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Assessment of the National Energy and Climate Plan of Greece

Accompanying the document

Commission Recommendation

on the draft integrated National Energy and Climate Plan of Greece covering the period 2021-2030

{C(2019) 4408 final}

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1. SUMMARY

Main observations[1]

- ✓ The Greek draft integrated National Energy and Climate plan (NECP) is a fairly well-developed strategy that covers the bulk of the important areas and provides a comprehensive narrative of the objectives, policies and measures capturing the positive interactions between the dimensions to a good degree.
- ✓ The document states that the greenhouse gas emissions dimension is the first and foremost component of the NECP structure, which will also serve as a basis for an ambitious long-term strategy. Greece's 2030 target for **greenhouse gas (GHG) emissions** not covered by the EU Emissions Trading System (non-ETS), is -14% compared to 2005, as set in the Effort Sharing Regulation (ESR)[2]. Based on the existing measures, the Greek NECP estimates it may overachieve this target by 9 percentage points, or by 13 percentage points if additional policies and measures are implemented[3]. These would create opportunities for modernisation of the Greek economy, including through making use of bilateral cooperation on the ESR flexibility to transfer emission allocations to other Member States. The draft plan does not yet include information on how Greece would achieve its commitment[4] that **Land Use, Land Use Change and Forestry** (LULUCF) emissions do not exceed removals. Whereas Greece has a National Adaptation strategy, the draft NECP does not specify Greece's adaptation goals and policies.
- ✓ In terms of **renewable energy**, the national contribution to the EU target for 2030 is set at a share of 31 %, which is in line with the result of the formula in Annex II of the Governance Regulation. The trajectory towards reaching that contribution needs to be made compatible with Article 4 of the Governance Regulation[5]. The final plan would benefit from elaborating further on the policies and measures allowing the achievement of the contribution and on other relevant sectorial measures.
- ✓ **In the energy efficiency dimension,** the proposed contribution of Greece for primary energy consumption seems insufficiently ambitious. However, the specific national

[1] In addition to the notified draft NECP this assessment also considers informal bilateral exchanges, which are part of the iterative process established under the Governance regulation.

[2] Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013.

[3] This reduction in percentages is calculated based on the 2005 base year emissions of Greece, which equals 62.6 Mt CO_2eq, [Commission Staff Working Document Accompanying the Document Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Energy prices and costs in Europe453, Table 4]. It differs from the percentages presented in the Greek draft NECP, where 2005 base year emissions are assumed to be 64.5 Mt CO_2eq.

[4] Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU.

[5] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

circumstances, notably relating to the economic situation of the country in the last years, have to be taken into account. The final plan would benefit from further detailing of the relevant policies and measures.

- ✓ As regards **energy security**, Greece targets the increased use of domestic sources, both renewable energy and fossil-fuels, and the reduction of import dependency, which is at very high levels. It has also set a target to connect 29 autonomous islands with the synchronised system of mainland Greece by 2030.
- ✓ In the **internal market** dimension, the dominant position of the incumbent in the electricity market remains a significant unaddressed issue, in spite of the significant efforts made by Greece in the context of the Economic Support Programme. The implementation of the target model is also lagging behind schedule, with negative consequences for effective competition in retail markets. The draft plan identifies the number of consumers affected by energy poverty and includes specific objectives and milestones to address it.
- ✓ Greece aims to reach the **interconnectivity level** of 15 % by 2030. Further development of the domestic transmission infrastructure, with priority for interconnections of islands, and of the distribution networks, with emphasis on smart meters implementation, are crucial. In general, more details on the relevant policies and measures and timelines for their implementation would significantly benefit the final plan.
- ✓ The objectives on **research and innovation** are unclear for the period after 2020. In terms of **competitiveness**, Greece has set as a target the reduction of energy and carbon intensity and the gradual decoupling of economic development from energy and carbon intensity, the reduction of energy costs for all consumers, and the creation of a circular economy.
- ✓ Regarding **investment needs**, the draft plan estimates the funding need for energy policy at EUR 34.7 billion for the decade 2021-2030, annually around 2 % of the current Gross Domestic Product (GDP), of which EUR 9 billion for energy efficiency. Also the main funding sources for the public support of renewable energy and climate action are identified, with a significant role of Union level funds. However, the assessment of the investment needs and expenditures, funding sources and other relevant information remains still partial, especially in view of the ageing of lignite-fired power plants. The draft plan does not yet fully take advantage of the role NECPs can play in providing clarity to investors and attracting additional investments in the clean energy transition.
- ✓ The draft plan describes several examples of **regional cooperation** already taking place in some Energy Union dimensions. In addition to cooperation with Germany for renewable energy and with the CESEC countries, Greece is contributing actively to the Clean Energy for EU Islands initiative. There is potential to further intensify the already existing regional cooperation arrangements.
- ✓ The draft plan takes into account existing **air pollution** reduction commitments and mentions that health impacts from reduced air pollution are calculated by climate and energy measure. Complementing the current analysis on this basis with quantitative information at least on air pollutants emission impacts and more analysis of synergies and trade-off effects would improve the final plan.
- ✓ With regard to the **just and fair transition** aspects, the draft plan mentions the national Fair Transition Support Initiative; nevertheless, a more detailed information on the

specific projects, the form of support and the impact of the initiatives would be welcome in the final plan. It would be relevant in particular to analyse the social and employment impacts of the transition, with a focus on training and skills. Greece is taking part to the initiative for Coal regions in transition, promoted by the Commission.

- ✓ A list of all **energy subsidies** and actions undertaken and planned to phase them out, in particular for fossil fuels, needs to be included in the final plan.
- ✓ The holistic policy framework developed by Greece to meet the 2030 share of renewables in the electricity sector, including comprehensive and clearly described policies and measures covering also decentralisation, energy communities and self-consumption, constitute a **good practice**.

Preparation and submission of the draft plan

Greece notified its draft integrated National Energy and Climate Plan (NECP) to the European Commission on 25 January 2019. The Greek draft NECP is based on climate and energy policy documents such as the National strategy for adaptation to climate change and the National circular economy strategy.

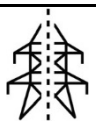
The draft NECP was prepared by the Ministry of Environment and Energy. It was subject to debates in the national parliament and other fora (e.g. with local and regional authorities and stakeholders). It also underwent **public consultation**, albeit within a relatively short timeframe and without clarifying the key conclusions from this engagement and how these have been considered in the final form of the draft plan.

The draft plan has not been consulted upon with Member States in the region, however Greece is planning to engage and consult with **neighbouring Member States** in the future.

Overview of the key objectives, targets and contributions

The following table presents an overview of Greece's objectives, targets and contributions under the Governance Regulation[6]:

[6] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

	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) (%)	-29	-4	-16	As in ESR
	National target/contribution for renewable energy: Share of energy from renewable sources in gross final consumption of energy (%)	16.3	18	31	In line with 31 % (result of RES formula)
	National contribution for energy efficiency: Primary energy consumption (Mtoe) Final energy consumption (Mtoe)	 23.1 16.8	 24.7 18.4	 25.0 18.1	 Very low Very low
	Level of electricity interconnectivity (%)	9.3[7]	10	15	N/A

Sources: EU Commission, ENERGY STATISTICS, Energy datasheets: EU28 countries; SWD(2018)453; European Semester by country[8]; COM/2017/718; Greek draft NECP.

2. ASSESSMENT OF THE AMBITION OF OBJECTIVES, TARGETS AND CONTRIBUTIONS AND ADEQUACY OF SUPPORTING POLICIES AND MEASURES

Dimension decarbonisation

Greenhouse gas emissions and removals

The draft NECP includes the binding national target of reducing non-ETS greenhouse gas emissions by 16 % by 2030 as compared to 2005, but does not include an estimate of the annual binding national limits for 2021-2030 under the Effort Sharing Regulation (ESR)[9].

[7] Level indicated in the Greek draft NECP.

[8] https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester/european-semester-your-country_en.

[9] Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030.

Based on the projections in the draft plan, the overachievement of the Greek 2030 target can be estimated as 13 percentage points with implementation of the planned policies and measures, which corresponds to a surplus of approximately 31 Mt over the period 2021-2030[10].

This assessment does not take into account possible credits or debits in the LULUCF sector as no information is provided on how Greece will meet the no-debit commitment for this sector. With respect to the National Forestry Accounting Plan including the national Forest Reference Level, submitted by Greece as required by Article 8(3) of the LULUCF Regulation[11], the Commission has put forward substantial technical recommendations requesting action on a range of issues, detailed in SWD (2019)213.

Most of the planned policies and measures are presented as revisions of existing ones and it is not clear what the changes will consist of, nor is it clear whether these changes are proposed or adopted.

The plan quantifies the impact of existing policies and measures. The largest impact by 2030 of those relevant for the non-ETS sector is expected to come from energy efficiency measures in the residential and tertiary sector, emissions reductions of fluorinated gases (F-gases) and treatment of organic waste (emissions of F-gases have increased strongly in Greece over the last decade). Key planned policies and measures include promotion of natural gas in all sectors, including transport and buildings, and of renewable energy and energy efficiency.

The draft plan does not clearly distinguish between whether policies and measures affect ETS or non-ETS emissions. In particular, it is unclear how to interpret the estimated impact of planned policies and measures where the objective is presented as reduction of non-ETS emissions while the largest impact is coming from policies and measures affecting electricity generation.

In the **transport** sector, a range of policies and measures are defined, with a particular focus on alternative fuels supported via tax incentives. Electromobility is supported via different measures including vehicle taxation, luxury tax, and support for charging. It is planned to achieve a share of electric passenger cars of up to 10 % by the year 2030. Support is also foreseen for the gas use in public transport and biofuels. Tax incentives are planned in the future for all types of alternative fuels. Promotion of the electrification of rail and power supply of ships at berth is also mentioned. More details for all modes on how related policies will be further developed in the future would be welcome.

The plan does not describe the mitigation impact of existing and planned policies and measures in the **agriculture** and LULUCF sectors (i.e. CAP[12] measures to support better management of water, natural resources, land and animal waste, organic farming, afforestation). The final NECP would benefit from clarifying the impact of renewables/bioenergy policy on the LULUCF sector and any potential sink, as well as explaining how the LULUCF sector will evolve (forest sink, agricultural land) under different scenarios of land use development.

[10] These calculations are based on the 2005 base year as calculated under the Effort Sharing Decision, and Commission estimates for the Annual Emission Allocations based on data published by the EEA. The draft Greek plan uses different 2005 effort sharing emissions for its calculations which seems not take into account the EU ETS scope enlargement valid from 2013.
[11] Regulation (EU) 2018/841 on greenhouse gas emissions and removals from land use, land use change and forestry.
[12] Common Agricultural Policy.

Renewable energy

The Greek draft plan sets out a contribution of at least 31 % renewable energy to the EU's 32 % target (in gross final consumption of energy) for **renewable energy** share in 2030, which may be increased to 32 % depending on the methodology retained for accounting cooling from heat pumps. The contribution of 31 % is in line with the result of the formula in Annex II of the Governance Regulation. The plan provides for a trajectory with interim shares of 19.9 % in 2022 (representing 14 % of the progress required between 2020 and 2030), 22.9 % in 2025 (37 % of progress), and 26.2 % in 2027 (63 % of progress). All of these reference points are below the required levels pursuant to Article 4 of the Governance Regulation.[13]

With respect to the sectoral shares, Greece provides contributions for 2030 of at least 55 % in renewable electricity (against 29.1 % projected in 2020), 30 % in the heating and cooling sector (against 24.5 % projected in 2020) and 14 % in renewables in the transport sector (against 6 % projected in 2020)[14]. In absolute terms, renewable electricity increases significantly faster than renewables in the heating and cooling and transport because of the planned electrification of the heating and cooling as well as transport sectors, in particular through the deployment of heat pumps, of methane and hydrogen produced from renewable electricity, and of electric vehicles. Across sectors, there is particular emphasis on the role of local energy communities. The relative contribution of sector and of specific technologies within each sector is broadly in line with the Commission's assessment of the cost-efficient potential for renewable energy in Greece.

Main contributing technologies in the **renewable electricity sector** are wind and solar PV. Production of hydroelectricity slightly increases in absolute terms but its share decreases to 18 % in 2030 (from 29 % in 2020). Biomass use in electricity increases to reach 5 % of total renewable electricity (from 1.5 % in 2020). Geothermal and concentrated solar power remain marginal at respectively 2 % and 0.7 % of total renewable electricity.

In the **heating and cooling** sector, the main contributing technologies are ambient and geothermal energy and bioenergy. Solar thermal contribution remains low at 13 % of total renewables in the heating and cooling sector, only increasing by 31 %. As regards to **heating and cooling renewable shares**, the plan could introduce a clear description of whether Greece intends to increase renewable energy in **heating and cooling** and in **district heating and cooling** by an indicative 1.3 and 1 percentage points as an annual average calculated for the periods of 2021 to 2025 and 2026 to 2030 respectively.

In the **transport sector**, main contributing technologies are biofuels and electricity. The plan however does not specify the calculation of the transport target as requested in Articles 25-27 of Directive 2018/2001[15] in shares and absolute values of ktoe. The draft plan would benefit from a calculation that takes into account the contributions of all eligible fuels as well as the limits for conventional fuels produced from food and feed crops, applicable multipliers and the sub-target for advanced biofuels.

[13] Art. 4(a)(2) of the Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Actionrequires that the indicative trajectory shall reach 18 % of the total increase by 2022, 43 % by 2025 and 65 % by 2027.

[14] Including multipliers in accordance with Article 27 of Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources.

[15] Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources.

Policies and measures are set out in nine policy priorities to promote renewable energy in 2021-2030, covering direct support measures, administrative support, infrastructure, and regulatory measures. Particular attention is paid to incentivising policies. These priority policy areas are clear and cover the spectrum of measures expected to effectively support renewable energy up to 2030. However, the final plan could benefit from more details on each measure envisaged, following the clear structure provided in Table 27 of Section 3.1.2.8 of the plan (Summary of policy measures). At this stage, it is particularly difficult to assess whether the envisaged measures would meet the requirements of the recast Renewables Directive[16].

Dimension energy efficiency

The **national contribution to the EU 2030 target** for energy efficiency is set at a level of final energy consumption of 18.1 Mtoe at most and translates to primary energy consumption of 24.7 Mtoe at most in the same year (trajectories are not determined). The target is set on the basis of the projections of a scenario with additional measures (WAM), which takes into account the impact of planned measures. The national contribution is not clearly formulated following the statistical definition of final energy consumption, especially with reference to the inclusion of "ambient heat" amongst the fuels, which would require clarifications from the EL authorities.

This national contribution would allow Greece to increase its energy consumption by 8 % in relation to 2017 levels for both primary and final energy consumption. The consumption of the residential sector is expected to grow by 6 %, industry by 12 %, services by 9 % and transport by 2 %. Such a trend contradicts the collective EU effort needed to achieve the EU 2030 target. However, it has to be taken into account that the trend in energy consumption over 2008-2016 was strongly affected by the severe economic recession faced by Greece, and it can be expected that future trends in consumption would have to reflect the economic recovery that is ongoing.

The national contribution for 2030 would require only a limited additional effort in terms of final energy consumption (-1.6 %) in relation to the target set for 2020, while as for primary energy consumption the 2030 contribution is higher (+1.2 %) than the 2020 target.

In addition, the assumptions about the economic forecast for Greece assumed in the modelling of the scenario (cf. Table 32) are more optimistic than the values assumed in the latest "Ageing Report" which have been recommended by the Commission.

Preliminary targets for **annual energy savings** in accordance with Article 7 of the Energy Efficiency Directive[17] would result in 7-7.3 Mtoe cumulative savings in the period 2021-2030. Greece has also set out a target to annually renovate 3 % of the total floor area of public buildings and a target of 40000 homes per year to be upgraded to nearly zero energy buildings levels by 2030 (equal to 10 % of total housing stock by 2030). This goal is positive but not ambitious enough. Greece included some general information relating to policies and measures for buildings that could be implemented as part of its long-term renovation strategy. Given the significant contribution of a cost-effective transformation of existing buildings into nearly zero-

[16] In particular, Articles 16 and 17 of on administrative simplification, of Article 21 on self-consumption, of Article 22 on renewable energy communities, of Articles 23 and 24 on heating and cooling, and of Articles 26 and 27 on transport, Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources.

[17] 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.

energy buildings to the Union's energy efficiency target, a coherent, realistic and ambitious long-term renovation strategy could be developed.

The **policies and measures** are described comprehensively, covering all end-use sectors and following eight policy priorities. However, several of the measures presented as additional were already planned in the National energy efficiency action plan for 2017 but not yet implemented. Emphasis is also put on supply side measures to increase the overall efficiency of the power generation and distribution sectors, with the goal of increasing the direct use of natural gas in the final consumption sectors by at least 50 % compared to the year 2016. Overall, the plan lacks information on the expected impacts of the additional policies, and on how the impact of policies has been reflected in the scenario with existing measures. Therefore it remains unclear if the planned policy framework would be sufficient to achieve the 2030 goals.

The main focus of the measures proposed in the end-user sectors is on the renovation of existing buildings (and primarily dwellings, even if the tertiary sector is clearly targeted as well) and the transport sector (replacement of vehicles, incentivising modal shift, public transport and active modes, developing Sustainable Urban Mobility). The plan also mentions measures that would contribute to more efficient organisation of the mobility system and thus towards improved energy efficiency and emissions reductions (e.g. incentivising modal shift, public transport and active modes, developing Sustainable Urban Mobility Plans). Measures targeting the services sector (including tourism) and industry are also mentioned. However the scale of policies in end-use sectors remains limited. This is reflected in the scenarios provided, where the additional measures foreseen are expected to achieve only marginal reductions of energy consumption in the next decade. Such effect could also be due to the fact that the most significant impacts are expected to be achieved thanks to the continuation of the already existing framework of policies, which are of limited scale.

Beyond the continuation of the existing programs providing financial support to building renovations, additional fiscal incentives and schemes based on the principle of “best value for money” are planned, which could complement positively the existing granting mechanisms and widen the participation of market players.

Dimension energy security

Greece is highly dependent on a single supplier for gas (and gas, together with petroleum products is used to cover more than 65 % of the gross inland energy consumption), but does not provide any target on the diversification of gas sources.

While mentioning some important planned projects, the draft plan does not describe either the current state of the projects or how these projects will contribute to the objectives of energy diversification and increase of flexibility (quantitative and qualitative information).

Particular attention is paid to the development of domestic energy sources, in particular hydrocarbon extraction, which from a policy perspective contributes to energy security. However, the information provided is limited to the current state of play of the exploration projects without assessing the expected impact of the new domestic energy sources on the flexibility of the national energy system.

The final plan will benefit from an analysis of possible imports from neighbouring countries in the regional context, looking also at the adequacy and export capacities of the neighbouring

countries. It is important to consider how electricity generation adequacy will be ensured in light of the renewable energy contribution, including on demand response and storage.

Regarding oil, the plan could make reference to the stockholding obligation and the existence of emergency procedures/ contingency plan.

Dimension internal energy market

Greece has set an interconnectivity target of 15 % for 2030. The interconnectivity level in 2017 was 9.3 %, and Greece expects to reach the 10 % interconnectivity target for 2020.

In order to achieve this objective, Greece intends to implement Projects of Common Interest (PCIs) with neighbouring Member States, especially north of its border, through new lines and reinforcement of existing ones, within the next decade. A detailed timeframe for the increased interconnectivity level as well as further elaboration on the specific cross-border projects under implementation should be included in the final plan.

There is only limited information on **market functioning**. It is worth recalling that Greece has made commitments under the economic adjustment programmes to increase the competitiveness of the wholesale and retail markets through reducing the shares of the incumbent that remain valid. Greece committed, in 2018, to ensure that the incumbent divests some of its lignite-fired generation plants to third-party operators to increase competition in the wholesale electricity market. A more detailed description of the current situation of the domestic electricity and gas markets, for example by including information on yearly consumption, peak demand, and installed generation capacity by technology, could prepare the scene for setting targets and designing policies and measures. In that respect, quantitative core parameters, e.g. wholesale and retail market concentration levels, indicators for market liquidity such as traded volumes and market participants, switching rates etc. are needed to assess the functioning of the market and to identify possible remaining obstacles to enter the market. As competitive markets are a key enabler for other dimensions of the Energy Union, objectives related to the further development of wholesale and retail market competition and corresponding measures and timelines merit being included in the final plan.

In terms of electricity market liberalisation, crucially important is the implementation of the Greek target market model and the coupling with neighbouring markets, based on the timelines set in the European Stability Mechanism (ESM) Programme.

The draft plan lacks sufficient description of status, specific objectives/targets and concrete deliverables and timeframes regarding **retail market aspects**. The final plan could benefit from more detailed descriptions of policies and measures, concrete actions and timeframes to reach the objectives, in particular on flexibility, demand response, storage, self-generation and aggregation. Furthermore, analytical data on the actual situation with respect to barriers for new market participants (e.g. aggregators) and the uptake of the different sources of flexibility (demand response, storage and distributed generation) would be welcomed.

Greece has identified the number of consumers affected by **energy poverty** (for example, 29 % of the population is considered unable to heat its household sufficiently). To tackle this problem, the Greek draft NECP includes specific objectives and milestones – such as reduction of 50 % in the poverty indicators by 2025 compared to 2016 and reduction of 75 % in the poverty indicators by 2030 compared to 2016. In this respect, the Greek energy poverty national plan foresees improvements in existing measures for the targeted application of social tariffs, as well as the

continuation of currently running schemes promoting energy efficiency for vulnerable households. The draft NECP also discusses the potential replacement of these measures by an "energy card" that could give vulnerable consumers the ability to choose how best to cover their needs.

Dimension research, innovation and competitiveness

The draft plan lacks an identification of research and innovation objectives and funding targets to be achieved by 2030 and is limited to a general description of existing objectives and funding targets under the Strategic Research and Technology Strategy for Smart Specialisations covering the period 2014-2020.

While the draft plan describes a number of objectives for competitiveness in a general fashion, such as the reduction of energy intensity, it does not present a baseline or quantify them. As such, the level of ambition has not been clearly established and it is not self-evident from the draft plan how achievement of the objective will be measured in the future. The NECP would be rendered more comprehensive if this was expanded to cover specifically the low-carbon technologies sector, including for decarbonizing energy and carbon-intensive industrial sectors, accompanied by a more comprehensive analysis on where said sector is currently positioned in the global market, highlighting areas of competitive strengths and potential challenges. Measurable objectives for the future should be defined on that basis, together with policies and measures to achieve them, making appropriate links to enterprise and industrial policy.

The draft plan presents headlines of future policies and measures, without providing any concrete details on how these work in practice on the objectives they aim to achieve.

The draft NECP does not include any mention of how the **Strategic Energy Technology (SET) Plan** is being translated into the national context.

3. COHERENCE, POLICY INTERACTIONS AND INVESTMENTS

The policies and measures cover all dimensions. There is generally consistency and coherence between the policies and measures across and within the different dimensions, for example across renewable energy, energy efficiency and GHG emissions. The internal policy framework is more coherent for some dimensions (e.g. renewables in power generation) than for others (e.g. energy efficiency, research, innovation and competitiveness). Dimensions usually also align between each other, e.g. renewables and internal markets and energy security, and energy efficiency and energy security. The draft plan does lack information of the negative interactions between dimensions and between Policies and measures, an area that is worthy of further analysis and reporting.

With respect to the **decarbonisation**, the draft plan does not describe the impact of planned bioenergy policies on removals in the LULUCF sector. Some of the measures announced (e.g. promotion of energy crops of woody biomass or coppice plantations, domestic bioethanol market development, “cleaning up” forests to avoid fires and use residues for energy production) could also benefit from an assessment of their impact on biodiversity. It also does not 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 for energy efficiency, such as in the thermal management of buildings.

In the **energy efficiency** sector, supply side measures to increase the overall efficiency of the power generation and distribution sectors are mainly targeting natural gas, with the goal of increasing its direct use in final consumption sectors by at least 50 % compared to the year 2016. Such a goal would also be supported by the planned increase in the deployment of renewables in heating and cooling, which represents a significant potential in Greece. Energy efficiency goals are often mentioned in the text as a driver to update and allow for a restructuring of the Greek energy system in the coming years, however a clear strategy to apply the horizontal energy efficiency first principle is not presented. It is acknowledged that the share of households in conditions of energy poverty is much higher in Greece than the EU average, and targeted measures are foreseen to address it. In addition to the measures to help vulnerable households to pay their energy bills (e.g. social tariff), targeted funding schemes will be designed to improve the energy efficiency of dwellings of vulnerable households. It will also be considered how the energy efficiency obligation scheme could contribute to alleviate energy poverty.

The Greek plan raises the relevance of the **circular economy** to both decarbonisation and regional growth and integrates the National Circular Economy Action Plan published in 2018.

The draft plan mentions that it takes into account the air pollution reduction commitments set in the "NEC Directive"[18] and that health impacts from reduced air pollution are calculated by climate and energy measure. However concrete information on the actual impacts would be welcome. The final version could therefore address interactions with air quality more concretely.

The Greek plan has very limited information on interactions with **biodiversity** policies, and some of the measures announced would benefit from an assessment from the point of view of their biodiversity impact.

Overall, the draft NECP contains a partial assessment of the investment needs and expenditures, funding sources and other relevant information. It estimates **investment needs** for energy policy at EUR 34.7 billion i.e. annually around 2 % of current GDP for the next decade (from both public and private sources). Of this, EUR 9 billion would go to energy efficiency. The main funding sources for the public support of renewable energy are identified but without any specific quantification. As regards investment in decarbonisation, part of the revenues from auctioning of EU ETS allowances will also be used to fund climate action. With respect to the financing mechanisms, the draft plan states that a significant part of the funding for implementing the proposed measures (especially in the areas of waste, rural development and forestry) would come from EU funds. However, given the already mentioned lack of details of the size and expected impact of the planned measures, it is not possible to assess the robustness of these figures. Some investment needs could partly be covered by EU funds, in particular cohesion policy funding, notably in line with the investment analysis for 2021-2027 of the 2019 European Country Semester Report for Greece and with any relevant legislation.

Links with the European Semester

Identifying financing needs and securing the necessary funding will be key to deliver on Greece's energy and climate objectives. The Commission had addressed this question as part of the 2019

[18] Directive 2016/2284/EC on the reduction of national emissions of certain atmospheric pollutants.

European Semester process, Based on the 2019 Country Report for Greece, published on 27 February 2019[19], the 2019 European Semester country-specific recommendations to Greece issued on 5 June 2019[20] highlight the need to invest in 'sustainable transport and logistics, environmental protection, energy efficiency, renewable energy and interconnection projects'. When preparing its overview of investment needs and related sources of finance for the final plan, Greece should take into account these recommendations and links to the European Semester.

The draft plan contains a description of **energy subsidies** for renewable energies. Based on internationally used definitions, energy subsidies, including subsidies for fossil fuels and renewables in Greece, were identified in the European Commission report on Energy Prices and Costs in Europe[21]. The final plan must include a description of all energy subsidies as well as the national policies, timelines and measures planned to phase out fossil fuel energy subsidies.

With regard to the just and fair transition aspects, the draft plan mentions the national Fair Transition Support Initiative which uses the revenues from the auctioning of the EU emissions trading system allowances to support development actions in areas of Greece whose economy is strongly dependent on coal mining, such as the regions of Florina and Kozani and the municipality of Megalopolis. While the draft plan clearly describes the different types of actions to be financed from these revenues, a more detailed information on the specific projects, the form of support and the impact of the initiatives would be welcomed in the final plan[22]. It would be relevant in particular to analyse the social and employment impacts of the transition, with a focus on training and skills. Greece is taking part to the initiative for Coal regions in transition, promoted by the Commission.

4. REGIONAL COOPERATION

While Greece is planning to engage and consult with neighbouring Member States in the future, there is no indication when consultations will take place.

With respect to regional cooperation **in the area of renewables**, Greece refers to active cooperation with Germany in the context of the TARES technical assistance project, as well as with several EU and non-EU countries within the Central and South Eastern Europe Energy Connectivity (CESEC). The draft plan envisages the organisation and participation of Greece in cross-border competitive bidding processes for new renewable installations, on the basis of reciprocity. Greece does not envisage at this stage to either buy or sell renewables in the form of statistical transfers or other cooperation mechanisms.

In the area of **internal energy market**, Greece mentions regional cooperation notably for the completion of existing interconnections and the planning of new international interconnectors. However, no further detail is provided. More robust reference to the relevant PCIs, such as those

[19] SWD(2019) 1007 final.
[20] COM(2019) 508 final.
[21] Commission Staff Working Document Accompanying the Document Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Energy prices and costs in Europe, COM(2019) 1.
[22] A macroeconomic assessment of the impact of proposed policies and measures of the plan in the context also of the issue of just transition in coal and carbon-intensive regions, is expected to be undertaken in line with point 5.2 in the Annex I (part 1) of the Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

with Cyprus, could be made as well as to the benefits deriving from them and the funding options available.

Regional cooperation is key to **security of supply**, both for gas and electricity. In that regard, it would be welcomed if Greece includes measures for regional cooperation when assessing system adequacy, as foreseen in the Electricity Regulation[23]. Furthermore, the objectives for increasing the flexibility of the national energy system through exploration of domestic energy sources and notably extraction of hydrocarbon from the sea merits possible cooperation with the neighbouring countries.

As regards cooperation with other Member States in the area of **research and innovation**, a brief overview is provided of a few cooperation fora without setting out what are the actions flowing from them and how they contribute to achieving research and innovation objectives by 2030.

Greece could further explore the cross-border potential of a coordinated energy and climate policy notably in the Adriatic with the aim of reducing the region's carbon footprint and implementing an ecosystem approach. In this regard, an assessment of the macro-regional aspects would further enrich the analysis and provide solid basis for regional cooperation in the future.

Finally, Greece is a signatory to the political declaration for the Clean Energy for EU Islands Initiative launched in May 2017 and mentions that it participates actively. However, the final plan would benefit from further details on enhanced cooperation with other Member States and island regions facing similar challenges and opportunities, including in areas such as interconnection, clean transport, system integration of local renewable production, specific demand response opportunities, for example from desalination plants or cooling loads, and the cost-effective deployment of energy storage systems.

5. COMPLETENESS OF THE DRAFT PLAN

Information provided

The Greek draft NECP follows the template set out in Annex I of the Governance Regulation. The use of voluntary templates[24] to report on quantitative projection parameters and results as well as on policies and measures is welcome.

The **decarbonisation dimension** of the draft NECP is partially complete with respect to the required information. The draft plan does not include an estimation of the annual binding emission limits in 2021-2030 under the ESR[25]. There is no information on how the binding no-debit commitment of the LULUCF Regulation[26] will be achieved under the Regulation's accounting rules. For example, the potential use of flexibilities between the LULUCF and the ESR sectors is not addressed, although they are likely to be important elements for Greece's achievement of its overall 2030 target. The draft NECP does not specify its adaptation objectives.

[23] Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity.
[24] Voluntary template for policies and measures, voluntary template for reporting of used parameters and variables included in Annex I, part 2 of the 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] Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030.
[26] Regulation (EU) 2018/841 on greenhouse gas emissions and removals from land use, land use change and forestry.

With regard to the **renewable energy dimension**, the elements provided in the draft plan should have been more detailed in order to provide investment certainty. In the section on national objectives and targets, information on the expected gross final energy consumption expected in 2030, expressed in absolute terms (in Mtoe) both for overall renewables share and for each individual technology needs to be included, as well as the trajectory for bioenergy demand in each sector, and on the assessment of the source for forest biomass and impact on the LULUCF sink should also be included. Planned capacities are generally described, without being split between new capacities and repowering. In the policies and measures section, the draft plan provides a clear overview of the measures planned in the area of renewable energy, however without individually explaining them in details and with insufficient impact assessment of the planned policies and measures.

On **energy efficiency**, the quantitative details of the impact assessment of the planned policies and measures are not provided in the draft plan and it is observed that the additional measures foreseen are expected to achieve only marginal reductions of energy consumption in the next decade. The mandatory elements on the long-term renovation strategy[27] are not provided. However, the information required in relation to cost-optimal minimum requirements for existing buildings subject to major renovations has been provided, even if it wasn't for new buildings. In addition, information on near to zero energy buildings standards for both new and existing buildings was also reported.

On **energy security**, the draft plan provides concrete numbers and figures for the current security of supply situation, but some sections would benefit from further development. In particular, for regional cooperation and financing measures, the final plan could elaborate beyond a simple listing. References could be added to the existing preventive action and emergency plans for gas as well as electricity risk preparedness plans and measures on cyber security.

On the **internal market**, the draft plan contains only limited information on core quantitative parameters on the functioning of the national retail and wholesale gas/electricity markets, preventing a full assessment of the draft plan. Objectives and strategies to further develop competition in the market, in line with the ESM programme, are missing. On infrastructure, the draft does not include indicators on peak load, installed capacity, renewable installed capacity, and specific measures for increasing tradable capacity on interconnectors, which would provide a complete picture on the internal energy market.

The information provided related to **research, innovation and competitiveness** is largely incomplete. Although Greece provides information on the current national priorities for research and innovation, concrete measureable objectives have been provided only for the period up to 2020, while objectives for 2030 and associated funding targets have not been provided. A number of objectives related to competitiveness have been presented. A general description of intended policies and measures, including financing and cooperation with other Member States was included. The draft plan does not include objectives related to the deployment of low-carbon technologies, which would be particularly relevant to support Greece's ambitious objective for renewable energy development.

[27] Namely the indicative milestones; the roadmap with measurable progress indicators; an estimate of the expected energy savings and wider benefits and the contribution of the renovation of buildings to the Union's energy efficiency target.

Robustness of the Greek draft National Energy and Climate Plan

The Greek draft plan addresses all the required elements of the **analytical basis.** It contains both a "with existing measures" (WEM) and a "with additional measures" (WAM) scenario. The data sources used include international, Eurostat and national statistics as well as other sources from the European Commission like the JRC (SETIS and IDEES).

The **with existing measures and with additional measures projections** cover the five dimensions of the Energy Union. Additional information would be desirable on the following variables: (i) the differentiation of sectoral GHG emissions per IPCC sector, (ii) the differentiation of sectoral GHG emissions per IPCC gas, (iii) the differentiation of sectoral GHG emissions between those covered by the EU ETS and those falling under the Effort Sharing Regulation, (iv) GHG emissions from international aviation, (v) GHG emissions and sinks from LULUCF, and (vi) non-GHG air pollutants, (vii) projections of electricity interconnectivity levels, and (viii)) time series data for energy related investment needs.

Key parameters have been provided, including sources. Information is provided on which policies have been considered in the with existing measures and with additional measures scenarios. The **transparency** of Greece's draft plan could be further improved by providing (i) the data reported in graphs only (as opposed to numerical data), (ii) the missing parameters' sources, and (iii) the assumptions on cooling degree days. The draft plan refers to some modelling tools. Documenting these in more detail including the overall modelling approach would further increase the transparency of the final plan.

The **impact assessment** of planned policies and measures presents the conclusions of a multi-criteria analysis, comparing the with existing measures and with additional measures scenarios. Information on the modelling results is limited, so far, and could be consolidated at the economy wide level. Greece's draft plan could be further improved by analysing planned policies and measures' impacts on other Member States and regional cooperation. The final plan should complete the assessment of macroeconomic and, to the extent feasible, the health, environmental, employment and education, skills and social impacts, including just transition aspects.

The key model parameters are largely in line with EUROSTAT figures for the base year 2016. The draft plan follows the fuel and EU ETS prices assumptions recommended by the Commission, however, as for GDP, own projections are used instead of those recommended.