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Assessment of the final national energy and climate plan of Greece

Table of contents

1. SUMMARY	2
2. FINALISATION OF THE PLAN AND CONSIDERATION OF COMMISSION RECOMMENDATIONS.....	4
Preparation and submission of the final plan	4
Consideration of Commission recommendations.....	5
3. ASSESSMENT OF THE AMBITION OF OBJECTIVES, TARGETS AND CONTRIBUTIONS, AND OF THE IMPACT OF SUPPORTING POLICIES AND MEASURES.....	7
Decarbonisation.....	7
Greenhouse gas emissions and removals	7
Renewable energy	9
Energy efficiency	9
Energy security.....	10
Internal energy market	11
Research, innovation and competitiveness.....	11
4. COHERENCE, POLICY INTERACTIONS AND INVESTMENTS	12
5. GUIDANCE ON THE IMPLEMENTATION OF THE NATIONAL ENERGY AND CLIMATE PLAN AND THE LINK TO THE RECOVERY FROM THE COVID-19 CRISIS.....	14
Guidance on the implementation of the national energy and climate plan	14
Link to the recovery from the COVID-19 crisis	18
ANNEX I: POTENTIAL FUNDING FROM EU SOURCES TO GREECE, 2021-2027	20
Table 1: EU funds available, 2021-2027: commitments, EUR billion.....	20
Table 2: EU funds available to all Member States, 2021-2027, EUR billion.....	20
ANNEX II – DETAILED ASSESSMENT OF HOW COMMISSION RECOMMENDATIONS HAVE BEEN ADDRESSED.....	22

1. SUMMARY

Greece's final integrated national energy and climate plan (NECP)¹ sets a 2030 target for greenhouse gas (GHG) emissions not covered by the EU Emissions Trading System (non-ETS) of -16% compared to 2005, in line with the Effort Sharing Regulation (ESR). Greece may exceed this target by at least 17 percentage points if planned policies and measures are implemented. The final plan states that Greece is committed to proportionally support the European objective of climate neutrality by 2050, consistent with its national long-term strategy. Specifically, the long-term strategy sets out a GHG reduction target of about 95% by 2050 compared with 1990 (for the 1.5 degrees Celsius target scenario) or of about 85% (for the 2 degrees Celsius target scenario). It also sets the target for renewable share in power generation at above 95%.

The draft plan does not yet include information on how Greece would achieve its commitment that by 2030 land use, land use change and forestry (LULUCF) emissions do not exceed accounted removals. Greece has a national adaptation strategy. The NECP does not specify Greece's adaptation goals and only refers to the existing strategy.

Greece's **renewable energy contribution** to the EU target for 2030 is 35% of gross final energy consumption without cooling from heat pumps. This is more ambitious than the contribution of 31% specified in the draft NECP and well above the minimum share resulting from the formula in Annex II of the Governance Regulation². This increased ambition is linked to the planned increase in the renewable energy share in the electricity, heating and cooling sectors.

For **energy efficiency**, Greece specified that it would achieve energy consumption levels of 20.6 Mtoe for primary energy consumption and 16.5 Mtoe for final energy consumption. While more ambitious than in the draft plan, those figures are still of modest and low ambition respectively³. The energy efficiency first principle is applied, acknowledging the overall importance of energy efficiency goals and considering energy efficiency policies as a horizontal priority throughout the NECP. The final NECP provides further information on the energy efficiency of buildings including a plan to renovate 600 000 homes by 2030. Greece has not yet submitted its long-term renovation strategy.

In its plan, Greece set objectives for **energy security**, aiming to ensure security of supply and the further development of the **internal energy market**. These two objectives are strongly interlinked and include a new market design, market coupling with neighbouring countries, interconnection of islands, new gas infrastructure projects as well as a new gas trading platform. Some of the objectives lack quantification and/or time frames.

Greece aims to reach an **electricity interconnectivity target** of 21% by 2030 and to expand its cross-border infrastructure with neighbouring countries for both electricity and gas to this end. Under the plan, this target should already be met by 2025.

¹ The Commission publishes this country-specific assessment alongside the 2020 Report on the State of the Energy Union (COM(2020)950) pursuant to Article 13 of Regulation (EU) 2018/1999 on Governance of the Energy Union and Climate Action.

² The Commission's recommendations with regard to the Member States' renewable ambitions is based on a formula set out in this Regulation. The formula is based on objective criteria.

³ In accordance with the methodology as illustrated in the SWD(2019) 212 final.

National objectives and funding targets related to **research, innovation and competitiveness** are established to support the development of technologies for the achievement of the overall energy targets by 2030. In particular, research and innovation activities relate to the improvement of the energy efficiency of buildings, while research and innovation (R&I) actions focus on renewables technologies. The plan indicates energy networks, digitalisation and development of smart grids as priority areas for R&I. Actions on energy storage are also planned.

Accumulated **investment** to attain the plan's objectives is estimated at around EUR 43.8 billion over 10 years. Overall investment figures are given per policy area, but the split between public and private funding is not specified for different sectors. Greece has provided estimates of the budgetary impacts for some of the planned policies and measures, in particular under the energy efficiency and renewable energy, and to a lesser extent, the R&I dimension of the plan. The plan lacks an analysis of the gap between the investment needs and available sources of financing.

A detailed list of **energy subsidies**, in particular for fossil fuels, is missing from the plan, although a qualitative discussion on subsidies is provided. Significant energy subsidies have been identified in recent Commission analyses on energy subsidies. A list of actions undertaken and planned to phase out fossil fuels subsidies is not included, although the intention to reduce or phase these out has been expressed in the plan.

The plan provides information on the interactions with **air quality and air emissions** policy by mentioning quantitative obligations to reduce national emissions of certain air pollutants under Directive (EU) 2016/2284. It also presents the **circular economy** as a core element in Greece's development strategy, integrated into sectors like construction, waste, urban planning and bioeconomy. The plan acknowledges the synergies between circular economy and GHG emissions reductions, but without quantification. Further quantification efforts of the impact of circular economy on decarbonisation would be welcome in future plans, in line with the most recent scientific evidence.




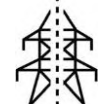
The NECP succinctly describes the synergies between climate policies and **biodiversity**. Future updates would benefit from further reflexion on the interactions with carbon sinks and biodiversity, especially when referring to the increased use of bioenergy and the sustainable supply of biomass.

The plan considers the **just and fair transition** aspects and provides information on social, employment and skills impacts of a transition to a carbon-neutral economy. For example, Greece will develop transition plans for Western Macedonia and Megalopolis that are both dependent on lignite and will be affected by its phase-out. Employment impacts in the energy sector have been considered. The overall jobs impact of the transition is projected to be positive, thanks to the creation of over 60 000 jobs by expanding renewable energy sources and implementing energy-saving measures and policies.

On **energy poverty**, Greece reports the number of households affected, and planned measures to reduce energy poverty. According to the plan, to date, 23% of the population was unable to heat their household sufficiently in 2017. For vulnerable consumers, this share was 41%.

There are several examples of **good practices** in Greece's final NECP, in particular 'the early and full decommissioning of lignite-fired generation linked to an increase in renewable resources and enhancing energy efficiency measures'.

The following table presents an overview of Greece's objectives, targets and contributions under the Governance Regulation⁴:

	National targets and contributions	Latest available data	2020	2030	Assessment of 2030 ambition level
	Binding target for greenhouse gas emissions compared to 2005 under the Effort Sharing Regulation (ESR) (%)	-28 (2017)	-4	-16	As in ESR, total GHG target implies higher reductions
	National target/contribution for renewable energy: Share of energy from renewable sources in gross final consumption of energy (%)	18 (2018)	18 (target)	35	Sufficiently ambitious (32% is the result of the formula)
	National contribution for energy efficiency: Primary energy consumption (Mtoe) Final energy consumption (Mtoe)	22.64 (2018) 16 (2018)	22.68 16.93	20.55 16.51	Modest Low
	Level of electricity interconnectivity (%)	10%	13	21	N.A

Sources: EU Commission, Energy statistics, Energy datasheets: EU countries; European Semester by country; Greece final national energy and climate plan.

2. FINALISATION OF THE PLAN AND CONSIDERATION OF COMMISSION RECOMMENDATIONS

Preparation and submission of the final plan

Greece **notified** its final national energy and climate plan (NECP) to the European Commission on 23 December 2019 together with its long-term strategy.

A public consultation on the draft NECP was held from 13 November to 7 December 2018. As a follow up, a number of meetings and workshops were held with various stakeholders before the NECP was finalised, and many comments were submitted.

⁴ 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, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council.

Greece organised a **public consultation** on the final NECP from 28 November to 16 December 2019. The Parliament as well as local and regional authorities were involved throughout the process. Annex E and a separate note submitted with the plan explain how Greece considered the feedback from the public consultation. There is no clear indication of a strategic environmental impact assessment (SEA) developed on the NECP under Directive 2001/42/EC, although the plan acknowledges the intention to prepare special environmental impact assessments in the period following the public consultation, ‘upon completion and adoption of special frameworks for the implementation of projects, strategic plans and programmes with a view to incorporating environmental approvals and promoting sustainable development’.

Consideration of Commission recommendations

In June 2019, the Commission issued nine recommendations on Greece’s final plan⁵. Annex II to this staff working document provides a detailed account of how these recommendations have been reflected in the final NECP. Overall, the recommendations were **partially addressed**. The main changes introduced in the final plan are the following:

On **renewables**, Greece **largely addressed** the recommendation to improve renewables policies and measures. National contributions have been, in general, increased and a clear outline of the renewables trajectory is presented, including a separate one for advanced biofuels.

On **energy efficiency**, Greece **partially addressed** the recommendation to increase ambition and to clarify timelines for the adoption and implementation of the policies planned to be in place as of 2020, especially regarding new instruments. The new national contribution marks a reduction, i.e. a significant improvement, compared to the contribution set out in the draft plan, but they are still ranked as ‘modest’ and ‘low’ respectively. More details are given on policies and measures. On buildings, the NECP includes significant information, including indicative milestones and measures to promote renovations. The long-term renovation strategy has not been submitted yet.

On **energy security**, Greece **largely addressed** the recommendation to specify the measures supporting the energy security objectives and to clarify the role of gas. In particular, Greece introduced new and clearer indicators in the final NECP. For example, the energy dependency target was set at the level of 70% by 2030, down from approximately 78% in recent years. Clearer objectives are also set in terms of diversification of sources (renewables and energy efficiency promotion) and interconnection targets. The final plan also explores the possibility of using liquefied natural gas (LNG) from different supply routes and increasing the role of natural gas as a transitional fuel.

On the **internal energy market**, Greece **largely addressed** the recommendation to set clear objectives, milestones and timelines as well as to address the distortions in the wholesale market. In particular, the final NECP better outlines the reform of the electricity market and sets clear timelines in line with Greece’s commitments under the European Stability Mechanism (ESM) programme for Greece. The final plan includes the commitment to increase competition, especially on the wholesale side, but it lacks further details. The accelerated de-lignification plan takes away a baseload generation source from the grid and may create space for investment in

⁵ Commission Recommendation of 18 June 2019 on the draft integrated national energy and climate plan of Greece covering the period 2021-2030, C/2019/4408.

new capacity. The final plan also promotes the participation of all resources, better integration of renewables, the active role and protection of prosumers and consumers. Some objectives and targets regarding demand response and consumer empowerment measures miss concrete details and are only partially addressed.

On **research, innovation and competitiveness**, Greece **partially addressed** the recommendation to clarify the national objectives and funding targets. In particular, Greece presents more ambitious targets for all key indicators and a better developed framework for its fulfilment. Nevertheless the plan does not include time frames or the details of the budget that will be needed. No reference to the strategic energy technologies (SET) plan or its implementation actions is included in the plan.

Greece **partially addressed** the recommendation to reinforce **regional cooperation**. Several actions have been undertaken to reinforce regional dialogues, especially across the Mediterranean. However, little information is reported about future goals and specific action to intensify cooperation in order to deliver the plan. The agreement for the establishment of the Regional Security Coordinator in Greece is a new, positive development to strengthen cooperation in South East region in terms of system security.

Greece **partially addressed** the recommendation to list actions and plans to **phase-out energy subsidies, in particular for fossil fuels**. A high-level overview of subsidies and the intention to reduce or phase out existing subsidies is mentioned in the final NECP. However, it lacks details on fossil fuel subsidies and on specific actions and plans to phase out subsidies.

Greece **partially addressed** the recommendation to complement the **analysis on air quality**. The final plan presents a short assessment of the impact of the planned measures on public health in terms of ‘disability adjusted life years’. However, it does not provide either an explanation on how these results will be reached or information on which air pollutants are impacted and to what extent.

Finally, Greece **partially addressed** the recommendation to better integrate **just and fair transition aspects**. In particular the plan provides additional information on how the just transition for coal reliant regions and energy poverty will be addressed. This relates to the development of strategies as part of a ‘master plan’ for Greece and in particular for these two issues (both planned in 2020). The plan provides limited information on specific action to be addressed through the master plan and other measures.

Links with the European Semester

In the context of the European Semester framework for the coordination of economic policies across the EU and of the country report 2019⁶, Greece received one country-specific recommendation⁷ on climate and energy, calling on it to ‘focus investment-related economic policy on sustainable transport and logistics, environmental protection, energy efficiency, renewable energy and interconnection projects, digital technologies, research and development,

⁶ The Annex D to the 2019 Country report also sets out priority investments for the 2021-2027 cohesion policy, substantially contributing to the clean energy transition.

⁷ Recommendation for a Council Recommendation on the 2019 National Reform Programme of Greece and delivering a Council opinion on the 2019 Stability Programme of Greece, COM(2019) 508 final.

[...] taking into account regional disparities and the need to ensure social inclusion'. In the 2020 country report⁸ adopted on 20 February 2020, the Commission found that Greece had made some progress on this recommendation.

Due to the COVID-19 crisis, the European Semester country-specific recommendations for 2020 addressed Member States' responses to the pandemic and made recommendations to foster economic recovery. In particular, they focused on the need to start mature public investment projects and promote private investment as soon as possible, including through relevant reforms, notably in the digital and green sectors. In this context, Greece received a country-specific recommendation⁹ stressing the importance of focusing investment on 'the green and digital transition, in particular on safe and sustainable transport and logistics, clean and efficient production and use of energy, environmental infrastructure and very-high capacity digital infrastructure and skills'.

The Governance Regulation requires Member States to ensure that their national energy and climate plans consider the latest country-specific recommendations issued in the context of the European Semester. Greece's national energy and climate plan has the potential to support the implementation of the European Semester recommendations, as it identifies the necessary investment needs and financial resources to meet them.

3. ASSESSMENT OF THE AMBITION OF OBJECTIVES, TARGETS AND CONTRIBUTIONS, AND OF THE IMPACT OF SUPPORTING POLICIES AND MEASURES

Decarbonisation

Greenhouse gas emissions and removals

Greece's binding 2030 **non-ETS greenhouse gas (GHG) emission target** under the Effort Sharing Regulation (ESR) is -16% compared to 2005. The plan does not include an estimate of the annual binding national limits for 2021-2030. Greece also has a national economy-wide target of at least -40% GHG emissions by 2030 compared to 1990, and at least -55% compared to 2005. With the planned policies, the final plan projects that effort sharing sector emissions will fall to 41.7 MtCO₂eq. This reduction exceeds the target by 17 percentage points according to Commission calculations¹⁰. This provides Greece with an opportunity to modernise its economy, including by transferring surplus emission allocations in exchange for possible investments from other Member States under the ESR in exchange for investments.

The LULUCF section of the NECP provides no indication on whether Greece projects to generate LULUCF credits that could be used for ESR compliance. The LULUCF sector is projected to continue to absorb carbon dioxide emissions (net sink) until 2040.

For the **agricultural and LULUCF sector**, the plan considers a number of specific measures to be supported via the common agricultural policy, including organic farming, supply chain

⁸ Commission staff working document Country Report Greece 2020, SWD/2020/507 final.

⁹ Recommendation for a Council Recommendation on the 2020 National Reform Programme of Greece and delivering a Council opinion on the 2020 Stability Programme of Greece, COM(2020) 508 final.

¹⁰ This estimate is based on the 2005 base year for Greece under the Effort Sharing Decision of 62.6 Mt, as e.g. published in SWD(2019)396, which takes account of the ETS scope extension in 2013. The Greek plan uses a higher 2005 emission value of 65.2 Mt, and calculates 35% emission reductions.

organisation, use of waste, the use of domestic biofuels, and afforestation. For **forestry**, the plan refers to synergies between mitigation and adaptation objectives and policies, notably through the national forest strategy that specifies clear actions on climate resilience, giving special attention to addressing forest fires and protection from insects. The expected increase in the use of bioenergy is not accompanied with an assessment of the sustainable supply of biomass and its impacts on carbon sinks and biodiversity.

Greece's **2050 objective** is to move towards a climate neutral economy by 2050. The required scenarios will be further discussed and processed in the future, to select the appropriate policy measures and technologies to meet this goal.

Greece aims to achieve a renewable energy share of 19% in the **transport** sector. The transformation of the transport sector will be achieved by reducing the cost of small-scale electricity storage technologies and of electromobility, developing smart infrastructures for electromobility, producing second-generation biofuels through domestic fuels, reducing the cost of all alternative fuels that can be used in transport, and promoting sustainable urban mobility.

Electromobility and the charging infrastructure that underpins it is supported by a targeted 30% share of electric passenger vehicles in new registrations by 2030. An operational plan for the development of electromobility has been set out with objectives such as expanding the demand side of the Greek market by, for example, incentivising the replacement of older vehicles with new ones that use clean technologies. Greece also aims to increase its share of electric vehicles from the current 0.33% to at least 8.7% of new registrations by 2024. Incentive schemes and communication programmes to the public are also included in the operational plan.

Advanced biofuels are estimated to contribute 8.7% to the target of RES penetration in transport by 2030, with a total of 197 ktoe consumption in transport. Targets for the use of biofuels in the transport sector exist already. Greece announces plans to expand these in other sectors. Developing domestic production of advanced biofuels and supply chains for their use is also a measure in the final NECP.

Greece also has a quantitative target for further emission reductions in the **building** sector (renovation of 600 000 residential buildings by 2030) and has presented several measures to improve the energy performance of buildings, as well as measures to upgrade the performance of public buildings.

The plan also considers measures in the product use and **fluorinated gas** (EU level policies) and **waste** sectors. Actions for reducing emissions of fluorinated gases include better control of the use as well as the prohibition of producing new domestic refrigerators and freezers that use fluorinated gases above certain thresholds. Initiatives to revise the national and regional waste management plan are also included, aiming to promote circular economy through waste management.

The plan recognises the country's vulnerability to climate change and the relevance of climate resilience. There is no explicit mention of the objectives under the National Strategy for Adaptation, but the NECP refers to the relevant documentation that sets the goals, priorities and means to achieve them. Thirteen regional action plans for climate adaptation are currently being developed.

Greece notified its long-term strategy to the Commission on 8 January 2020. Greece aims to approach climate neutrality by 2050 with a radical reduction in GHG emissions at a level that is compatible with the objective of limiting global warming to 2 °C to 1.5 °C. However, the long-term strategy lacks many elements required by Article 15 of the Governance Regulation.

Renewable energy

The national contribution to the 2030 EU renewable energy target is specified in the plan, amounting to 35% in gross final energy consumption. This is considered sufficiently ambitious, since it is above the share of 32% that results from the formula in Annex II of the Governance Regulation. The indicative trajectory provides all reference points¹¹.

Greece aims to cover 61% of its **electricity** consumption from renewable sources by 2030. The main contributing technologies are wind and solar photovoltaics. Greece aims at a 42.5% share of renewable energy in heating and cooling and 19% in the transport sector. In absolute terms, renewable electricity is expected to increase significantly in heating and cooling and transport because of the planned electrification of these sectors. This will occur through the deployment of heat pumps, energy storage systems, methane and hydrogen produced from renewable electricity, and electric vehicles. Across sectors (electricity, heating and cooling), there is particular emphasis on promoting the role of local energy communities.

In the **heating and cooling sector**, the main contributing technologies are solar and geothermal, ambient heat and bioenergy. Greece intends to increase renewable energy in heating and cooling by an annual average increase of almost 1.2% per year, 0.1 percentage point higher than the indicative 1.1% per year for Member States where waste heat and cold is not used.

In the **transport sector**, the main contributing technologies are biofuels and electricity. The plan shows the contribution of biofuels and electricity to the share of renewables in transport. The contribution of biofuels, related to the use of advanced biofuels, is intended to increase by 5% from 2020 to 2030.

The plan provides a detailed list of 27 policies and measures to achieve the renewables target. These include regulatory, economic, fiscal and technical measures for electricity, heating and cooling, and transport, and some cover several sectors. Special policies and measures for regional cooperation are envisaged for RES and combined heat and power (CHP) projects. However, no specific action or time frame is mentioned. Measures on financial support are lacking detail concerning the sector, volume, and instrument for their introduction.

Overall, the plan does not provide time frames or quantifications for the policies and measures. Therefore it cannot be assessed if they meet the requirements of the Renewables Directive.

Energy efficiency

Greece's **national contribution for energy efficiency** in 2030 is 20.6 Mtoe for primary energy and 16.5 Mtoe for final energy. This is a significant improvement compared with the draft plan, taking the specific circumstances of the Greek economy into account.

Greece has provided a detailed table with a total of quantitative and qualitative information on the planned **energy efficiency policies** and measures. Among the ones with quantified impact, there are 15 new measures planned for 2021 to 2030. For some measures a clear implementation timeline is missing.

The measures under Article 7 of the Energy Efficiency Directive¹² are included with a cumulative amount of 7.3 Mtoe. Some measures are mentioned regarding the synergies among energy

¹¹ Pursuant to Article 4(a)(2) of Regulation 2018/1999.

¹² Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency as amended by Directive (EU) 2018/2002.

efficiency and the other dimensions of the plan (e.g. incentive base scheme for the network operators). The 10% target of electric passenger cars indicated in the draft plan has been increased to 30% in the final plan.

On energy efficiency in buildings, Greece provides substantial detail on policies and measures, with new measures for 2021 to 2030. A clear implementation timetable is missing for some measures. The plan to renovate 600 000 homes by 2030, which represents 12% to 15% of all homes, is realistic, but not enough to facilitate the decarbonisation of the building stock by 2050. However, there are no targets for the non-residential sector.

The planned budget has been largely quantified, and some funding sources have been specified, such as the financial programme 'Electra', blended/hybrid finance programmes, and the National Energy Efficiency Fund. The total planned budget for all energy efficiency measures amounts to EUR 11 000 million. A breakdown by measure is not provided.

These policies and measures are considered to be an improvement in comparison to the draft plan. They are credible in relation to the achievement of the overall targets, but not sufficiently ambitious.

Energy security

The Greek NECP defines a high level of security of supply as a priority in the transformation of the energy system. The plan includes 18 policies and measures to attain this objective.

The plan sets a target to put an end to the energy isolation of islands by early 2029, interconnecting them with the mainland where possible. The plan announces the setting up of autonomous, innovative hybrid renewable power generation systems and markets for the benefit of consumers.

On **diversification of sources**, the final plan includes measures on diversification of sources from third countries through new electricity and natural gas infrastructure (e.g. TAP (Inter-Adriatic) pipelines, Interconnection of Greece-Bulgaria (IGB) and East-Med pipelines). Increasing domestic energy production, exploiting domestic hydrocarbon resources, and developing new RES plants, coupled with electricity storage systems, are also considered.

As regards **oil and gas**, Greece presents general objectives and measures, including on renewable methane and hydrogen. Due to the early lignite decommissioning, natural gas will serve as a transitional fuel towards achieving Greece's long term targets, expected to reduce total GHG emissions by 17% by 2030. The quantitative objective is to increase the direct use of natural gas in the final consumption sectors by at least 50% compared to 2017. The final plan includes an objective to gradually put in place applications to feed **biomethane or hydrogen** into the natural gas network for final uses - as in transport or heating and cooling.

The plan envisages significant further investments in the **storage** of electricity and natural gas as well as in network infrastructure. It mentions technologies and use of liquefied natural gas (LNG) as key tools to improve the security of energy supply. The plan announces the setting up of autonomous, innovative hybrid renewable power generation systems, in particular on non-connected islands and markets.

The plan includes considerations on **cybersecurity** as part of the measures on digitalisation of its network infrastructure and measures to protect critical infrastructure.

The planned policies and measures are considered credible for achieving the objectives. Many projects are already under way, while others are in an advanced stage of planning. Some more detail and clear timelines are essential; these are announced in the plan as part of further measures to be taken, such as the Just Development Transition master plan.

Internal energy market

Concerning the development on the internal energy market, the plan includes 20 policies and measures. To meet its interconnection target of 21% for 2030, the plan lists current ‘projects of common interest’, which will increase interconnectivity.

On **market concentration/competitiveness**, the plan affirms the effort for reforming the retail and wholesale market and improving competition. As part of its earlier commitments to the European Stability Mechanism (ESM) programme, Greece is developing a monitoring mechanism to assess the level of market concentration and detect anti-competitive practices. The plan includes clear timelines for the implementation of a new electricity market design and coupling of its day-ahead and intraday markets with its neighbours. The plan sets out further measures for the retail market, the **deployment of new technologies** for the decentralised production and balancing at local level, promoting increased participation of demand side flexibility and **storage** in the new to be established electricity market design.

On **energy poverty**, Greece reports on the current situation and the number of households affected. It provides measures to address energy poverty under the energy poverty action plan that is to be fully developed in the course of 2020. It includes a number of measures to help vulnerable households with their energy bills, such as well-targeted social tariffs and the potential introduction of an ‘energy card’. This card could be given to vulnerable consumers to replace other support measures for the consumption of energy goods and also enable them to select on their own the way to meet their energy needs. The plan also envisages setting up tailor-made funding schemes to improve the energy efficiency of vulnerable consumers’ homes. The final plan also considers how the energy efficiency obligations scheme could contribute to alleviating energy poverty.

These policies and measures are considered credible in relation to the achievement of the target since they are comprehensive in nature.

Research, innovation and competitiveness

The plan identifies areas where **research and innovation** efforts are required. Greece’s final plan also establishes the objective to significantly support the development of technologies for the achievement of the 2030 climate and energy targets. Focus areas of the envisaged research and innovation activities concern the energy efficiency of buildings, renewable energy technologies, energy networks, digitalisation, and the development of smart grids. Actions on energy storage are also planned.

These efforts are considered credible for achieving the target overall, because Greece has estimated the planned budget for the main policies and measures, particularly under the energy efficiency and renewables dimensions, and to a lesser extent, the R&I dimension of the plan. The policies and measures are realistic and consistent with the objectives, albeit not always quantified. The plan lacks an in depth analysis of the investment gap between the research and innovation needs and available resources.

Greece is interested in developing hydrogen production from renewable electricity and to use hydrogen to decarbonise the transport sector (mainly shipping), together with a long-term

hydrogen storage for power generation and incentives to hydrogen related R&I. Greece explicitly refers to the possibility of decarbonising the heating sector and introducing a ‘Guarantee of Origin‘ system as a measure to stimulate the deployment of renewable hydrogen.

Regarding **competitiveness**, the emphasis is on improving energy and low carbon intensity, reducing energy costs for all consumers, developing sustainable transition plans for the areas which depend on lignite, and increasing the value added of the domestic energy sector.

The consideration of the measures specified in the **strategic energy technology (SET) plan** is insufficient. While many of the planned measures concern technologies that are in principle covered by the SET plan, there is no systematic reference to that plan or its actions.

4. COHERENCE, POLICY INTERACTIONS AND INVESTMENTS

The final plan discusses the **interlinkages** between the lignite decommissioning, the renewable energy and energy efficiency targets, policies and measures respectively. The energy security and internal market dimensions of the plan are also strongly interlinked. Many measures serve both objectives. The final plan explores synergies between many policies in the decarbonisation (GHG and renewable energy) and energy efficiency dimensions. For example, the plan includes incentives to enhance energy efficiency, fiscal measures, regulation, the development of new low-carbon technologies, and strengthening of flexible energy sources and demand response use to cover energy needs. Synergies are less well explored in the area of buildings. Nor does the plan consider coherence of adaptation with the other dimensions. For example, there is no information on how climate change risks might affect energy supply (e.g. wildfires and storms destroying biomass resources and power networks, availability of hydro power), in spite of the fact that Greece’s national adaptation plan includes measures for the energy sector. Information is also lacking on adaptation co-benefits and trade-offs for energy efficiency, such as in the thermal management of buildings.

Information is provided on **investment needs**; as well as mechanisms and funding sources to lever those. Total accumulated investments for the period 2020 - 2030 is estimated at EUR 43.8 billion, split over the various sectors. Greece intends to use EU funding sources as well national and private ones including financial tools. Greece calculates the available public funds (national and EU) for the energy sector and climate change, including adaptation at EUR 7.2 billion (in constant 2018 prices), with the rest leveraged through private sources. It does not explain by policy area/sector where private investment is needed. Regarding the macro-economic assessment of the proposed policies and measures, Greece mentions further studies, particularly regarding the benefits of decommissioning lignite plants and mines for public health.

In the **gas** sector, Greece is planning to invest significantly in new networks to reach new consumers and help substitute more polluting oil products used for heating, among other objectives. The plan does not appear to consider how these plans fit in the longer-term context for a net-zero energy system in 2050 or if they will have a negative impact on other policies (e.g. high costs to be paid by customers or stranded assets).

The description of all existing **energy subsidies** and the timeline to phase them out are however still underdeveloped in the NECP. The NECP does not appear to fully reflect internationally-used definitions in this regard. However, it is stated that despite challenges associated with the energy transition, Greece is progressing in reforming its subsidies for fossil fuels across a wide range of sectors. As a general objective, it will review existing social policies including regarding energy poverty.

Regarding the **just and fair transition** aspects and concerning the areas affected by the decommissioning of lignite, Greece announced an integrated, multi-faceted and front-loaded strategy - the 'Just Development Transition master plan', by mid-2020. This strategy is to specify the forms of support and various impacts of the policies and measures, in order to ensure a fair transition of the regions affected as well as the security of energy supply.

Greece has to some extent assessed impacts on employment, specifically for the production of renewable energy and for energy efficiency. The overall jobs impact of the transition is projected to be positive thanks to the creation of over 60 000 jobs by implementing RES and energy-saving measures and policies. The plan recognises the importance of training and retraining of workers and employees to adapt to the new technical skills.

Energy poverty is a significant problem in the country and Greece is aiming at addressing it to a great extent over the next 10 years. It intends to finalise an energy poverty action plan by mid-2020. Measures addressing energy poverty are taken in the context of declining yet still-high arrears in the electricity market, where the market's ability to collect payment is important.

The final plan refers to the air pollution quantified reduction commitments under the National Emission reduction Commitments Directive¹³, but provides limited information and analysis on **air quality and air emissions policy**. It does mention the expected positive impact of the planned renewable and energy efficiency policies in buildings in terms of disability adjusted life years, but adds no explanation on how the results are reached or which air pollutants are impacted and to what extent. The links between the NECP and the national air pollution control programme (NAPCP) cannot be assessed as Greece has not yet submitted the latter.

The **circular economy** and its potential for climate action and GHG emissions and removals specifically is recognised across the plan in different dimensions and policies and measures. The plan refers to the circular economy strategy adopted in 2018. It lists measures to be taken on circular economy and recycling at an estimated total investment of EUR 5 billion (e.g. for waste management, energy efficiency, eco-design and the fight against plastic pollution, etc.).

Applying the **energy efficiency first principle** is an important element where the targets have been revised upwards in the final plan. Still, there is some room for further ambition in some areas, such as the deep renovation of residential buildings, which could be an opportunity to increase the supply of affordable residential housing.

In the plan, Greece mentions the significance of its participation in the **Clean Energy for EU Islands initiative**. This initiative is considered to support renewables penetration in autonomous island systems which cannot be interconnected with the mainland. Setting up state-of-the-art renewables plants combined with storage technologies and hybrid renewables plants is therefore promoted.

The final version of the plan partially complies with **data transparency** requirements and with the use of European statistics.

¹³ Directive (EU) 2016/2284

5. GUIDANCE ON THE IMPLEMENTATION OF THE NATIONAL ENERGY AND CLIMATE PLAN AND THE LINK TO THE RECOVERY FROM THE COVID-19 CRISIS

Greece needs to swiftly proceed with implementing its final integrated national energy and climate plan as notified to the Commission on 23 December 2019. This section provides some guidance to Greece for the implementation phase.

This section also addresses the link between the final plan and the efforts to recover from after the COVID-19 crisis, and pointing to possible priority climate and energy actions measures Greece could consider when developing its national recovery and resilience plan in the context of the Recovery and Resilience Facility¹⁴.

Guidance on the implementation of the national energy and climate plan

Greece's plan sets an economy-wide ghg emission reduction target of 55% and intends to achieve a 35.4% GHG emissions reduction in effort sharing sectors by 2030 compared to 2005.¹⁵ The latter is more than twice the 16% reduction target specified in the Effort Sharing Regulation. The targeted total greenhouse gas reduction would be reached with the existing and additional measures specified in the plan. The reduction would be achieved by choosing cleaner forms of energy in all sectors, and would occur mainly in the electricity generation sectors (the energy sector more broadly, including industrial processes) and the residential sector, with a modest reduction in the transport sector. There would be a stabilisation in the CO₂ emissions of the service and agricultural sectors in the same period.

The Greek contribution to the EU 2030 **renewables target** is sufficiently ambitious when compared to the share resulting from the formula in Annex II of the Governance Regulation, whereas the Greek contribution to the 2030 energy efficiency target is still of modest and low ambition for primary and final energy consumption respectively. However, Greece's plan still leaves scope to adopt additional policies and measures on both renewable energy and energy efficiency in order to contribute more to the EU climate and energy targets and strengthen the green transition.

On **renewables**, Greece committed to increase the share of renewables in gross final energy consumption to 35%. Where missing, Greece is expected to adopt additional policies and measures and provide time frames and/or quantification of the policies and measures. If possible, this would need to be provided for each interim trajectory and sector. Greece can accelerate some of its policies and measures to promote renewable energy, particularly in heating & cooling and

¹⁴ On 17 September 2020, the Commission has put forward the Annual Sustainable Growth Strategy 2021 (COM(2020) 575 final), as well as guidance intended to help Member States prepare and present their recovery and resilience plans in a coherent way. The guidance is without prejudice to the negotiations on the proposal for a Regulation on the Recovery and Resilience Facility in the European Parliament and the Council (Commission staff working document. Guidance to Member States – Recovery and resilience plans, SWD (2020) 205 final).

¹⁵ The plan projects that non-ETS emissions will fall to 41.7 Mt CO₂eq. According to Commission calculations the non-ETS emission reduction target by 2030, compared to 2005, would then be 33%. This estimate is based on the 2005 base year of Greece under the Effort Sharing Decision of 62.6 Mt, as e.g. published in SWD(2019)396, which takes account of the ETS scope extension in 2013. The Greek plan uses a higher 2005 base year emission value of 65.2 Mt.

transport in order to meet the first interim trajectory in 2022. In heating & cooling, Greece proposes to significantly increase heat pumps in the tertiary and residential sectors, of biomass, of thermal solar systems in the residential sector, as well as the use of RES (biomass and geothermal systems) in district heating. In transport, Greece proposes biofuels and electricity as the main contributing technologies.

On **energy efficiency**, Greece would benefit from adopting and implementing additional policies and measures that would deliver additional energy savings by 2030. Proper implementation of the main instruments and policy measures already identified is needed to avoid any delay that could put the achievement of the overall objectives at risk. Following up on the recognition of the ‘energy efficiency first’ principle in the NECP, Greece is invited to ensure that it is applied in climate and energy planning, in particular in implementing the national strategy supporting a phase-out from lignite. Greece could also explore the possibility of using green transition funding to finance energy efficiency measures, particularly for the renovation of buildings, and the services and tourism sectors.

Improving energy efficiency in buildings has much potential for speeding up energy savings and contributing to the recovery of the economy after the covid-19 pandemic. Building on the momentum of the **Renovation Wave** initiative¹⁶, there is scope for Greece to intensify efforts to improve the energy performance of the building stock with specific measures, targets and actions, while giving due attention to energy poverty. Further support for the renovation of public and private buildings could be provided through increased public funding and by leveraging EU and national budgets with private money, combining grants, lending, guarantees and loan subsidies. Greece is expected to provide a robust and comprehensive long-term renovation strategy, in accordance with Article 2a of the Energy Performance of Buildings Directive, which can contribute to the energy efficiency target and the recovery of the Greek economy following the COVID-19 pandemic. The long-term renovation strategy is due to define a roadmap for decarbonisation by 2050 with ambitious milestones for 2030, 2040 and 2050, measurable progress indicators, expected energy and wider benefits, measures and actions to renovate the building stock, and a solid finance component with mechanisms to mobilise public and private investment.

Regarding **energy security**, Greece is expected to benefit from further enhancing security of supply and diversification of resources. This includes specific measures to preserve and strengthen cybersecurity in the energy sector. Given the country’s significant market reforms and the significant change in its energy mix until 2028, Greece is invited to ensure strong regional cooperation to ensure security of supply through the Regional Coordination Centre. Other regional projects on electricity and gas infrastructure can also be explored further to accommodate the challenges of the smart sector integration goals. Taking into account the long-term goals of smart sector integration and the partially underdeveloped **gas** infrastructure in Greece, the country will benefit if any new infrastructure is future proof to accommodate new clean technologies and avoid stranded assets. Finally, Greece would need to quickly define and implement concrete new measures to avoid negative effects on security of supply and availability

¹⁶ Communication ‘A Renovation Wave for Europe – greening our buildings, creating jobs, improving lives’, COM(2020)662 and SWD(2020)550.

of local heating due to the phasing out of lignite-fired power plants, particularly in the affected areas.

Concerning the **internal energy market**, Greece would benefit from finalising the electricity market design reforms envisaged in the final plan. This includes creating new electricity markets, coupling its electricity market with Italy and Bulgaria, ensuring the non-discriminatory participation of new market participants and providing appropriate gas trading opportunities. Any remaining obstacles to new providers entering the electricity market are expected to be assessed and, if necessary, removed by the relevant regulatory authority. All these measures will ensure the supply of sustainable power to Greek citizens and business while also offering more possibilities for new actors in the Greek gas and electricity wholesale markets. On retail market reforms, Greece is invited to reinforce its competitiveness targets and measures in areas such as retail competition, integration of new technologies - such as electric vehicles – into the market, and demand response and deployment of smart meters.

Greece would benefit from defining clear indicators to track the achievement of milestones towards its **research and innovation and competitiveness** objectives. Over time, the gathering of granular research, innovation and competitiveness data will be useful to strengthen this process. Greece would need to ensure the link with the activities undertaken under the SET Plan. Greece would also benefit from further strengthening the link between the competitiveness objective and the policies and measures to be put in place for the different sectors by 2030.

Greece estimates that EUR 43.8 billion of additional **investment** is needed between now and 2030 to implement the national energy and climate plan. Investment figures are given per policy area, but the split between public and private funding is not specified. The final plan provides further estimates of the budgetary impacts of some of the planned policies and measures, particularly the energy efficiency and renewable energy ones, and to a lesser extent, the ones related to R&I. A more thorough assessment and estimate of the investment needs in these dimensions would support the swift implementation of the plan. More detail regarding the gap between investment needs and the available sources of financing would also help clarifying the framework for the implementation of the plan.

Greece is invited to continue ongoing efforts on **regional cooperation** with a view to intensifying exchanges and initiatives that will facilitate the implementation of its national energy and climate plan, particularly on relevant cross-border issues, including those in the context of the CESEC High Level Group. Greece is encouraged to explore the potential of the Clean Energy for EU Islands Initiative to advance the clean energy transition on its islands¹⁷. Greece is also invited to better exploit the potential of the **multilevel climate and energy dialogues** to actively engage with regional and local authorities, social partners, civil society organisations, business community, investors and other relevant stakeholders and to discuss with them the different scenarios envisaged for its energy and climate policies. Regarding the participation in the Clean Energy for EU Islands initiative, Greece is encouraged to approach the transition of the small non-interconnected islands, in a holistic way.

¹⁷ In this context, the Commission will help address related issues 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 and offshore renewables capacity building.

Greece is encouraged to reinforce the analysis of **just and fair transition** aspects, notably by developing in the relevant national ‘master plan’ a more comprehensive assessment of the social, employment, skills and training impacts of the planned objectives, policies and measures, especially in the coal reliant regions that will be affected by the phasing out of lignite.

The measures to tackle **energy poverty** would need to be monitored closely, while the energy poverty action plan (to be fully developed in the course of 2020) is expected to be comprehensive and flexible enough to respond to this challenge and achieve the ambitious national targets. In this regard, the momentum of the Renovation Wave initiative of the European Green Deal is an opportunity to intensify efforts to tackle energy poverty by improving the energy performance of the existing building stock with dedicated measures and concrete actions. The Renovation Wave can also be grasped as an opportunity to increase the stock of affordable residential and social housing. Energy poverty could be, among other measures, addressed through specific support to socially innovative solutions and social enterprises that work on addressing this challenge (e.g. energy-awareness campaigns, retraining unemployed as energy advisors, supporting green installations by cooperatives, buying energy-saving appliances for social enterprises to rent out). It will be important to ensure the upskilling of the workforce in the construction sector. Greece is encouraged to consult the Commission Recommendation of 14 October 2020 on energy poverty and its accompanying staff working document providing guidance on the definition and quantification of the number of households in energy poverty and on the EU-level support available to Member States’ energy poverty policies and measures.

Greece is invited to extend and update the identification and reporting on **energy subsidies** by preparing a more complete inventory, and intensify action to phase them out, in particular for fossil fuels. The green transition in Greece would receive a further boost from rapid phase-out of the fossil fuel subsidies identified in the NECP and recent Commission analyses. This would involve the further development and implementation of concrete plans with associated timelines, coupled with measures to mitigate the risk of households’ energy poverty.

For all investments implementing the national energy and climate plan, Greece is invited to ensure these are in line with national, regional or local plans for **air pollution** reduction, such as the National Air Pollution Control Programme (NAPCP), and relevant air quality management plans.

In implementing its plan, Greece is invited to make the **best possible use of the various funding sources available**, combining scaled-up public financing at all levels (national and local, as well as EU funding) and leveraging and crowding in private financing. Tables 1 and 2 of Annex I provide an overview of EU funding sources which should be available to Greece during the forthcoming multiannual financing period (2021-2027) and EU funding addressed to all Member States and companies. For the forthcoming period, the European Council has committed to the mainstreaming of climate action into all EU programmes and instruments and to an overall target of at least 30% of EU funding to support climate objectives. At the same time, EU expenditure should be consistent with the Paris Agreement and the ‘do no harm’ principle of the European Green Deal. At EU level, funding will be available for Greece from the Innovation Fund, and will also be based on revenues from the auctioning of allowances under the EU emissions trading system.

Link to the recovery from the COVID-19 crisis

The vast majority of Member States' final national energy and climate plans were drafted before the COVID-19 crisis, and the present staff working document assesses Greece's plan in that context. Nevertheless, the implementation of Greece's final integrated national energy and climate plan will need to fully take into account the post-COVID-19 recovery.

In the context of the Recovery and Resilience Facility, which is expected to be operational on 1 January 2021, **Greece's final plan constitutes a strong basis for it to design the climate and energy-related aspects of its national recovery and resilience plan**, and to deliver on broader European Green Deal objectives.

In particular, **mature investment projects outlined in the plan, as well as key enabling reforms that address inter alia, investment-barriers, should be frontloaded as much as possible**. The link between investments and reforms is of particular relevance for the national recovery and resilience plans, to ensure a recovery in the short to medium term and strengthening resilience in the longer term. In particular, Member States' recovery and resilience plans should effectively address the policy challenges set out in the country-specific recommendations adopted by the Council. In addition, **the Commission strongly encourages Member States to include in their recovery and resilience plans investment and reforms in a number of 'flagship' areas**¹⁸. In particular, the 'Power up', 'Renovate' and 'Recharge and refuel' flagships are directly related to energy and climate action and to the final national energy and climate plans. Investments and measures under the 'Reskill and upskill' flagship, in particular as regards green technologies, are also essential to foster the climate and energy transition in all Member States.

In turn, the Recovery and Resilience Facility will provide opportunities to accelerate Greece's green transition while contributing to economic recovery. In order to follow the European Council's commitment to achieve a climate mainstreaming target of 30% for both the multiannual framework and Next Generation EU, **Greece's recovery and resilience plan will have to include a minimum of 37% expenditure related to climate**. Reforms and investments should effectively address the policy challenges set out in the country-specific recommendations of the European Semester, and will have to respect the principle of 'do no harm'.

Based on Greece's final national energy and climate plan, and on the investment and reform priorities identified for Greece in the European Semester, **the Commission services invite Greece to consider, while developing its national recovery and resilience plan, the following investment and reform priorities in the climate and energy domain in particular:**

- Measures to continue the implementation of the energy reform agenda, to promote renewables, energy efficiency improvements in particular in buildings, island and energy connections; measures to facilitate the phase-out of lignite-fired power plants while taking into account a just transition to accommodate their decommissioning.
- Measures promoting electric vehicles and the electro-mobility infrastructure, as well as the further development of city and rail public transport;
- Measures addressing vulnerability to the impacts of climate change, including investments in climate-proofing infrastructure and the inclusion of adaptation considerations in environmental and planning legislation.

¹⁸ Cf. Annual Sustainable Growth Strategy 2021 (COM(2020) 575 final), pp. 9-12.

The above mentioned measures are indicative in nature and not meant to be exhaustive. They aim to orient reflections in the development of the national recovery and resilience plan. They do not prejudge the position of the Commission on the actions to be proposed. This position will, inter alia, need to comply with the agreed legislative text on the Recovery and Resilience Facility.

ANNEX I: POTENTIAL FUNDING FROM EU SOURCES TO GREECE, 2021-2027

Table 1: EU funds available, 2021-2027: commitments, EUR billion

Programme	Amount	Comments
Cohesion policy funds (ERDF, ESF+, Cohesion Fund)	20.4	In current prices. Includes funding for European territorial cooperation (ETC). Does not include amounts transferred to the Connecting Europe Facility.
Common agricultural policy – European Agricultural Fund for Rural Development, and direct payments from the European Agricultural Guarantee Fund.	18.6	In current prices.
Recovery and Resilience Facility	16.2	In 2018 prices. Indicative grants envelope, sum of 2021-2022 and estimated 2023 commitments. Based on the Commission’s summer 2020 GDP forecasts.
Just Transition Fund	0.8	In 2018 prices. Commitments both under the multi-annual financial framework (MFF) and Next Generation EU.
ETS auction revenue	0.5	Indicative: average of actual 2018 and 2019 auction revenues. The amounts in 2021 to 2027 will depend on the quantity and price of auctioned allowances.

Table 2: EU funds available to all Member States, 2021-2027, EUR billion

Programme	Amount	Comments
Horizon Europe	91.0	In current prices. Includes Next Generation EU credits.
InvestEU	9.1	In current prices. Commitments both under the multi-annual financial framework (MFF) and Next Generation EU. Includes the InvestEU fund (budgetary guarantee to public and private investment) and the advisory hub (technical advice). Does not consider appropriations available to beneficiaries through implementing partners, such as the European Investment Bank.
Connecting Europe Facility <ul style="list-style-type: none"> • Transport • Energy 	24.1 5.8	In current prices. The commitment for transport includes the contribution transferred from the Cohesion Fund. Excludes Connecting Europe Facility Military Mobility funding for dual use infrastructure.
Recovery and Resilience Facility	360.0	In 2018 prices. Non-allocated commitments for loans. Loans for each Member State will not exceed 6.8% of its gross national income.
Technical Support Instrument	0.9	In current prices.
Programme for Environment and Climate Action (LIFE)	5.4	In current prices.
European Agricultural Fund for Rural Development	8.2	In current prices. Commitments under Next Generation EU.
Innovation Fund	140.0	Approximation: 7/10 of the allocations of ETS allowances to provide revenue to the Innovation Fund for 2021-2030 and assuming a carbon price of EUR 20 per tonne.

Note to both tables

The figures provided by programmes under the EU budget include both the proposals under the forthcoming multiannual financial framework, and the reinforcement of these under the Next Generation EU instrument outside the EU budget.

The figures quoted in this document are based on the conclusions of the European Council of 17-21 July 2020. They however do not prejudge the outcome of the ongoing discussions between the European Parliament and the Council on the elements of the recovery package, such as the Multiannual Financial Framework, the sectoral programmes, their structure and budgetary envelopes, which will be concluded in accordance with their respective adoption procedure.

For most of the above funds, support to the climate and energy transition is one objective among others. However, for the forthcoming period, the European Council has committed to the mainstreaming of climate action into all EU programmes and instruments and to an overall target of at least 30% of EU funding to support climate objectives. EU expenditure should also be consistent with the Paris Agreement and the ‘do no harm’ principle of the European Green Deal.

Some of the programmes listed in Table 2 provide funding through open calls to companies, not public administrations.

ANNEX II – DETAILED ASSESSMENT OF HOW COMMISSION RECOMMENDATIONS HAVE BEEN ADDRESSED

Recommendations		Assessment	
Decarbonisation - GHG	No recommendation	n.a.	-
Decarbonisation - renewables	Enable a timely and cost-effective achievement of Greece's 31% contribution to the EU 2030 target for renewable energy, by including in the final plan, among others, an indicative trajectory that reaches all the reference points pursuant to Article 4(a)(2) of (EU) Regulation 2018/1999.	Largely addressed	<p>The national contribution to the EU's 2030 target for renewable energy of at least 32% (as a share of gross final consumption of energy) increased between draft and final plan from 31% to at least 35%. The plan provides for a trajectory with interim shares of 23.4% in 2022 (representing 31.8 % of the progress required between 2020 and 2030), 27.1% in 2025 (53.6 % of progress), and 29.6% in 2027 (68.5% of progress). All of these reference points are above the levels required by Article 4 of the Governance Regulation.</p> <p>With respect to the sectoral shares, Greece provides contributions for 2030 of at least 61% in renewable electricity (against 29.2% projected in 2020), 42.5% in the heating and cooling sector (against 30.6% projected in 2020) and 19% in renewables in the transport sector, including multipliers for the contribution of advanced biofuels and RES electricity (against 6.6% projected in 2020). Across sectors (electricity and heating and cooling), there is particular emphasis on promoting the role of local energy communities.</p> <p>The main contributing technologies in the renewable electricity sector are wind and solar PV. Hydroelectricity production slightly increases in absolute terms but its share decreases to 17% in 2030 (from 31% in 2020). Biomass use in electricity increases to reach 4% of total renewable electricity (from 2.3% in 2020). Geothermal and solar thermal remain marginal at respectively 1.6% and 0.8% of total renewable electricity.</p>
	Provide detailed and quantified policies and measures complying with the obligations laid down in (EU) Directive 2018/2001	Partially addressed	The Greek final plan provides a detailed list of policies and measures (27 in total). Those are divided into regulatory, economic, fiscal and technical measures and are aligned per sector (electricity, heating and cooling and transport) and sometimes cover more than one sector. Special policies and measures for regional cooperation are currently in place only for RES and CHP projects.

			<p>No specific action or timeframe is mentioned. Regarding measures on financial support they are only listed without giving details on the sector, neither size, nor the tool to introduce them.</p> <p>Overall, the NECP does not provide timeframes or quantification for the specific policies and measures, making it still difficult to assess whether the envisaged measures would meet the requirements of the recast Renewables Directive.</p>
	<p>Reconcile the objectives put forward in the draft plan for the share of renewable energy in the heating and cooling sector with the indicative target included in Article 23 of (EU) Directive 2018/2001 and the transport sector in line with Article 25 of (EU) Directive 2018/2001.</p>	Largely addressed	<p>In the heating and cooling sector, the main contributing technologies are solar and geothermal, ambient heat and bioenergy. Greece intends to increase renewable energy in heating and cooling by an average increase of almost 1.2% per year through a significant increase of heat pumps in the tertiary and residential sector, of biomass, of thermal solar systems in the residential sector, as well as the use of RES in district heating.</p> <p>Greece sees a necessity to build new infrastructure for district heating only (not cooling) as it aims to build new district heating systems that can provide 30-40 MWth and that will be powered with residual solid biomass and geothermal energy.</p> <p>In the transport sector, the main contributing technologies are biofuels and electricity. The contribution of biofuels, related to the use of advanced biofuels, is increased by 5% from 2020 to 2030, including multipliers. The contribution of electricity, related to multipliers for road and rail transport, is increased by 7% over the same period.</p>
Energy efficiency	<p>Substantially increase its ambition towards reducing both final and primary energy consumption in view of the need to increase the level of efforts to reach the Union's 2030 energy efficiency target. Support these with policies and measures that would deliver additional energy savings by 2030.</p>	Largely addressed	<p>The new contribution mark a reduction, i.e. a significant improvement compared to the draft ones but they are still ranked as 'modest' and 'low' respectively. The information provided on the renovation of the building stock is updated.</p>
	<p>Clarify the timeline for the adoption and implementation of the policies foreseen to be in place as of 2020, especially for the new instruments.</p> <p>The measures foreseen to achieve the cumulative savings goal should be designed at an adequate scale.</p>	Partially addressed	<p>Greece has provided more information than in the draft plan and has set out a detailed table with quantitative and qualitative information on the planned energy efficiency policies and measures. Among the listed energy efficiency measures with quantified impact, there are 15 new measures; that is, new measures planned for the period 2021-2030 but not yet implemented. The list of measures under Article 7 has been correctly provided (with quantified impact in terms of savings). Some measures are mentioned regarding the synergies among energy</p>

			<p>efficiency and the other dimensions (e.g. incentive base scheme for the network operators). The target of 10% of electric passenger cars in draft NECP has increased to 30% in the final NECP.</p> <p>For some measures, a clear timetable for their implementation is still missing. The planned budget has been quantified for most measures (or groups of measures). It is not clear what funding sources correspond to each measure specifically. The NECP provides additional information on the renovation of the building stock but further details will be determined in the long-term renovation strategy, which has not been submitted yet.</p>
Energy security	Specify the measures supporting the energy security objectives on diversification and reduction of energy dependency, including measures ensuring flexibility, in particular regarding natural gas.	Largely addressed	Measures on diversification of sources from third countries and increase of domestic energy production (e.g. hydrocarbon, renewables, storage from renewables) are included. Interconnection of islands and infrastructure projects are included.
	Include an assessment of how the infrastructure projects and regional cooperation contribute to the energy security objectives, also making use of regional cooperation and flexibilities to use the opportunities presented by reducing greenhouse gas emissions for the modernisation of the Greek economy.	Largely addressed	Tables of the ongoing and future electricity and natural gas/LNG projects are presented in the final plan and a general analysis on the impact of the lignite decommissioning related to energy security issues is provided. Some measures are announced as a capacity remuneration mechanism but no details are included in the plan. The plan generally describes regional cooperation and there is not much new information about concrete actions to intensify cooperation in order to deliver the plan.
Internal energy market	Include forward-looking objectives and targets concerning market integration, in particular measures to increase competition in the retail and wholesale markets, in line with its commitment under the European Stability Mechanism (ESM) programme of reducing, by 2020, the incumbent's retail and wholesale market shares below 50%.	Largely addressed	<p>As part of Greece's earlier commitments to the ESM programme, the development of a mechanism for market monitoring indicators is mentioned to assess the level of market concentration and detect anti-competitive practices.</p> <p>Digitalisation of the networks and the creation of a regulatory environment for new actors, active consumer participation and the offering of smart energy services are important elements of the plan. For example, a framework for aggregators is developed and a framework for storage will be in place still this year with simplified procedures for licences. The plan sets a target of a 30% share of electric passenger vehicles in new registrations by 2030. For these objectives, more tangible indicators, concrete timelines and actions are under development and thus, missing from the plan. The measures can</p>

			therefore not be sufficiently assessed in relation to the achievement of the objectives.
	Implement the electricity target model and market coupling with neighbours, based on the timelines agreed under the post-programme surveillance mechanism.	Largely addressed	The final NECP includes clear timelines for the implementation of a new electricity market design and coupling of its day-ahead and intraday markets with its neighbours and the pan-EU single coupling projects.
Research, innovation and competitiveness	Further quantify the national objectives and funding targets in research, innovation and competitiveness, specifically related to the Energy Union, to be achieved between now and 2030, so that they are readily measurable and fit for purpose to support the implementation of targets in the other dimensions of the integrated national energy and climate plan. Underpin such objectives with specific and adequate policies and measures, including those to be developed in cooperation with other Member States, such as the Strategic Energy Technology Plan.	Partially addressed	The plan includes relevant areas where R&I efforts are identified. However, targets are general and without a baseline. In addition, there are no specific measures/programmes on how these priorities will be implemented. As regards competitiveness, the emphasis is put on the shift to a low-carbon-intensity energy system to allow new energy technologies to enter the energy market but no measurable objectives are provided. The interaction with the SET Plan is missing. The revised document has hardly taken into consideration the recommendations on the R&I and competitiveness dimension.
Investments and funding sources	No recommendation	n.a.	-
Regional cooperation	Intensify the already good regional cooperation arrangements with Bulgaria and Cyprus as well as with the Central and South Eastern Europe Energy Connectivity (CESEC) countries.	Partially addressed	The final plan provides more detail about the implementation of the Target Model and the coupling of Greece with neighbouring markets. For example the day-ahead (DA) market coupling of Greece and Bulgaria is expected in 2020 as well as the coupling of the intraday markets with Italy. Greece will also host the Regional Security Coordinator for South-East Europe.
	In the context of the 'Clean Energy for EU Islands' initiative, enhance cooperation with Member States and island regions facing similar geographic, climatic and infrastructure related challenges and opportunities in their energy transition.	Partially addressed	Details are provided on enhancing cross-border interconnections in terms of projects of common interest (PCIs) and concrete timelines for the interconnection of islands.
	Explore the cross-border potential and the macro-regional aspects of a coordinated energy and climate policy notably in the Adriatic-Ionian with the aim of reducing the region's carbon footprint and implementing an ecosystem approach.	Partially addressed	The plan generally describes existing cooperation. There is little information about future goals and specific actions to intensify cooperation in order to deliver the plan. With the exception of the internal energy market and security areas, the final plan hasn't addressed the rest of the recommendations.

	The focus of the regional exchanges could be on internal energy market and energy security areas, in view to the changes in the electricity systems accommodating higher shares of renewable electricity, which will increase electricity import and export and enhance the need for system flexibility.	Partially addressed	A Regional Coordination Centre will be established in Greece for system operation coordination in the South East Region (Greece, Bulgaria, Romania) and with Italy.
	In addition, make use of bilateral cooperation and flexibilities to use the opportunities presented by reducing greenhouse gas emissions for the modernisation of the Greek economy.	Partially addressed	The plan expects an overachievement of the binding 2030 target under the effort sharing regulation, providing the scope to engage in bilateral cooperation and further modernise the Greek economy.
Energy subsidies	List all energy subsidies.	Partially addressed	The final NECP represents a limited upgrade of the draft NECP on energy subsidies. Greece included a new chapter on this issue providing a broad overview of subsidies to support clean mobility and energy efficiency for the industry.
	List in particular fossil fuel subsidies.	Partially addressed	The final version of the NECP includes a general description of social policies to subsidise the cost of energy products (indirect fossil fuel subsidies). It is not clear though if this is an exhaustive a list of all energy subsidies.
	List actions and plans to phase out energy subsidies, in particular for fossil fuels.	Partially addressed	Greece did not include a detailed list of specific actions and plans to phase out energy subsidies, in particular for fossil fuels. However, the intention to reduce or phase out these has been expressed in the final NECP and a high-level overview of the actions to be taken is presented.
Air quality	Complement the analysis of the interactions with air quality and air emissions policy with more quantitative information, at least including the required information about the projected air pollutants emissions under the planned policies and measures.	Partially addressed	Links with air policies are mentioned qualitatively in several instances. A thorough quantitative assessment is, however, missing from the plan. For example, Section 5.1 briefly presents the impacts of clean energy technologies on public health (hospital admissions, risk of premature death). Related expected annual benefits are quantified for renewable and energy efficiency in buildings to respectively 19.5 and 1.1 thousand Disability Adjusted Life Years (DALY). The exact methodology is not presented and there is no intermediate information on the air pollutants' impacts. Air pollution impacts of bioenergy are recognised but it is projected to remain constant between 2020 and 2030.
Just transition and energy poverty	Integrate just and fair transition aspects better, notably by providing more details on social, employment, skills and training impacts of planned objectives, and policies and measures. Provide more detailed information on the projects to support a just and fair transition, specifying the form of	Partially addressed	The final NECP does not provide new information on social, employment, skills and training impacts of its targets and policies and measures. For addressing the negative impact on employment, only a few measures are proposed (like training and retraining of workers and employees). It would also be relevant to provide a distributional impact

	support and the impact of the initiatives, also making the link to the transition of coal, carbon-intensive or industrial regions.		assessment on households' income (including impact on housing costs) of the planned transition measure.
	Further develop the approach to addressing energy poverty issues as required by the Regulation (EU) 2018/1999.	Largely addressed	The plan includes additional information in terms of addressing the just transition for coal dependent regions and on energy poverty. Strategies addressing both issues are planned for 2020. There is limited information in terms of specific actions for tackling these problems.