to perform the task they are assigned in the most efficient and effective way.

66. First, new learning opportunities should be promoted for staff in the companies, authorities and Ministries involved by holding **specific training sessions** on energy, technology and project management for personnel depending on the task to which they are assigned, thus favouring the development of new competences useful for dealing with the issues related to the energy transition.

67. Moreover, **recruiting procedures** explicitly targeted at people with competences in the fields related to the energy transition should be launched to recruit new competent staff with technical skills. This would also be useful in light of the average age of the staff in the public sector, with the aim of hiring young people that are more used to innovation and digitalisation, something extremely relevant for the energy transition.

68. From an educational standpoint, building an **integrated system** designed to develop the Energy Transition at European and national level is pivotal. This policy aims to create a **Network of Universities for the Energy Transition** at European level for the promotion of Energy Transition courses within national university systems, thereby strengthening skills and competencies on energy and sustainability. By showcasing Energy Transition-related teaching and research, the network aims to drive collaborative ventures and knowledge-sharing

in academia to promote an exchange of skills and information with policy makers and the business world.

The newly-signed "Patto per l'innovazione del lavoro pubblico e la coesione sociale"
The issue of training for public employees is one of the key points addressed by the Draghi government and a fundamental element of the "Patto per l'innovazione del lavoro pubblico e la coesione sociale" signed with the trade unions.
The agreement aims to strengthen the role of Public Administration by simplifying processes and investing in social capital.
The promotion of a new and modern Public Administration is based on the enhancement of people, through professional growth and updating, and on the definition of a skills plan based on which planning staff recruitment and needs.
To this end, the Patto establishes that every public employee should have a subjective right/obligation to continuous training and that Public Administration should use training paths of excellence, suitable for the individual and certified.
Among the elements contained in the agreement, education and training have an important role. The right to education will be granted by trade union agreements and education and training will not be considered a cost but rather a strategic investment.

Source → The European House – Ambrosetti and Enel Foundation elaboration, 2021.

Proposal 6

Creating a homogeneous and standardized mechanism of interaction between local authorities on the one hand, and Distribution System Operators and Charge Point Operators on the other

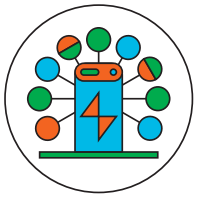
Rationale →

69. The **collaboration between local authorities** (municipalities and Regions), from the one hand, and **DSOs** (Distribution System Operators) and **CPOs** (Charge Point Operators) from the other, for the identification of recharging point sites and charging needs[7], currently leverages on a plurality of framework agreements and pilot projects. Nevertheless, a single, homogeneous framework, which could help to facilitate the deployment of a recharge infrastructure, is missing. The collaboration mechanism between local authorities, DSOs and CPOs for identification of recharging point sites and charging needs should therefore be enhanced and made homogeneous on the entire national territory.

70. Moreover, the different market players have also created a **non-homogeneous situation regarding interoperability** and payment standards for charging infrastructure. Indeed, various charging networks are characterized by different means of identification, billing systems, proprietary protocols, the result being an incompatibility between them which makes it difficult for electric vehicle (EV) drivers to charge their vehicles. As a matter of fact, EV drivers are required to sign up to as many commercial schemes as the different charging networks.

7 Based on mobility flows (e.g. high traffic roads) and on the points where the network can benefit the most from the presence of charging infrastructure.

Proposal →



Creating a **homogeneous and standardized mechanism of interaction** between local authorities on the one hand, and Distribution System Operators and Charging Point Operators, on the other, in order to facilitate the development of the charging infrastructure.

- Promoting the **dissemination of interoperability standards** for charging infrastructures.

71. In order to facilitate the development of the charging infrastructure, the creation of a **homogeneous and standardized mechanism of interaction** between local authorities on the one hand, and Distribution System Operators (DSOs) and Charging Point Operators (CPOs) on the other should be favoured, also with the aim of identifying charging needs based on traffic flows and the points in which the network can accommodate high connection powers.

72. The mechanism should also serve to **collect the information** provided by each public charging infrastructures operator, which is required to provide the following minimum information: location, technology used (type of sockets), power, type of charging, card required for access (if any) and recharging costs. The mechanism could also serve for the analysis of needs in terms of number, type and positioning of the charging infrastructures, the receipt of expressions of interest by the Charging Point Operators (who supply and manage the infrastructures) and the assignment of installation points to operators. This would also allow for greater coordination to identify areas where investments should be concentrated for the homogenous growth of electric car charging technologies.

73. The proper **dissemination of interoperability standards** for charging infrastructure should also be promoted, by defining minimum requirements (concerning means of identification, billing systems, protocols and plug designs) that charging stations have to fulfil in order to enable interoperability and grant the end user a seamless EV usage.

Proposal 7

Promoting a full integration of districts and clusters of companies at local level, ecosystems of innovation and energy communities with the national distribution grid

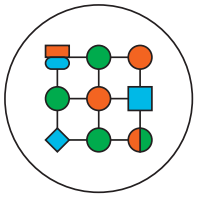
Rationale →

74. The energy transition is a pathway toward the transformation of the global energy sector from fossil-based to zero-carbon by the second half of this century. The need to reduce energy-related CO_2 emissions to limit climate change is its core. Energy transition processes involve the entire supply and demand side, implying a complete change in the production methods to decarbonise the entire energy value chain (generation, distribution and end-uses), starting with the expected increase in electric technologies (e-mobility, digitalization, distributed generation, renewable sources, etc.).

75. This is a great challenge but also a great opportunity that can be leveraged to create widespread benefits. The energy transition will impact all aspects of daily life and is a process that could foster the creation of tangible benefits for the population and the economic ecosystem in general thanks to its key unique characteristics such as its cleanness, safety and potential for integration with digital appliances.

76. However, to achieve such an ambition and respond to the increasing pressure from the institutional sphere, new production processes, new business models as well as new energy systems need to be developed. Given the tremendous embedded change, this would require **new dialogue and collaboration** between companies at different stages of the supply chain, including those in the energy sector.

Proposal →



Promoting a full integration of **districts and clusters of companies** at local level, **ecosystems of innovation** and **energy communities** with the national distribution grid.

- Promote the creation of **districts and clusters** of companies at local level to foster energy transition along the whole industrial value chain, also by creating an **ecosystem for innovation** and fostering cooperation between different companies.
- Support a fully integrated development of **energy communities**, addressing specific elements in the current legislation (current criterion of secondary substations, definition of incentives, governance of the mechanism), leveraging on positive externalities (e.g. fewer losses, fewer disconnections, higher quality and resilience, lower network costs, lower investment) and fostering distributed generation capacity from renewables and the active **involvement of citizens in more efficient consumption patterns**.

77. The analysis of the complexity and heterogeneity of energy transition factors in the industrial sector highlights the need to **support and promote coordination mechanisms** along and across value chains. This has to be taken into account whether evaluations take place at local level or at a broader global level. Logically, the global case differs substantially in the degree of complexity and the type of actors to be involved.

78. At local level approaches should promote the **formation of clusters around leading companies** capable of moving towards the more efficient use of energy and the decarbonisation of their production processes. These approaches may involve the public sector, to favour a collaborative and positive approach between the private and the public sector. Moreover, in the absence of proactiveness on the part of the production ecosystem, public authorities should play an active role and promote discussion forums in which private actors can be involved. In light of the great challenges entailed in the energy transition, research and innovation is a strategic issue to be fostered and promoted. As a matter of fact, research and innovation allows for the development of the new technologies required to rethink manufacturing processes currently still based on coal or on natural gas and, as such,

makes it possible to meet sustainability goals. The European Union hosts important international industrial players, small specialised and high-quality companies and highly qualified research systems that can be even more competitive in meeting technology revolution challenges. To get the most out of the presence of these different kinds of firms, the creation of **ecosystems of innovation** should be promoted to boost research. The creation of such ecosystems should go beyond collaboration between firms to formalise agreements with research centres and universities and should attract both the support of the public sector, by promoting a system of tenders, and investments. Such collaborative approaches between firms should necessarily be established for some strategic sectors that are key to a successful energy transition (such as batteries, renewable energy and electromobility).

79. Energy communities should also be supported for the diffusion and spread of the energy transition along value chains. Energy communities are a new form of citizen involvement that promote a participative way of producing and using energy. Until recently, energy communities lacked a clear status in the EU and national legislation, but for the first time under EU law the Clean Energy Package recognises the rights of citizens and communities to engage directly in the energy sector. It formally acknowledges and sets out legal frameworks for certain categories of energy communities. Energy communities are defined in two separate laws of the Clean Energy Package. The revised Renewable Energy Directive (EU 2018/2001) establishes the framework for "renewable energy communities" covering renewable energy. The revised Internal Electricity Market Directive (EU 2019/944) introduces new roles and responsibilities for "citizen energy communities" in the energy system, covering all types of electricity. Energy communities can perform both traditional activities and engage in new business models.

The first agricultural energy community: "La Mediterranea" Consortium

A group of companies from the city of Ragusa, Sicily, led by the "La Mediterranea" Consortium with the technical support of Enel X and the financial support of Banca Agricola Popolare di Ragusa has launched the first agricultural energy community, with the farms involved occupying about 60 hectares of land. The photovoltaic plant will benefit from its exposure to the sun to produce more than 300MWh per year and this energy will be shared with the member companies. The Sicilian energy community represents the first energy community open to small and medium-sized enterprises in the agricultural sector.

The Sicilian project is highly innovative because, for the first time in Italy, the mechanism of energy communities - defined in the "Milleproroghe" Decree (162/2019) - has been applied to the agricultural sector. The energy production and distribution system will prevent the release of 121 tons of CO_2 per year into the atmosphere thanks to the renewable energy produced by the photovoltaic system, and will also generate economic benefits for members in terms of government incentives (lasting 20 years) for the production and sharing of energy from renewable sources.

Source → The European House – Ambrosetti and Enel Foundation elaboration on European Commission data, 2021.

80. In the Italian context the legislation regulating energy communities is evolving. Currently the Decree Law 8/2020 is in force, establishing rules for collective auto consumers and for energy communities (see the following box for further details about the Italian legislation on Energy Communities). Undoubtedly, the models as currently defined have many strengths, in particular related to the fluidity and simplicity of the mechanism which should allow for the easy insertion of the mechanisms within the existing regulation. However, also with a view to the transposition of the directives and the full implementation of the configurations, it is important to address **certain elements** with a view to the effectiveness of the processes, which mainly concern the sizing of the perimeter of the Renewable Energy Communities (REC) and, therefore, also of the power threshold of the plants they contain:

- The current criterion of secondary substations, while appreciable in some respects, creates limits to the Communities' membership and dimensions.
- The definition of incentives: the current scheme envisaged by the Ministry of Economic Development consistently rewards only shared energy through a single tariff that does not take into account the size of the plant, where smaller plants seem to be sustainable only thanks to the presence of tax incentives (deductions and “SuperBonus”), whose nature is however temporary. In the event that these tax incentives can be overcome, and in any case taking into account the possibility of increasing the maximum plant size admitted to the configurations, the configuration of the incentives may need to be reviewed.
- Regulation should avoid predetermined methods to distribute benefits among community participants, such as deducting the energy shared from the energy component of the bill, as the latter, in addition to complicating the tracking of energy flows on both wholesale and retail markets, would automatically direct a significant share of the revenues towards highest consuming members, de-facto imposing not necessarily desirable criteria to share the benefits inside the community, and making unattractive or even impossible a number of business models, including ESCO ones.
- The widening of the possibility of participating in the configurations to subjects currently excluded, but whose inclusion seems in line with the principles of these models, such as NGOs and third sector entities.

Energy community legislation in Italy

The themes of energy communities and of extended self-consumption of renewable energy have received widespread attention in the Italian debate, coagulating a drive for experimentation that would allow the possible environmental and social results to be verified immediately. This cohesion resulted in a push for a **partial early transposition**, which took place by means of the introduction of a rule contained in the "Milleproroghe 2019" that, albeit temporarily, anticipates the effects of RED II: this rule was subsequently integrated into the body of rules of the sector Authority (ARERA) and implemented by a Ministerial Decree of the Ministry of Economic Development (recently, operational regulations were also defined by the GSE).

In January 2020, an amendment was approved to the Conversion Law of the "2019 Milleproroghe" Decree aimed at introducing a **first experimental framework** of energy communities in Italy pending full transposition of the directives. Given that the "Milleproroghe" Decree is limited exclusively to anticipating (pending full transposition of the European framework) only the configurations referred to in RED II (thus referring only to plants powered by renewable sources), the most important choice concerns the theoretical model of reference: it is in fact excluded that the new configurations may provide for the construction of new networks or, in general, the management of distribution activities by communities. In other words, unlike what happens today for individual self-consumption (in which self-consumed energy never passes through public networks), in the new model shared energy will not have to pass through a private connection but will rely on **existing distribution networks**, making self-consumption of energy a virtual fact. The remuneration model that is defined is based on a **double incentive track**. In fact, the benefits associated with participation in these models will derive on the one hand from an explicit incentive defined by the Ministry of Economic Development and on the other from a recognition of a valorisation defined by ARERA - a sort of restitution of the benefits that communities/collectives bring to the electricity system.

With regard to the possible models that can be adopted, in full compliance with RED II, **two forms** of collective self-consumption are envisaged: the Renewable Energy Communities (which may include, as members, residential final customers, public administration and SMEs, in any case excluding subjects for whom participation in the configuration represents the "main professional" electricity activity) and collective self-consumers (literally "self-consumers of renewable energy acting collectively as households or other entities whose participation in the configuration does not constitute the main "non-professional" business or professional activity, provided that they are located in the same building"). These subjects will therefore be able to form an association (through the creation of an ad hoc legal entity) and share the energy produced (i.e. perform self-consumption in a collective form) by their plants, provided they are newly installed, powered by renewables and with a maximum power of 200kW.

Source → The European House – Ambrosetti and Enel Foundation elaboration on Legambiente data, 2021.

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