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**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

An EU-wide assessment of National Energy and Climate Plans

**Driving forward the green transition and promoting economic recovery through
integrated energy and climate planning**

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1. THE ROLE OF INTEGRATED NATIONAL ENERGY AND CLIMATE PLANS IN DELIVERING THE 2030 TARGETS AND CONTRIBUTING TO RECOVERY AND RESILIENCE

This Communication presents the EU-wide assessment of the 27 National Energy and Climate Plans (from here onwards NECPs or the plans) submitted by Member States in accordance with the EU's Governance regulation¹, across all the dimensions of the Energy Union and in the light of the European Green Deal² and post-COVID 19 recovery context.

This assessment comes at the end of an extensive process of preparation and coordination at national level and constant dialogue between the Member States, the Commission and the other EU institutions. Member States have engaged since 2018 to prepare their NECPs, to be submitted by 31 December 2019. In June 2019, the Commission examined the draft plans³ and provided individual feedback to the Member States⁴, which took into account most of the recommendations. All Member States have now presented their final plans⁵ containing an integrated vision of the energy and climate transition for the next ten years. This has been an unprecedented process, as the plans have been subject to extensive consultation with stakeholders, civil society and citizens to ensure ownership and wide public support⁶. The Council also discussed the preparation of the plans in various occasions.

The 27 plans give an overview of how Member States are approaching the first phase of their transition towards climate neutrality and where they want to go in the period 2021–2030 across five areas: decarbonisation, energy efficiency, energy security, internal energy market, research and innovation and competitiveness. Member States' long term decarbonisation strategies will complement the plans⁷.

The assessment shows how the full implementation of the plans would lead Europe to overachieve the current 2030 greenhouse gas emissions reduction target, establishing a springboard for the greater ambition proposed by the Commission in the Communication “Stepping up Europe’s 2030 climate ambition: Investing in a climate-neutral future for the benefit of our people” it is adopting in parallel, on the basis of an accompanying impact assessment.

As the impact assessment shows, the plans also provide a solid base to aim in a realistic and responsible way to a higher greenhouse gas emissions reduction target for 2030 if additional action is taken at all levels to provide further momentum and to fill outstanding gaps and if the opportunities for a green recovery are fully taken up.

¹ Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action

² COM(2019) 640 final.

³ COM(2019) 285 final.

⁴ Commission Recommendations of 18 June 2019 on the draft integrated National Energy and Climate Plan of each Member State covering the period 2021-2030, C/2019/4401 to C/2019/4428

⁵ Ireland has asked to consider its intention to update its plan and the level of ambition in the near future.

⁶ Several Member States organised local, regional, sectoral workshops to discuss the content of their final NECP with stakeholders (social partners, civil society, educational institutions, local institutions and environmental NGOs).

⁷ Article 15 of the Governance Regulation: to be submitted by Member States by 1 January 2020.

The assessment takes into account the context of the post-COVID-19 recovery. NECPs are both a policy tool and an investment agenda that provide business and investors a forward-looking framework. They constitute a strong basis for Member States to design their green recovery and resilience strategies and deliver on broader European Green Deal objectives from a clean and circular economy to a zero pollution ambition. This Communication highlights how funding under the EU's Recovery and Resilience Package can be used to support the investments and reforms identified in the national plans⁸, in particular by investing in energy efficiency, renovating buildings, deploying renewable energies, sustainable mobility, modernising electricity grids and boosting innovation in crucial technology areas such as renewable hydrogen and batteries.

This Communication is a first step in a process that will involve other stages. The Commission will publish an in-depth assessment of each individual NECP in October together with the State of the Energy Union report, including country-specific guidance on how Member States can make further progress in implementing the plans. This will provide valuable input for Member States to draw on in preparing their national recovery and resilience plans and drive the investment agenda for green deal related projects that deliver jobs at the same time as a positive climate and environmental impact. It will also inform the Commission's assessment of the recovery and resilience plans. Lastly, Member States need to ensure their Just Transition Plans (to be submitted in the context of the Just Transition Fund) are consistent with the NECPs.

Throughout this process, the Commission will continue its dialogue with Member States with a view to supporting the full implementation of the plans, prepare their update due in 2023 and ensure they remain the compass to guide the national progress towards reaching ambitious energy and climate targets in 2030 and beyond. Coordination with Member States will also include the external aspects of the NECP's and their implementation will be supported by energy and climate diplomacy.

2. ASSESSMENT OF THE FINAL NECPs: WHAT HAVE THEY DELIVERED AND HOW CAN THEY SUPPORT RECOVERY AND RESILIENCE?

2.1. Assessment of the renewable energy, energy efficiency and greenhouse gas reduction parts of the NECPs

2.1.1. EU renewable energy

The assessment of NECPs shows that the share of renewable energy could reach, under existing and planned measures, a range of 33.1 to 33.7% in 2030 at Union level **surpassing the target of at least 32% in 2030** and putting renewables at the forefront to achieve the objectives set out in the Communication on stepping up Europe's 2030 climate ambition.

⁸ According to the IEA, a sustainable recovery plan could add 1.1 percentage points to global economic growth each year. The effect on employment would be significant, saving or creating roughly 9 million jobs a year over the next three years (IEA's World Energy Outlook Special Report on Sustainable Recovery)

This would build on the back of continued relatively positive developments. The analysis of Eurostat figures for 2018 and projections at Member State level of the expected 2020 renewable energy share in final energy consumption show⁹ that the EU is projected to reach a renewables share of between 22.5% and 22.7% and that the vast majority of Member States are projected to meet their national binding targets. Early estimates suggest that renewable power generation capacity continued to grow by 6.2% in 2019, with a market growth of 33% compared to 2018. Furthermore, several analysts suggest that while negatively impacted by the COVID-19 crisis, the renewables industry and the associated investments are showing relatively strong resilience. The EU thus appears well on track to achieve the European target of 20% renewables share in final energy consumption by 2020. Nonetheless, several Member States, notably those which are projected to lag behind at this stage should consider additional measures, including in the form of cooperation mechanisms, to ensure that they achieve their 2020 national binding targets.

The EU's newly established **renewable energy financing mechanism**¹⁰ could in particular rapidly benefit larger scale offshore and innovative technologies. The flexible nature of the mechanism allows Member States to tap into the best potential for renewable energy generation across Europe and reduce the cost of support, helping Member States to achieve or even exceed their national target for 2020 and the EU's 2030 target. The mechanism can also be combined with other EU instruments such as CEF or InvestEU to further streamline funding for new renewable energy projects.

Nearly all final NECPs have confirmed or in some cases increased their renewable energy ambition compared to the draft plans. However, the aggregate figures mask differences between Member State contributions. Several plans fail to include sectoral trajectories that are in line with the Renewable Directive requirements, remaining below cost-efficient national potentials. By contrast, a few Member States have set very ambitious sectoral targets for renewables. Austria and Sweden with the objective of 100% renewable electricity by 2030 and 2040, respectively.

The analysis for the Communication on stepping up Europe's 2030 climate ambition shows that higher shares of renewables are fundamental to achieve higher greenhouse gas emissions reduction targets. As set out in the impact assessment, reducing greenhouse gas emissions by at least 55% would require a share of renewable energy in the EU of 38-40% by 2030.

NECPs provide a vast number of matured projects of renewables that can also contribute to the economic recovery. Examples include the creation of 100.000 rooftops solar panel and small-scale storage programme in Austria; financial support to prosumers for installation of small-scale power plants in Lithuania, with an expected outcome of 696 MW of installed capacity as from 2024; investments to achieve 4 GW of offshore wind capacity in Denmark and 3.8 GW in Poland; the launch of six offshore wind tenders by 2023 aiming at 3.7 GW

⁹ Uncertainty remains on 2020 energy demand impact by the pandemic and corresponding impacts on the society and the economy. Therefore, two distinct demand trends (low and high) are shown that appear likely as lower and upper boundaries.

¹⁰ Renewable Energy Financing Mechanism C(2020)6123, operational as of January 2021

capacity in France; and building solar farms and hydrogen infrastructure on former lignite mining sites in Greece and Portugal.

NECPs and renewables: challenges and opportunities for the recovery and the European Green Deal

NECPs provide a clear signal from Member States that they back the rapid and cost-effective transition to a resilient carbon neutral economy, strongly based on renewables, which will help the private sector invest confidently. For example, at least 10 Member States have indicated their intention to phase out coal production of electricity in the coming years and the replacement of the decommissioned capacity mainly by renewable technologies. Clean mobility is also an example where a high number of Member States have set ambitious targets, in particular for electro mobility¹¹ and advanced biofuels¹². However, NECPs fall short of identifying the potential of offshore renewables that is available to them, and the related challenges. The Commission will help address this in a strategic manner in its upcoming Strategy for Offshore Renewable Energy by identifying key actions in the area of maritime planning, upscaling technologies, and a new approach to infrastructure planning.

Frontloading investments in these solutions respecting the “do no harm” principle would align government spending and the financial stimulus for recovery and resilience with the increased ambition to reduce emissions by at least 55% by 2030 the EU’s ambition to transition to climate neutrality by 2050. Additional investments in renewables can also have a quick and positive impact on the recovery of the economy (as well as reduce energy bills and improve air quality in the case of non-combustible renewable). Each €1 million shifted from brown to green energy would create a net increase of five jobs¹³.

Frontloading investments would also accelerate demand and competition, making Europe’s manufacturing base stronger along its value chain while showing worldwide industrial leadership and deliver better jobs.

Investments in renewables create jobs. In the EU almost 1.5 million people were employed in the renewables sector in 2018, including the indirect jobs in the value chain. The solar photovoltaic sector is the most intensive job creator with 12 jobs for each million euro of investment. In contrast, the wind industry creates 3 jobs for each million euro of investment, but because of the expected growth over the period from 2020 to 2030 it will become the largest job creator in the renewables sector in the EU. At the EU level, IRENA estimated 2.7 million jobs in renewables by 2050, 1.7 in energy efficiency and 0.8 in system flexibility¹⁴.

¹¹ In its NECP, Germany has set a target of 7-10 million electric vehicles by 2030 and up to 1 million public accessible recharging points by 2030. Greece includes a target of 30 % of electric passenger cars by 2030 and Italy of 6 million electric vehicle by 2030.

¹² Estonia estimates a ten-fold increase of biomethane by 2030; Finland of advanced biofuels to 30% by 2030.

¹³ Modelling estimates suggest that while €1 million spending in fossil fuels would create 2.7 full-time equivalent jobs, that same spending would create 7.5 FTE jobs in renewable energy or 7.7 FTE jobs in energy efficiency; Garrett-Peltier (2017), <https://www.sciencedirect.com/science/article/pii/S026499931630709X?via%3Dihub>

¹⁴ IRENA (International Renewable Energy Agency) Global Renewables Outlook: Energy transformation 2050.

Similarly, IEA estimates that solar photovoltaic together with energy efficiency in buildings and industry create the most jobs per million euro of investment¹⁵.

The European renewables industry is well positioned for global leadership. Its gross value added amounted to €80 billion in 2018 (growing at 6-8% annually). The EU is strong in developing the technologies necessary for renewables (e.g. offshore renewables), including a rich ecosystem of SMEs. Renewables may also provide replacement employment in eligible Just Transition regions and generally in a decentralised manner also opportunities for remote areas and islands. Thanks to huge cost reductions, the cost-competitiveness gap of renewables is closing rapidly in the EU and mature renewables are now cost competitive and bring down energy prices for European consumers¹⁶.

Member States are invited to fast track and make better use of the following measures, which are generally not included or sufficiently detailed in their NECPs¹⁷. Explore and maximise the use of **waste heat/cold**, ensure that citizens are entitled to become a **renewable self-consumer** (including in combination with storage systems), and be part of renewable energy communities, while **promoting electrification based on renewables in transport** that facilitate variable renewable energy generation projects. Furthermore, **predictability on planned tenders** including volumes and breakdown of new and repowered capacity for renewables, **streamlining permitting** (e.g. single contact point), swift procedures for **repowering and power purchase agreements** have a positive impact on stimulating both large-scale and small-scale investments.

Further grid rules and infrastructure adaptation will be necessary to cater for both increasing decentralised generation, large offshore renewable production and integration of hybrid projects combining renewables with storage, in particular renewable hydrogen. The potential for cross-border regional initiatives¹⁸ remains to be further tapped through better cooperation between Member States and use of EU funds, including funds under the temporary recovery instrument ‘Next Generation EU’, and building on regulatory advances¹⁹. This will further boost competitiveness and decarbonise demand side sectors such as buildings, industry, and transport, which traditionally relied on fossil fuels.

The impact assessment accompanying the Communication on stepping up Europe’s 2030 climate ambition²⁰ also shows that investments at local and national level are needed to create more physical links between energy carriers in an integrated energy system. For example, investments in modern, low-temperature district heating systems should be promoted (as they

¹⁵ IEA (International Energy Agency), World Energy Outlook, Special Report Sustainable Recovery, June 2020; on average the three above mentioned measures create between 10-15 jobs for every million euros.

¹⁶ The upcoming annual Prices and Cost report will provide further details

¹⁷ The actions proposed in the Energy System Integration Strategy COM (2020) 299 final are complementary to the renewable energy regulatory framework

¹⁸ Grouping of a number of Member States like south east Europe, Baltic, central Europe etc.

¹⁹ Good examples of the regional cooperation are the North Seas Initiative and Baltic Sea Region that could be replicated to other regions across Europe.

²⁰ Communication on Stepping Europe’s 2030 Climate Ambition COM(2020) 562

can connect local demand with renewable and waste energy sources), as well as the wider electric and gas grid in order to optimise supply and demand across energy carriers.

2.1.2. Energy efficiency

The assessment of the final plans shows that the **energy efficiency** aggregated ambition would amount to a reduction of 29.7% for primary energy consumption and 29.4% for final energy consumption²¹, reaching 1176 Mtoe and 885 Mtoe respectively in 2030. This means that the collective ambition for 2030 has been increased compared to the conservative scenario from the draft plans²², thanks to several Member States increasing their planned efforts and clarifying points. However, there remains a **gap compared to the Union's 2030 target of at least 32.5%, which still stands at 2.8 percentage points for primary energy consumption and at 3.1 percentage points for final energy consumption.**

The COVID-19 crisis currently impacts on energy consumption, which might unexpectedly bring the EU very close to reaching the 2020 energy efficiency targets. However, this is not the result of structural changes nor adaptations and will not be long-lasting. Recovery from the COVID-19 crisis will lead to a rebound in energy consumption, which means that additional energy efficiency efforts and investments are needed to make energy efficiency gains structural²³.

The Energy Union has recognised a prominent role of **energy efficiency** and enshrined the guiding “Energy Efficiency First” principle into legislation²⁴. Still, **most final NECPs only set out limited details on the application of this principle** despite the fact that energy efficiency plays a key role for the achievement of all targets, and notably the reduction of greenhouse gas emissions. Final plans include more details on electrification which is in line with the energy efficiency first principle. Co-benefits and possible trade-offs between energy efficiency measures and climate adaptation remain unrecognised and untapped.²⁵ Member States need to consider cost-effective, technically, economically and environmentally sound energy efficiency measures as part of and as alternatives in planning, policy and investment decisions, and prior to making any future investment decisions on energy infrastructure.

The Commission is preparing a dedicated guidance for the implementation of the Energy Efficiency First Principle for energy related policy planning and investment decisions across the economy. The Commission is already working towards implementing this principle in all its relevant energy policy proposals, such as the EU Strategy for Energy System Integration and the upcoming TEN-E revision.

²¹ Compared to the projections of the 2007 Reference Scenario for 2007

²² The draft plans' aggregated ambition ranged from 26.3%-30.2% for primary energy consumption and 26.5%-30.7 % for final energy consumption.

²³ Recent data BNEF shows that power consumption levels in several Member States is already back to normal.

²⁴ Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action

²⁵ Co-benefits include better insulation protecting against heatwaves (if coupled with adequate ventilation, while poorly executed energy efficiency measures that do not take into account vulnerability to climate hazards (such as flooding, hail, strong winds) are at risk of being damaged or destroyed.

Considering that additional action is in particular necessary in the built environment, it is welcome that **NECPs include various energy efficiency measures in the building sector**. In general, there is broad coverage in all NECPs (and in the national long term renovation strategies submitted so far) of supportive measures to building renovation. Some interesting approaches increase the level of stringency of ‘prescriptive’ measures, such as binding building renovation targets (e.g. dwellings rented out having to meet a minimum performance class, tightening public procurement rules for buildings and legal limits on fossil fuel use for heating purposes, including bans). Several Member States have good examples to follow, including: Bulgaria has set an ambitious target to renovate over 5% of public buildings per year; Latvia intends to renovate 2 000 multi-apartment and 3 000 single family buildings by 2030; Romania has put in place specific financing schemes with an energy efficiency investment fund financed by private, national and EU funds; Cyprus has also co-financed programmes until 2020 to finance the renovation of 2 100 residential buildings and 164 SMEs.

As the objectives, targets and contributions of the plans appear insufficient for the collective achievement of the EU’s energy efficiency objective for 2030, in line with Article 31 of the Governance Regulation the Commission shall propose measures and exercise its powers at Union level to ensure the achievement of the Union’s energy efficiency targets²⁶. To that end, the Commission plans to **review and possibly revise the Energy Efficiency Directive**²⁷ and if needed specific targeted provisions of the Energy Performance of Buildings Directive. It will also promote relevant Green Deal initiatives, notably the Renovation Wave and the Strategy for Energy Sector Integration, which will be key to promote further energy efficiency to bridge the gap. These would complement other actions targeting public procurement, energy audits, heating and cooling and recovery of waste heat (including from industrial sites and data centres²⁸) energy services, administrative capacities, and skills. The integration of circular economy (i.e. materials efficiency) would bring additional benefits to achieve climate and environmental objectives.

Furthermore, the Commission is also preparing its Ecodesign and Energy Labelling Working Plan to identify priorities for the years ahead in terms of possible new or revised Ecodesign and Energy Labelling regulations whilst continuing to work with Member States to facilitate full and effective implementation and compliance.

It is important to emphasise that the impact assessment accompanying the Communication on stepping up Europe’s 2030 climate ambition shows that the increased ambition for greenhouse gas emissions reductions by 2030 would also require higher energy efficiency ambition regardless of the scenario chosen. Final and primary energy consumption would have to decrease to around 39-41% and 36-37%, respectively, to achieve at least 55% greenhouse gas

²⁶ Article 31(3) of Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action

²⁷ <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12552-Review-of-Directive-2012-27-EU-on-energy-efficiency>

²⁸ The importance of the Primary Energy Factor in the facilitation of energy efficient decision between different energy carriers should be fully recognised.

emissions reductions. Thus, the challenge to increase energy efficiency efforts goes beyond the ambition gap of the final NECPs and additional measures need to match the ambition required by the Communication on stepping up Europe's 2030 climate ambition.

NECPs and energy efficiency: challenges and opportunities for recovery and European Green Deal objectives

Energy efficiency and, in particular, building renovation and affordable housing are priorities for action and for investments to support the recovery through local jobs.

Member States should explore the potential of speeding up building renovation in providing recovery stimulus where it is most needed: the local economies and SMEs (who account for 90% of the construction sector). Lowering energy bills, alleviating energy poverty, and, in the long-run, improving public health and comfortable living, can make society more resilient to potential future crisis. Worldwide, jobs in the energy efficiency sector are expected to total around 21 million by 2050²⁹. In particular, investment in social and affordable housing is a beneficial countercyclical economic measure that generates economic return in terms of employment during low economic conjuncture.

Member States need to draw up and submit national long-term renovation strategies, broken down to action at regional and local levels³⁰. As of end-August 2020, only 12 Member States³¹ had submitted their long-term strategies³². The Commission calls on all Member States who have not yet submitted their strategy to do so as a matter of urgency.

The elements in the NECPs and in the limited number of these strategies submitted so far are an important building block for the policy vision to be set out in the Renovation Wave Initiative which will provide a political impetus to address cross-cutting challenges in the building sector. The initiative will build on three fundamental blocks: a solid regulatory framework, adequate financing and a strong governance framework based on long-term planning and stakeholder engagement. It will propose forward legislative and non-legislative instruments and enabling tools, including an important financing element, to ensure action at EU, national and local or regional levels.

2.1.3. Greenhouse gas emissions

The NECPs provide key information on how Member States aim to achieve their national emissions reduction targets set in the Effort Sharing Regulation (ESR)³³. Currently, these targets range from 0 to -40% in 2030 compared to 2005 to achieve EU-wide minimum reductions in sectors not covered by the EU Emission Trading System (ETS)³⁴ of 30%

²⁹ Global Renewables Outlook: Energy transformation 2050

³⁰ Art. 11 of Governance Regulation on multilevel dialogue that aims to improve realism & buy-in by the levels of government implementing the strategies and plans.

³¹ (NL, DK, FI, SE, AT, CY, FR, ES, CZ, LU, DE, EE). In Belgium, the regions of Brussels and Flanders

³² The Energy Performance of Buildings Directive (EPBD) requires Member States to notify national long-term renovation strategies (LTRS) to the Commission by 10 March 2020.

³³ Regulation (EU) 2018/842

³⁴ The non-ETS sectors include effort sharing sectors such as, land transport, heating of buildings, agriculture, waste and small industrial installations, and the Land Use Land Use Change and Forestry sector.

compared to 2005³⁵. Compared to their current ESR targets, Luxembourg, Slovakia, Slovenia and Sweden have set more ambitious national targets in the sectors not covered by the EU ETS. Also many other Member States project that the implementation of their policies and measures planned in the NECPs reduces emissions beyond their ESR binding targets³⁶.

An aggregation of the projected emission impacts of the national measures currently planned in the NECPs shows that by 2030 the EU would reduce emissions by 32% in sectors not covered by the ETS (excluding the land use, land use change and forestry (LULUCF) sector). This represents a progress of around 4 percentage points compared to the draft NECPs and is already a welcome first step towards achieving the increased ambition levels of the 2030 Communication on stepping up Europe's 2030 climate ambition³⁷.

The assessment of the NECPs shows that for the economy-wide greenhouse gas emissions reductions, including those covered by the EU ETS, emissions reduce under existing and planned measures by 41% below 1990 levels, surpassing the EU 40% reduction target³⁸. This is an improvement of about 1.5 percentage points compared to the draft EU NECPs.

To achieve these emissions reductions, the NECPs lay out a mix of sectoral and cross-sectoral measures. Several Member States intend to make **increased use of carbon pricing**. For example, Germany has adopted a national emissions trading law which is gradually introduced. It covers fossil fuel CO₂ emissions so far not included in the EU ETS, notably those of the transport and building sectors. Luxembourg plans to bring in a gradually increasing minimum carbon tax for all fossil fuels, which will be constantly adapted to the objectives of the Paris Agreement. Ireland envisages a strong carbon tax trajectory and increased its carbon tax by 30% in 2020, with all revenues ring-fenced to support climate action and protect the most vulnerable people in the country. Other Member States such as Belgium study the design of a carbon pricing mechanism for buildings and transport.

In addition, all Member States can use credits from the LULUCF sector to help achieve their ESR targets. LULUCF is the only sector which is a net carbon sink, that is, which can sequester carbon from the atmosphere and store it in soils, biomass and harvested wood products. Member States can generate LULUCF credits if they report a larger carbon sink than the one which would have occurred if past management practices continued. If, on the contrary, the carbon sink is smaller than the business-as-usual counterfactual, then the corresponding emissions are considered debits and this sector creates net emissions; these would need to be compensated by using allocations from the effort sharing sectors³⁹. Most Member States plan to ensure that their carbon sink will be large enough to avoid generating

³⁵ There is significant flexibility on how to achieve the national ESR targets, e.g. transfers between Member States, limited use of EU ETS allowances for some Member States, or using a certain amount of additional emission removals in the land use and forestry sector.

³⁶ Croatia, Estonia, France, Greece, Hungary, Italy, Latvia, Lithuania, Portugal and Spain. In addition, while not providing emission projections reflecting their plans, Denmark and the Netherlands set national total greenhouse gas reduction targets in law which imply the need to meet if not surpass their non-ETS targets domestically.

³⁷ COM(2020) 562

³⁸ This is under the current 2030 target scope, including international aviation and excluding international navigation and the LULUCF sink.

³⁹ Regulation (EU) 2018/841

any debits, but very few of them give any indication in their NECPs of the extent to which they plan to generate and use LULUCF credits for ESR compliance. Several Member States indicate that their carbon sinks are decreasing due to ageing of forests, harvesting and increasing natural disturbances. Aggregating the projection information included in the NECPs reveals that around a third of the 2005 EU carbon sink could be lost by 2030. The LULUCF sector may even become a net emitter after 2030.

Member States were required to list **climate adaptation** goals in their NECPs, where available and as applicable to achieve the Energy Union objectives. Although national adaptation strategies are available in all Member States and the changes in climate are affecting the entire EU, around a quarter of Member States have not listed such goals, and some limit themselves to describing the framework for adaptation policy making, without quoting the goals themselves⁴⁰.

NECPs and greenhouse gas emissions reductions: challenges and opportunities for recovery and European Green Deal objectives

The planned sectoral national policies are often strongly focused on a broad set of measures addressing **transport**. In emission terms, this is the largest non-ETS sector. As it is also an economically important sector, planned measures are relevant for reducing emissions and for the recovery and should mutually support each other. Measures planned in the NECPs help, for example, to boost demand for clean zero and low emission vehicles that reduce CO₂ and pollutant emissions in line with ambitious EU standards and ensure a clear pathway towards zero-emission mobility, in line with the priorities for fleet renewal as part of the overall economic recovery and resilience planning. This will be supported by an increased roll-out of recharging and refuelling infrastructure for zero and low emission vehicles and investments for green transition in the transport industry value chain (e.g. batteries, hydrogen fuel cells). 20 NECPs included detailed measures to increasing the use of bicycles. Also the investment in public transport and promoting its use, as often planned, will help recovery. The upcoming strategy for sustainable and smart mobility will outline a comprehensive set of measures towards the decarbonisation of the transport sector.

A lot of the measures to reduce **agricultural** emissions or increase the LULUCF sink enable synergies and significant opportunities for recovery and resilience. The main focus of NECP measures is on reducing emissions by optimising fertiliser use (through support to organic farming and precision farming) and addressing emissions from the livestock sector (grazing management, animal breeding/feeding and management). Anaerobic digestion measures reduce emissions, recover nutrients and diversify farm income with the production of energy. Nature-based solutions and the protection of natural areas are also mentioned. Some Member States plan measures to increase the LULUCF sink, for instance by providing subsidies for converting organic soils from arable land to protected natural areas, or for afforestation in

⁴⁰ Good examples for integrating climate change adaptation aspects coherently into different NECP dimensions and/or providing some detail on adaptation measures are Croatia, Ireland, Italy, Slovenia and Spain.

agricultural land⁴¹. Member States refer to the Common Agricultural Policy (CAP) and its rural development programmes as the main tool for supporting measures to reduce agricultural emissions and enhance sustainable forest management, as well as afforestation and forest resilience. The NECPs will be an important starting point in the preparation of the national strategic plans, especially for describing how to achieve the climate objectives of the CAP. The actions described in the NECPs are also relevant in the context of the Biodiversity Strategy, ‘farm to fork strategy and the forthcoming forestry strategy.

Another sector with significant opportunities for recovery and resilience is **industry**. The regulatory and policy frameworks at EU level (e.g. EU ETS, Innovation Fund, new industrial policy and the circular economy action plan) and at national level can help to accelerate and support modernisation and deep transformation of the energy-intensive industry ecosystem to climate-neutrality, including through the use of hydrogen and carbon capture utilisation and storage. Other important areas of work are to create lead markets for climate-neutral and circular products and to develop climate-neutral solutions and finance their uptake. In this context, it will be important to ensure that (national) subsidies do not unduly distort competition and trade among Member States.

Measures promoting the circular economy with its potential for growth and jobs creation will also help further reduce **waste** emissions. The upcoming EU methane strategy will also support this.

EU funding instruments available for renewable energy, energy efficiency and greenhouse gas reductions

The costs for most renewables and the clean technologies needed to decarbonise energy-intensive industries are highly dependent on the cost of capital. The EU can play an important role in catalysing the development of private financing mechanisms that both attract capital and can be an effective means of reducing the cost of projects. Such mechanisms should also cater for small scale and technology specific needs so as to increase local participation and acceptance of the energy transition. This will be crucial for the deployment of renewables in the next decade at all levels. In this respect, early involvement of local authorities for continued public consultation and transparent planning is of utmost importance. Similarly boosting the Renovation Wave will require a huge amount of private capital.

There is an array of instruments to help realise renewable, energy efficiency and other emissions reduction projects, which can, in certain instances, be complemented by private financing mechanisms. EU instruments available include the Connecting Europe Facility, Cohesion policy funds (including additional funding via REACT-EU), Just Transition Mechanism, InvestEU, Recovery and Resilience Facility, Innovation Fund, Modernisation Fund, Rural Development Fund, Horizon Europe, ELENA, Technical Support Instrument (TSI), and capacity building and market uptake measures under LIFE, Renewable energy EU Financing Mechanism, and the European Investment Bank.

⁴¹ Belgium is considering shifting food production to the sea

2.2. Promote investments and a just transition

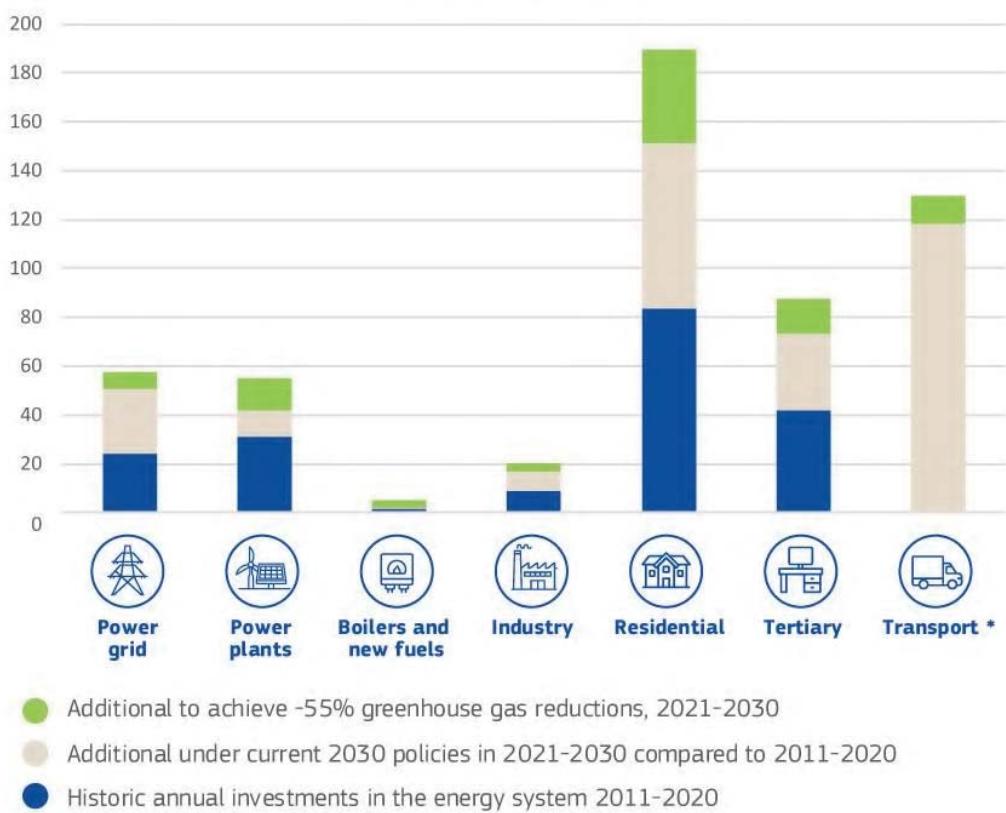
2.2.1. Investments

In their NECPs, Member States presented an improved general overview of the expected investments needed to achieve the various objectives, targets and contributions. However, some of the plans lack details and do not allow to compare or add up the total investment needs for energy and climate objectives.

Based on Commission calculations, to achieve the current EU 2030 climate and energy targets, annual investments related to energy production and use will need to increase in 2021-2030 by just over 1 percentage points of GDP on average, compared to the previous decade, that is, an increase of around €260 billion per year. For an increased greenhouse gas emissions reduction target of 55% this figure would increase to around €350 billion.

Average annual investments 2011-2020 and additional investments 2021-30

under existing policies and to achieve -55% greenhouse gas emission reductions
(in billion EUR 2015)



* transport only shows additional investment

Most Member States reported energy-related investment needs in the building, industrial, and transport sectors. Few reported expected investment needs in the agricultural sector, the third largest source of emissions in non-ETS sectors. While for some Member States, EU funds will make up significant portions of planned investments, the achievement of targets contained in the plans cannot be conditional on obtaining additional allocations from the EU budget.

Full implementation of the NECPs over the coming years will require to mobilise important amounts of new public and private investments. The response to COVID-19 provides the opportunity to spearhead some of the needed green investments and reforms through the national and EU recovery and resilience strategies, especially as these offer major job creation potential in areas such as energy and resource efficiency and renewable energies. Following the unprecedented drops during the COVID-19 crisis⁴², rising uncertainty about future oil demand due to changes in patterns of work, production and consumption highlights the risks of investments in stranded assets. In this regard, sustainable finance tools, such as the EU taxonomy will help to identify sustainable economic activities and guide capital flows to green investments^{43 44}.

In the field of energy and climate, the **priority areas for reforms and investments** include:

- the renovation of the building stock and access to affordable housing;
- decarbonisation of industry and renewable energy;
- sustainable mobility;
- energy system integration including infrastructure, batteries and renewable hydrogen.

A wide variety of forms of support in the form of grants and financial instruments (loans, guarantees, equity) are available under the Multi-annual Financial Framework (MFF), the recovery and resilience package, including the Recovery and Resilience Facility, and from funds under specific legislative instruments such as the EU Emissions Trading System for prioritising these areas critical to the clean energy transition.

The priority given to energy and climate investments is reflected in the Commission's proposal for the 2021-2027 EU long-term budget. It sets a share of the Cohesion Fund and European Regional and Development Fund to be obligatorily earmarked on investments for a greener and low-carbon Europe. The final NECPs mark a milestone towards fulfilling the **enabling conditions**, i.e. the conditions that have to be met by Member States in order to receive this funding.

The NECPs put forward reforms and investment needs in these priority areas. Based on the plans, it is estimated that for **building renovations** alone, Member States identified the need to collectively invest around €130 billion per year. In social housing, it is estimated that €57 billion per year is needed⁴⁵.

⁴² Q1/2020 also saw a drop in coal and gas power generation (38 TWh and 3 TWh), the highest ever renewables share in the power mix in the EU (40% having risen by 38TWh), and reduced natural gas imports of €10 billion

⁴³ The development of the EU taxonomy for environmentally sustainable economic activities is one of the key actions of 2018 Action Plan for Financing Sustainable Growth. The sustainable finance toolbox will be further expanded through the upcoming Renewed Sustainable Finance Strategy to move the behaviour of financial actors, companies, and policy-makers further towards environmentally sustainable economic activities. This should prevent further investments into potentially expensive stranded assets that could block technology leaps and the needed innovation for reaching climate neutrality

⁴⁴ World Energy Investments 2020 – Analysis IEA <https://www.iea.org/reports/world-energy-investment-2020>

⁴⁵ Report of the high-level task force on investing in social infrastructure in Europe 2018

https://ec.europa.eu/info/sites/info/files/economy-finance/dp074_en.pdf

In view of the 2030 objectives and the envisaged **energy system integration**, the energy infrastructure (transmission and distribution networks, heating and cooling, transport, and energy storage) investment needs are estimated at the level of €59 billion per year⁴⁶.

By 2030, total investments needs in **hydrogen** electrolyzers are estimated between €24-42 billion plus €220-340 billion to scale up and directly connect 80-120 GW of solar and wind energy production capacity. About €65 billion is needed for hydrogen transport, distribution and storage⁴⁷.

2.2.2. Just transition

The NECPs also address the social and territorial implications that the clean energy transition can have. The transformation of extractive industries (hard coal, lignite, peat or oil shale) and carbon-intensive industries (cement, steel, aluminium, fertiliser or paper production) will pose a significant challenge to territories that are strongly reliant on such activities and will require to restructure and/or diversify the economy, maintain social cohesion, and, (re)train the affected workers and youth to prepare them for future jobs. Many NECPs include this transition in the coal sector and its social and economic impacts. The NECPs show that the transition has further accelerated due to global changes in prices of fossil fuels and falling costs of renewable energies. **Europe is phasing out coal sooner than initially expected**, which helps reduce greenhouse gas emissions and air pollution (the latter often being the main driver at local level for such a move, based on health and well-being concerns). This requires adequate measures to accompany regions and ensure no one is left behind.

A total of 21 Member States are either already coal-free (Estonia, Latvia, Lithuania, Belgium, Malta, Luxembourg, Cyprus)⁴⁸, or have committed to phasing-out coal (including lignite and peat), indicating specific dates in their NECPs (see above chart). Two Member States (Slovenia, Czechia) are still considering coal phase out while four (Poland, Romania, Bulgaria, Croatia) have not planned any phase out yet. In this context, the use of coal is projected to decrease by 70% by 2030 compared to 2015, and renewable electricity will represent 60% of electricity produced in the EU.

A large majority of Member States still needs to develop clearer strategies and objectives through a cross-cutting approach to identify and measure the social, employment and skills consequences and other distributional impacts of the energy transition and give proper consideration on how to address these challenges.

The Just Transition Mechanism, and the Just Transition Fund at its core, is specifically designed to address the social and economic impacts of the transition, focusing on the regions, industries and workers who will face the greatest challenges.

⁴⁶ In-depth analysis in support of the Commission Communication COM(2018) 773

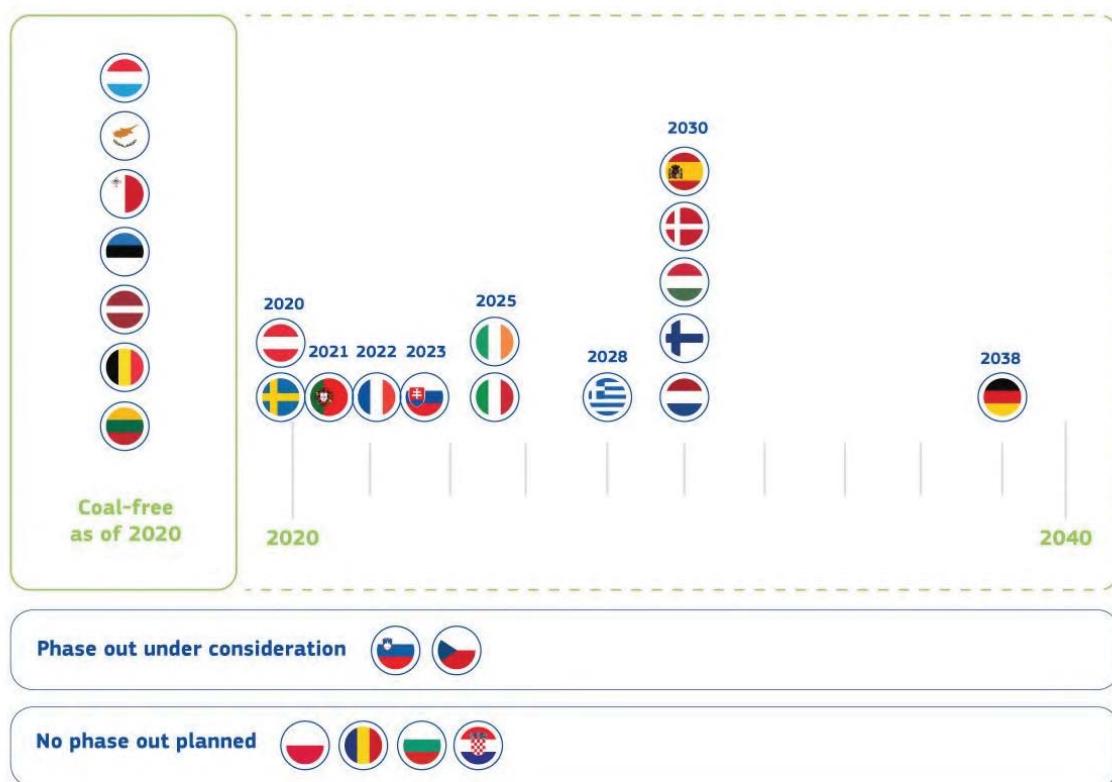
⁴⁷ A hydrogen strategy for a climate-neutral Europe COM(2020)301

⁴⁸ Starting in 2020, the Coal Regions in Transition Initiative also addresses peat (FI, IE) and oil shale regions (EE). EE is still relying on oil shale.

The EU legislative proposal for the Just Transition Fund Regulation, requires that the plans for just transition (Territorial Just Transition Plans) be coherent with the objectives and investment needs identified in NECPs. The approval of Territorial Just Transition Plans by the Commission will unlock dedicated financing not only from the Just Transition Fund but also from the dedicated just transition scheme under InvestEU and the EIB public sector loan facility (the two other pillars of the Just Transition Mechanism).

Update on transition-related issues in the EU

Coal phase out commitments as per National Energy and Climate Plans (NECPs)



Overall, the NECPs did not provide a clear prioritisation of funding needs regarding just transition, nor investment needs for reskilling and upskilling and for support of labour market adjustments. A description of how the different sources of funding will complement each other are needed to promote a just and fair transition.

Also related to a just transition, many NECPs address energy poverty. This is a major challenge, since close to 40 million Europeans were unable to afford keeping their home adequately warm in 2018. Most Member States have presented a detailed overview of energy poverty. Many also reported detailed indicators to analyse its impact on their territories. Several Member States use the primary indicators developed by the European Energy Poverty Observatory. NECPs also address affordability often, notably in the context of the energy and climate transition. This is the case, for instance, in Austria, Belgium, France, the Netherlands or Denmark.

Based on the information in their NECPs, most Member States are only preparing to take a more systematic approach to address energy poverty, despite the clear focus set out in the Clean Energy Package.

To help Member States take more determined and targeted action against energy poverty, the Commission will adopt guidance on the definition and on indicators of energy poverty this autumn. This will facilitate sharing of good practices and build on the work of the EU Energy Poverty Observatory.

NECPs and just/fair transition: challenges and opportunities for recovery and European Green Deal objectives

Based on the EU wide assessment summarised above, and in the context of the Just Transition Mechanism, it would appear that Member States need to work further to develop specific actions for a clean and fair energy transition in the most affected regions, including mobilising private investment, and synergies with other funding sources and mechanisms for regional cooperation. In that respect, pillar II (InvestEU scheme) and pillar III (EIB public loan facility) of the Just Transition Mechanism will offer new ways of financing the transition, in particular by leveraging public and private investments. Member States are encouraged to finalise their Territorial and Just Transition plans so they can become eligible to the different pillars of the Just Transition Mechanism.

Coal regions in transition is an EU initiative to help address challenges and opportunities in those areas⁴⁹. The Commission supports regional and local level involvement in ‘just transition’ related initiatives, which are a driving force for Coal Regions in Transition. The Commission assists regions in building cross-regional consortia, identifying transition-related projects and matching projects with funding opportunities, including under EU funding programmes^{50 51}.

All stakeholders need to continue cooperating and providing support to regions in a tailored manner, including through implementing the Just Transition Mechanism and Fund. The Commission will continue working with Member States and affected territories to ensure a just transition, leaving no affected region and their people behind. The Just Transition Platform (add reference to the website), launched in June 2020, will support authorities and stakeholders working on just transition, by providing tailored technical assistance, not least to develop and then implement the transition plans for both coal regions and carbon intensive regions.

⁴⁹ All coal, peat and oil shale regions (DE, PL, CZ, BG, RO, ES, EL, IE, HU, SK) are supported via EU funds (Cohesion policy, LIFE, H2020). Support also comes in the form of technical assistance (Structural Reform Support Programme, the EIB-Commission support through Jaspers, ENER’s START programme and contract with the World Bank).

⁵⁰ The Initiative is an open forum for stakeholder dialogue with national, regional and local authorities, wider society, industry, trade unions, NGOs, academia, experts in energy transition, and the European Commission.

⁵¹ E.g. joint work by Commission and Polish partners in Poland’s coal country team set up under the initiative led to €100 million of ERDF and Cohesion Funds being reprogrammed in Silesia to support local ‘just transition’ projects. This highlights the need to anticipate consequences of the transition and adapt policies and objectives in a concerted manner. Most Member States currently planning the phase out of coal or other solid fossil fuels (peat, oil shale) would benefit from providing more specific information on the way to proceed with the transition until 2030 and beyond.

The Commission will also continue promoting dialogue and cooperation with and among local authorities through the **Covenant of Mayors** (already covering 320 million EU citizens in over 10 000 municipalities), the **Clean Energy for EU Island Initiative** (56 islands in 25 Member States)⁵², and the establishment of a new Climate Pact. Public-private partnerships⁵³ for social housing can complement public-sector measures to combat energy poverty at local level.

2.3 Energy security, internal energy market, R&I and competitiveness

2.3.1. Energy security

The COVID-19 crisis has shown the importance of a resilient energy system with appropriate business continuity plans. It has tested the resilience of critical energy infrastructures and highlighted their vulnerability to shortages in the supply of strategic components and technologies, as well as the importance of preserving strategic supply chains. It has also highlighted the interlinkages between different sectors and the need to protect against cyberattacks since the energy system is increasingly digitalised and decentralised⁵⁴. A number of NECPs also acknowledge energy efficiency and domestic renewables as key factors contributing to their energy security (Malta, Luxembourg, France, Lithuania and Portugal). Even though most Member States flag their energy sector as vulnerable to climate change in their national adaptation strategy or even in the decarbonisation chapter, only five Member States have proposed corresponding measures under the chapter on energy security.

In terms of external energy security, the EU remains dependent on imports for half of its primary energy consumption, but has diversified its supply routes, notably for natural gas. Regional cooperation is crucial in this respect. In their NECPs, seven Member States (Bulgaria, Italy, Estonia, Germany, Poland, Croatia, and Ireland) are considering or planning further LNG capacities to ensure supply security or increase competition on the gas markets.

Member States with nuclear energy as part of their energy mix, presented their nuclear plans in their NECPs. The Commission will continue to secure the application of the highest safety standards for nuclear technologies, supporting the regulatory processes and cooperation between concerned Member States. Concerned Member States should maintain adequate capacities in all the parts of the nuclear supply chain and ensure security of fuel supply to lead to safer facilities for people and the environment, and focus on building up skills and industrial strategic capabilities for decommissioning and nuclear waste reprocessing.

⁵² 26 islands receive support for the development of their Clean Energy Transition Agenda (6 "pilots" and 20 "pioneers"), 13 more islands have signed the Island pledge in 2019 towards full decarbonisation; 16 additional islands receive support on specific technical aspects for projects being prepared.

⁵³ Such as the Papillon project (city-NGO-industry) in Belgium

⁵⁴ The Commission Staff Working Document Energy Security: good practices to address pandemic risks, contains a list of risks and challenges in the short-term and long term, as well as a series of 20 good practices to address risks in the energy sector that are associated with a pandemic. https://ec.europa.eu/energy/topics/energy-security/energy-supply-and-pandemic_en

NECPs and energy security: challenges and opportunities for recovery and European Green Deal objectives

On energy security, the pandemic highlighted the need to focus more on the resilience of clean technology supply chains. **Developing strategic supply chains of industrial capabilities in clean technologies⁵⁵ should be a focus of recovery and resilience plans⁵⁶.** Member States need to identify policies and measures from NECPs to improve preparedness and enhance resilience in this respect. This also requires cross-border cooperation and EU action, including beyond EU's borders supported by an assertive energy diplomacy.

Member States need to ensure that their energy systems are capable of meeting the challenges posed by both extreme events (storms, droughts, floods, heatwaves) and slow-onset pressure (e.g. water scarcity, sea-level rise, permafrost thawing), not only within the EU, but also outside its borders in terms of energy imports. The EU is providing funding (Horizon 2020 call and future Horizon Europe funding) to reduce reliance on commodity modules by developing next generation solar photovoltaic manufacturing through innovative technologies for modules that bring together the whole value chain.

As part of the new Security Union Strategy⁵⁷, which addresses both critical infrastructure and cybersecurity, the Commission proposed actions to tackle the specific risks faced by critical energy infrastructures in an integrated energy system and infrastructure. A Network Code on cybersecurity in electricity will be developed with sector-specific rules to increase the resilience and cybersecurity aspects of cross-border electricity flows. This includes rules on common minimum requirements, planning, monitoring, reporting and crisis management.

2.3.2. Internal Energy Market

A fully integrated and well-functioning internal energy market provides price signals to guide investment in green energy and technologies, secures energy supplies and enables the least-cost path to climate neutrality through smart technologies. The NECPs assessment highlights several shortcomings in the energy market (flexibility through smart grids, storage and limited demand-side response). These have a negative impact on costs for consumers and industry, hamper a successful recovery, and the transition towards climate neutrality.

In this context, the NECPs are a tool to help ensure that the objectives the electricity and gas internal market legislation are achieved, and the right policy and financial framework is in place to meet the challenge of climate neutrality at least cost while safeguarding energy security. The NECPs also provide an opportunity to strengthen the role of consumers as active participants and beneficiaries of the green transition.

Though most Member States recognise the importance of the new electricity market design, only some have a holistic approach to necessary changes in forward-looking objectives. In an

⁵⁵ Including photovoltaic, batteries, renewable hydrogen, wind and ocean energy, grid and electronic components

⁵⁶ Complementing the EU's Action Plan on Critical Raw Materials, and upcoming European Raw Materials Alliance including energy.

⁵⁷ EU Security Union Strategy COM(2020)605 final

integrated and cost-reflective energy system, efficient markets should provide transparent price signals for consumers to both contribute to and benefit from the transition. Many plans also lack key information on competition and market liquidity.

A considerable number of NECPs refer to smart meter deployment with a specific and measurable target as enabling consumers to actively participate in the market. However, few set specific objectives and clear timelines, making it difficult to monitor progress towards the targets.

Fossil fuel subsidies remain a major impediment to a cost-efficient energy and climate transition and to a functioning internal market. The final plans show a slight improvement in the reporting of energy and fossil fuel subsidy amounts and measures to phase them out. Providing the necessary details overall would be important for an assessment of the extent to which fossil fuel subsidies in place are hampering climate objectives⁵⁸. Only three countries (Italy, Denmark, and Portugal) have performed a comprehensive stocktake of fossil fuel subsidies and few Member States intend to phase them out or have formulated specific policies.

Electricity interconnections together with local grids are a key enabler for decarbonisation, market integration, security of supply and competition. Most Member States have included interconnectivity targets or projections of interconnectivity level by 2030 in their final plans. On electricity, most Member States have already achieved and even far exceeded the EU interconnectivity target of 15% as set for 2030. The role of Projects of Common Interest (PCIs) in meeting this target is key⁵⁹. The Commission will continue to assist the remaining Member States in increasing their interconnection capacity and ensure that existing interconnection capacity is fully used to maximise the benefits of the internal energy market in line with EU law⁶⁰.

Member States have indicated the investment needs relating to the internal energy market in their NECPs. On interconnections, Germany indicated that it needs €55 billion to upgrade its existing electricity transmission system and to build new onshore transmission infrastructure by 2030. A further €21 billion is needed for offshore electricity transmission infrastructure to allow for the installation of 17-20 GW offshore wind by 2030. Spain also planned to strengthen and expand transmission and distribution lines, including between islands, and interconnections with neighbouring countries, in particular France. On investments related to energy system integration and flexibility, Estonia indicated 500MW of pumped hydro storage by 2028, and Greece plans to implement ‘smart’ policies for islands

⁵⁸ Although Member States have addressed the recommendation to describe and list energy subsidies in their NECPs, the quality of the information ranges from general descriptions to comprehensive and quantified lists of subsidies. 19 Member States have included information on fossil fuel subsidies. 12 Member States have indicated (the intention to) work on setting plans to phase out fossil fuel subsidies. Only six Member States have included a timeline to phase out some of the existing fossil fuel subsidies.

⁵⁹ Since the Energy Infrastructure Regulation (TEN-E) came into force in 2013, nearly 40 gas and electricity PCIs have been implemented and some further 79 Projects of Common Interest (PCIs) are expected by 2022. To this end, an amount equal to EUR 3.8 billion has been invested from the Connecting Europe Facility (CEF).

⁶⁰ Article 16.8 of the Regulation (EU) 2019/943 on the Internal Market for Electricity

that cannot be interconnected in a cost-effective way, for instance by setting up innovative hybrid renewable power generation with storage systems.

NECPs and internal energy market: challenges and opportunities for recovery and European Green Deal objectives

The focus on ensuring that markets remain liquid and competitive is key to delivering energy and climate goals as well as steering recovery investments to avoid distorted market signals. A more structured and coherent approach is needed to identify and promote sources of flexibility and address any barriers to market participation by new players and enable open and competitive markets for the transition. This should be fully reflected by Member States when implementing their NECPs.

Though Member States follow different paths to sector integration, the recently adopted **EU Strategy for Energy System Integration** can constitute a reference point for Member States on more flexible energy systems and provide the next steps in adapting energy markets to climate neutrality needs.

The **Commission will also promote greater demand side flexibility through a Network Code⁶¹, revision of the State Aid guidelines, and consumer information.**

Member States need to fulfil their obligation to report on **energy subsidies, in particular for fossil fuel subsidies, and measures to phase them out**. In view of the international commitments to phase out fossil fuel subsidies in the G20 and the UN, as well as EU's own policy commitments, the Commission will address this matter in the State of the Energy Union report 2020 and issue further guidelines to Member States to promote a shift away from fossil fuel subsidies. This will help Member States to address the incoherence between 2030 objectives and green recovery and resilience on the one hand, and the use of scarce financial resources to encourage fossil fuels consumption and prevent the needed technological shifts on the other. The Commission will pay particular attention to improving reporting on fossil fuel subsidies and progress towards phasing them, particularly as part of the integrated national energy and climate progress reports. In the context of the legislative reviews of the Energy Taxation Directive, as well as State Aid Guidelines, the Commission will consider the need to take further measures to ensure coherence among EU policies and address the EU Green Deal's ambition to end fossil fuel subsidies.

Concerning **infrastructure**, most plans identified as key actions the completion of PCI projects, strengthening of internal grids and the deployment of innovative technologies such as smart grids and new generation electricity grids⁶², including the revision of network codes for renewable energies. European grids must adapt to the changing energy system of more decentralised, digital real-time, and two way energy across sectors. To this aim the Commission will review the TEN-E and TEN-T Regulations and the Alternative Fuels

⁶¹ To unlock the potential of electric vehicles, heat pumps and other electricity consumption to contribute to the flexibility of the energy system (starting end-2021).

⁶² New generation electricity grids make efficient use of new communication technology (e.g. digital platforms) to exploit the energy infrastructure in an innovative way (e.g. flexible networks), by its users (generators, consumers and prosumers).

Infrastructure Directive, the scope and governance of the Ten Year Network Development Plans, and accelerate investment in smart, highly-efficient, renewables-based electricity, district heating and cooling, and in CO₂ infrastructure.

2.3.3. Research, innovation and competitiveness

There final NECPs fail to pay sufficient attention to R&I needs for delivering on climate and energy objectives. There is an **overall decrease in national budgets devoted to R&I in clean energy technologies** and a **severe lack of national objectives and funding targets** that show concrete and relevant pathways to 2030 and 2050. Most of the plans also outline only funding of existing non-energy specific programmes that run for fewer than five years.

The cooperation between the Member States and the Commission through the Strategic Energy Technology Plan (**SET-Plan**) received full support in the vast majority of the NECPs as a basis for energy R&I planning and alignment. Some Member States specified areas of particular interest, but most did not specify how national funds and/or activities are allocated under the work packages (implementation plans) in which they are involved and how the SET Plan and their national energy and climate objectives are linked.

Batteries will play an equally prominent role for the EU's transport decarbonisation and power sector to keep system costs low (by providing emissions free balancing and flexibility and reducing grid expansion needs). Batteries are covered by NECPs in this respect for their necessary roles in stationary and mobility applications. NECPs cover partially the related needs for further R&I and the development of industrial manufacturing capabilities. The European Battery Alliance⁶³, launched by the Commission three years ago, has helped to provide the necessary impetus among industrial stakeholders to invest in battery production in the EU. Member States, industry and other key stakeholders have responded massively and rapidly, including through Important Projects of Common European Interest (IPCEI). Over 500 actors are now part of the alliance that has attracted €100 billion of combined investments announced along the EU value chain. There are over 20 battery factories under development (at different maturity stages) with numerous projects across the whole value chain, including extraction and refining raw materials, battery materials, and recycling. The first resulting 11 EU factories that are being built should start producing by 2022-2023 and deliver 270GWh batteries per year by 2030. Industry estimates this results in value added of €250 billion annually from 2025 onwards, creating 4 to 5 million jobs, whilst overall transport electrification including road and rail in the EU could bring additional 600,000 jobs by 2030.

Before the end of 2020, the Commission will adopt a new fit-for-future regulatory framework for batteries, which will aim to ensure that all batteries placed on the EU market (regardless of their origin) meet the highest standards regarding performance, durability, safety, responsible sourcing of raw materials and minimal environmental impact, including low carbon footprint

⁶³ To develop a strong, innovative, sustainable and competitive battery value chain in the EU, supporting transport electrification in response to the strong demand for electric vehicles, securing access to batteries strategic raw materials and increasing resilience and autonomy, capturing the skills and boosting manufacturing capacities.

over their life cycle. The new regulation should be complemented by high quality and timely standards to be developed by CEN/CENELEC.

Some Member States give specific attention to long-term technologies such as carbon capture and use and storage (CCUS) which could contribute to decarbonise certain hard-to-abate sectors by 2030 and hydrogen, while incremental innovation in more near-term technologies such as energy efficiency, wind and solar receives less attention.

The **approach to competitiveness varies between NECPs**. Some followed a narrow definition looking at patents and researchers, or even just at power prices. Other plans cover technology deployment aspects and thus take a broader competitiveness approach to national suppliers of clean technologies, including the value chains to develop such solutions. However, most plans lack quantitative indicators and are therefore not measurable.

NECPs and R&I and competitiveness: challenges and opportunities for recovery and European Green Deal objectives

A new strategic approach to clean energy R&I and competitiveness is needed to rebuild the European economy and accelerate the innovation and market uptake of new technologies and innovation for climate neutrality. Both EU and national R&I policies as well as funding and national industrial strategies need to be better aligned with energy and climate objectives and be made operational through NECPs.

A range of funding instruments are available to help Member States do more in this area, such as Horizon Europe, the Innovation and Modernisation Funds and Invest EU. In September 2020, the Green Deal call will also support economic recovery by providing €1 billion of R&I funding (with €250-300 million for key energy priorities). The Innovation Fund launched a first call in July 2020, providing €1 billion to large-scale projects for clean and innovative technologies. A new call dedicated to small-scale projects (with a capital expenditure of less than €7.5 million) is being prepared and will be launched by the end of 2020.

The Commission will revise the SET-Plan in 2021. This will support the EU's green recovery and address the R&I needs of Member States, who also need to develop clear and ambitious national objectives and funding targets for R&I. The EU will also work with the private sector to increase their level of R&I spending and related deployment in clean energy technologies.

Hydrogen strategy

Most NECPs acknowledge⁶⁴ the role of hydrogen in the energy transition. Half of the plans mention concrete hydrogen-related objectives for the domestic generation of renewable or low-carbon hydrogen, for end-use in industry and hard-to-electrify transport sectors (such as Luxembourg which aims to make steel more sustainable through renewable hydrogen use).

⁶⁴ France, Germany, Austria, The Netherlands for instance have concrete plans in their NECPs, while others such as Portugal are developing fast concrete strategies.

The Commission, Member States and industry will work together in the Clean Hydrogen Alliance on implementing the recently published EU Hydrogen Strategy.

The goal is to develop an investment agenda with a pipeline of viable projects and further develop clean hydrogen supply chains and downstream technologies. Energy diplomacy and coordinated action beyond EU borders, particularly with the countries in the Neighbourhood, will be necessary for the successful implementation of the Hydrogen Strategy.

Numerous projects are underway. Denmark and Germany building at Bornholm a 3-5 GW offshore wind energy production, including an electrolysis facility to fuel trucks, busses, ships and aircraft. Spain is planning since the submission of its NECPs the construction of a 100 MW PV plant, 20 MWh ion lithium battery storage system and hydrogen production system through electrolysis in Puertollano.

Together with the State of the Energy Union Report, the Commission will present the first Competitiveness Progress Report in autumn 2020. This will analyse how competitive the clean technologies and solutions are and propose a common approach to assessing competitiveness and quantifying efforts. The underlying Clean Energy Transition - Technologies and Innovations Report will present a more detailed evidence-based analysis of the current and future **status** of clean technologies and solutions to help create a stronger link between R&I activities, clean technologies, and energy and climate objectives (at national and EU level).

2.4. Regional cooperation and environmental aspects in the NECPs

2.4.1. Increased cooperation between Member States and multi-level dialogue

The plans indicate that, though Member States understood well and described the need for **regional cooperation**, with some making use of existing regional fora in drawing up the plans, the full potential of regional cooperation has yet to be seized. Few Member States describe specific measures to optimise access to and use of regional facilities or how to plan better renewable energy deployment and energy efficiency measures in cooperation with other Member States.

Building on the NECPs, Member States should make better practical use of regional cooperation. This should include using existing fora to address common issues affecting energy transition priorities, especially energy efficiency, transport, smart grids and renewables (such as planning, skills shortages for renewable energies, energy efficiency and buildings) thus enhancing the energy transition regionally. Examples of this happening already are the four existing groups: the Pentalateral and CESEC, the Northern Seas initiative, and the Baltic countries (for example Estonia and Latvia are planning a joint auction for offshore wind).

Regional planning of auctions, such as for offshore wind, would help build a steady pipeline of projects and underscore foresight and recovery contribution of this sector⁶⁵.

Member States should accelerate flagship projects with a regional dimension such as offshore wind and fast charging networks along TEN-T corridors. To do this they should use the recovery funds, CEF and regional aid funds, and the EU renewable energy financing mechanism, making full use of regional forums. Member states could also collaborate on the pilot testing of breakthrough energy efficiency or energy generation technologies, with a view to identifying the most efficient and cost-effective technologies and triggering their industrial production. The pooling of architectural heritage renovation projects could also trigger the large scale production of specific technologies such as solar shingles or photovoltaic glass, and render those a cost-effective option for the renovation of historic buildings.

2.4.2. NECPs and environmental policies

Air pollution is a risk factor for certain illnesses, such as respiratory and cardiovascular diseases⁶⁶. These are the diseases that put people at a higher risk from COVID-19.

The Governance Regulation requires⁶⁷ Member States to report on the impacts of industrial, agricultural, transport and energy policies and measures on air pollution, linked to environmental legislation⁶⁸. Despite some efforts made, there continues to be insufficient reporting of the projected impacts of the planned policies and measures on the emissions of air pollutants by Member States in their final plans. Only 13 Member States provided a sufficient level of detail and/or improved analysis of the air impacts compared to the draft plans. The final plans provide insufficient analysis of potential trade-offs between air and climate/energy objectives (mostly related to increasing amounts of bioenergy). It is welcome, though, that some Member States analysed impacts of planned measures on all air pollutants regulated under the National Emissions Reduction Commitment Directive⁶⁹, with even sometimes a useful split by source sector, which helps define mitigating measures more efficiently.

The assessment of the potential impacts of expanding bioenergy planned in several plans on carbon sinks, biodiversity, water, and air pollution is insufficient. They lack details on how to supply the required sustainable biomass, by feedstock and origin and trajectories for forest biomass, and how they are aligned with measures to maintain and increase the carbon sink.

⁶⁵ Slovenia has promoted regional cooperation in setting up smart grids and introduced innovative technologies in the wider region together with Croatia, using the Connecting Europe Facility.

⁶⁶ WHO estimates globally annual 7 million premature deaths due to air pollution and over 400,000 premature deaths in the EU according to the European Environmental Agency

⁶⁷ The Energy Union Governance Regulation stipulates that this obligation applies “where relevant”, which is the case in all sectors where air pollutants and GHG emissions originate from the same source (transport, energy, agriculture, industry, domestic heating etc.).

⁶⁸ NEC Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants.

⁶⁹ EU 2016/2284

NECPs and environmental policies: challenges and opportunities for recovery and European Green Deal objectives

All Member States should strengthen the link between National Air Pollution Control Programmes (NAPCPs) and NECPs, also in terms of implementation at local level⁷⁰. This will improve the process of identifying synergies and avoiding or mitigating trade-offs, while promoting synergistic measures (e.g. clean transport, increased share of non-combustible renewables).

In most NECPs, further work is needed to integrate and quantify greenhouse gas emissions reductions associated to **circular economy** policies, and assess the synergies and trade-offs of specific policies with **biodiversity** (e.g. role of ecosystem services for mitigation and adaptation, but also risks in terms of biodiversity loss). The analysis of such interactions could be expanded to other environmental domains, such as water and soil pollution, resource-efficiency and the water-energy nexus in line with the “do no harm” principle espoused in the European Green Deal. When assessing the potential to develop bioenergy, Member States should also evaluate the efficiency of bioenergy compared to other sources of renewable energy, including in terms of land-use and carbon sinks, air quality and other environmental impacts. As set out in the Biodiversity Strategy, the **EU will prioritise solutions such as ocean energy, offshore wind (that supports fish stock regeneration)**, solar-panel farms that provide biodiversity-friendly soil cover, and sustainable bioenergy.

3. CONCLUSIONS

This assessment shows that the first implementation of the new integrated planning framework set out in the Governance Regulation has been very positive. All Member States have submitted final plans of good quality, albeit sometimes with some delay. The plans follow a comparable structure and cover integrated national objectives and policies for all the dimensions of the Energy Union. The plans were also the outcome of wide consultation and participation at national and subnational level, building a strong sense of ownership of the energy and climate transition objectives. This work represents a major effort by Member States and lays the foundation for stepping up the ambition to deliver climate neutrality in line with the European Green Deal, the proposed European Climate Law and the Communication on stepping up Europe’s 2030 climate ambition.

The aggregate assessment at EU level has identified the following key takeaways and trends. The final plans are substantially more ambitious than the 2018 draft plans, on key dimensions such as greenhouse gas emissions reduction or renewables targets. This is in line with the Commission’s June 2019 recommendations on the draft plans.

⁷⁰ At municipality level, air quality drives behaviours towards energy transition and decarbonisation as the benefits are felt quickly. EU finances several bottom up initiatives covering circular economy and air pollution.

First, the assessment shows that Member States are accelerating their energy and climate transition driven by the EU wide objective of climate neutrality. Greenhouse gas emissions reductions surpass the current EU target of -40% by 2030 compared to 1990 levels. Under existing and planned measures they would decrease by 41% in the current EU target scope, excluding the LULUCF sink. The energy mix is projected to change even faster than expected by many only recently. The plans indicate that almost all Member States are phasing out from coal or have set a phase-out date. The use of coal is projected to decrease by 70% compared to 2015, with renewable electricity set to reach 60% of electricity produced by 2030.

Second, the assessment shows that the share of renewable energy could reach under existing and planned measures a range of 33.1-33.7% by 2030 at Union level, going well beyond the current 2030 target of at least 32% share of renewable energy. Further investment and reforms in renewable energies identified in NECPs, have the potential to push this share further up.

Third, with regard to energy efficiency, an ambition gap for 2030 remains. Albeit reduced compared to that of the draft plans, the gap still stands at 2.8 percentage points for primary energy consumption and 3.1 percentage points for final energy consumption, compared to the target to increase energy efficiency by at least 32.5% by 2030. While there is a growing attention to the issue, as shown by the final plans, and measures already planned at the European level, there are still significant efforts to be made to close the gap. In this context, the Commission will take action, in particular through the Renovation Wave initiative and the review and possible revision of the Energy Efficiency Directive, and guidance for the Energy Efficiency First Principle.

Furthermore, plans do not always detail with sufficient precision actions and measures in important dimensions such as identifying investment needs, mobilising funding, research and innovation and competitiveness, regional cooperation, land use and land use change and forestry, just transition and energy poverty. Lastly, Member States need to step up efforts to phase out fossil fuel subsidies. Recommendations from the Commission in these respects were not fully taken into account.

The shortcomings and remaining gaps emerging from this EU wide assessment will have to be addressed through a collective effort both by Member States and at EU-level. Member States will have to implement their NECPs, taking into account the new financing opportunities under the MFF and the Recovery and Resilience Facility. Investments should primarily be centred on renovating buildings, sustainable mobility, decarbonising industry and agriculture, renewable energies, including renewable hydrogen, and associated technologies and solutions for energy system integration. Enhanced attention should also go to climate adaptation and carbon sinks. Mature projects should be frontloaded as much as possible. The Recovery and Resilience Facility should be used in conjunction with other existing funds, notably InvestEU to crowd in private financing and scale up public financing.

In the context of the fifth report of the State of the Energy Union to be adopted in October, the Commission will publish staff working documents for each Member State containing individual assessments of each final NECP and of the way these addressed the related 2019 Commission recommendations. They will also provide some guidance for the implementation

of the plans, and on actions that will help exploit the full potential of the plans in the context of a green recovery.

The Commission will assist Member States in implementing the plans through bilateral and regional engagement, the exchange of best practices, as well as through the different tools at its disposal, such as the Structural Reform Support Programme and its proposed successor the Technical Support Instrument, which offer tailor-made technical support to Member States to improve the capacity to design, develop and implement reforms, the InvestEU and the instruments proposed under Next Generation EU. Furthermore, the Commission will promote technical exchanges with Member States on the implementation of the NECPs, making the link with national recovery and resilience plans.

Action at national level will be reinforced and complemented by further policy measures at EU level, to close the remaining gap and increase the ambition level, as set out in the parallel Communication on stepping up Europe's 2030 climate ambition. The full implementation of the Clean Energy Package, including a rapid adoption of any outstanding measures, provides a solid foundation for this work.

Finally, this first exercise shows that a well-designed governance framework matters for delivering a common effort at European level. Building on the existing framework centred around the NECPs, this will nonetheless require adaptations to evolving needs and policy priorities under the Green Deal and the recovery and resilience plans. In its review by mid-2021 of the energy and climate legislation to reflect the increased greenhouse gas emissions reduction ambition for 2030, the Commission will also review the Governance Regulation and ensure that it remains fit for purpose.

The NECPs are not a one off exercise, but an iterative process. The annual reporting of greenhouse gas emissions inventories and projections, as well as the national bi-annual implementation reports, will be important tools for monitoring progress. Based on these elements Member States will update and revise their NECPs in 2023 (drafts) and 2024 (final)⁷¹. This will provide the opportunity to build on lessons learned from the first years of implementation and adapt plans to the changed climate and energy targets and economic circumstances, reflecting the agenda for green investment developed at national level in the context of the Recovery and Resilience Plans.

⁷¹ For these updates, Member States should use, whenever available and as soon as they become available, European statistics