



Brussels, 14.10.2020
SWD(2020) 903 final

COMMISSION STAFF WORKING DOCUMENT

Assessment of the final national energy and climate plan of Denmark

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1. SUMMARY

Denmark's final, integrated, national energy and climate plan (NECP)¹ sets a legally binding target to reduce **greenhouse gas (GHG) emissions** by 70% by 2030 (relative to 1990) to reach net-zero emissions by 2050 at the latest. Denmark's 2030 target for GHG emissions not covered by the EU emissions trading system (non-ETS) is a 39% reduction compared to 2005, as set in the Effort Sharing Regulation (ESR)². Denmark has not fully clarified in the final plan how it intends to reach its 2030 non-ETS target. With existing measures, the European Commission estimates that Denmark will miss this target by 13 percentage points and have a deficit of 28.3 million tonnes of CO₂ equivalent over the period 2021-2030.

For **renewable energy**, Denmark indicates a 55% share of renewable energy in gross final consumption of energy by 2030 as its contribution to the EU renewable-energy target for 2030. This is significantly above the 46% share in 2030 that results from the formula in Annex II of Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action ('the Governance Regulation')³. This 55% share is the same as that contained in Denmark's draft plan, but Denmark's NECP states that the new policies needed to reach the new national 70% GHG reduction target, 'may impact the pace and magnitude of the renewables penetration'.

For **energy efficiency**, the Danish contribution to the EU target is of very low ambition⁴ and amounts to 18.3 Million tonnes of oil equivalent (Mtoe) for primary energy consumption and 15.8 Mtoe for final energy consumption. The final plan provides some details on energy efficiency of buildings. Denmark has submitted its long-term renovation strategy⁵.

For **energy security**, maintaining a high level of security of supply is a priority for Denmark. This is particularly challenging given that Denmark has an ambitious objective for the share of renewables in electricity to be greater than 100% of consumption by 2030. Denmark plans to ensure security of supply by relying on imports for both electricity (particularly in times of low wind-power generation) and gas (notably during the renovation of the Tyra gas field).

In the **internal energy market**, Denmark already has an interconnectivity level of 51% and has set an objective of having the most integrated, market-based and flexible energy system in Europe. Denmark's NECP presented policies and measures on some aspects of market integration, for instance on improving price signals. On energy poverty, the plan includes a description of relevant social policies.

The importance of funding for **research and innovation (R&I)** is recognised, but the plan does not include a quantitative objective for 2030. Denmark's strategy is to invest in areas in which

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

⁴ In accordance with the methodology as illustrated in SWD(2019) 212 final.

⁵ Denmark submitted a long-term renovation strategy in accordance with Article 2(a) of Directive 2010/31/EU on the Energy Performance of buildings on 10 March 2020. However, this assessment is only based on the building related elements provided in the final NECP.

there is a particularly good match between demand for new energy technology on the one hand, and ‘Danish strongholds’ (i.e. areas in which Danish industry already has a commercial advantage, such as wind power, district heating, energy efficiency, bioenergy, smart grids and system integration) on the other hand. This approach also affects Denmark’s **competitiveness** objectives, where the country’s main objective is to provide green solutions to the fast-growing global market.

It is estimated that total private and public **investments** over the period 2021-2030 will reach DKK 100-180 billion (EUR 13-24 billion). While there is an overview by sector between 2018 and 2040, the NECP does not provide any information on the methodology used to forecast the investment needs.

A list of renewable and fossil-fuel **energy subsidies** is included in Denmark’s final plan. On fossil-fuel subsidies, the list is in line with the figures and categories that have been identified in recent Commission analyses on energy subsidies. In addition, Denmark commits in its plan to phase out energy subsidies.


The plan makes very limited references to the integration of energy-andclimate and **air-quality policies**. The plan includes quantitative information on air-pollutant emissions, but does not reflect the air-quality implications of its projections for energy and GHG emissions.

The plan considers the **just and fair transition** aspects of its policies, and provides information on the social, employment and skills impacts of the transition to a climate-neutral economy. For example, it considers the need for skills and employment in the energy sector and in clean transition industries.




On **energy poverty**, Denmark indicates that it does not have verifiable data on how many households live in energy poverty. Energy poverty is addressed through social measures such as heating supplements and supplementary benefits.

There are several examples of **good practices** in the final NECP, in particular the comprehensive overview of energy subsidies and investment needs by sector between 2018 and 2040.

The following table presents an overview of Denmark’s objectives, targets and contributions under the Governance Regulation⁶.

	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) (%)	-19%	-20%	-39%	As in ESR
	National target/contribution for	35.7%	30%	55%	Sufficiently

⁶ 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.

	renewable energy: Share of energy from renewable sources in gross final consumption of energy				ambitious (46% is the result of RES formula)
	National contribution for energy efficiency:				
	Primary energy consumption	17.8 Mtoe	17.5 Mtoe	18.3 Mtoe	Very low ambition
	Final energy consumption	14.8 Mtoe	15.2 Mtoe	15.8 Mtoe	Very low ambition
	Level of electricity interconnectivity	51%	NA	NA	NA

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

2. FINALISATION OF THE PLAN AND CONSIDERATION OF COMMISSION RECOMMENDATIONS

Preparation and submission of the final plan

Denmark **notified** its final national energy and climate plan to the European Commission on 20 December 2019.

A **public consultation** on the NECP was held via the EU Special Committee between 22 November and 2 December 2019. The committee consists of approximately 100 stakeholders, interest groups, organisations, non-governmental organisations, companies, and public institutions. Denmark has submitted a summary of the public's view and of how those views were taken into account in the final plan. According to the Danish government, the comments on the NECP are also being taken into consideration in the ongoing work on the country's national climate action plan. The final NECP was not subject to a strategic environmental assessment under Directive 2001/42/EC. Denmark clarifies that the Danish NECP is a generic and strategic plan, for which the criteria of the Strategic Environmental Assessment Directive do not apply.

Consideration of Commission recommendations

In June 2019, the European Commission issued 10 recommendations to Denmark⁷. Annex II to this staff working document offers a detailed account of how the different Commission recommendations were reflected in the final NECP. Overall, the final NECP **partially addresses** most of the Commission recommendations. The main changes introduced in the final plan are set out in the following points.

On **GHG emissions in non-ETS sectors**, Denmark has **not addressed** the recommendation to:
(i) clarify how it intends to reach its 2030 target for GHG emissions not covered by the EU ETS

⁷ Commission recommendation of 18 June 2019 on the draft integrated national energy and climate plan of Denmark covering the period 2021-2030 - C/2019/4404.

of a 39% reduction compared to 2005; (ii) put in place further cost-efficient policies; (iii) specify Denmark's intended use of the flexibilities between: the effort sharing sectors; the land use, land use change and forestry (LULUCF) sector; and the ETS sector. The final plan includes less, rather than more, information on how Denmark plans to meet its 2030 non-ETS target. Specifically, the plan presents only a scenario with existing measures, in which the 2030 non-ETS target would not be met. Planned policies and measures are not described and the plan does not clarify whether Denmark intends to make use of the ETS and LULUCF flexibilities.

On **renewables**, Denmark **partially addressed** the recommendation to: (i) clarify the level of the indicative trajectory that reaches all the reference points pursuant to Article 4(a)(2) of the Governance Regulation; and (ii) underpin their level of ambition with detailed and quantified policies and measures. The analytical basis in the plan has been strengthened, and the modelling of existing policies and measures now predicts a 54% share of renewable energy in gross final energy consumption by 2030. However, this is still not in line with the 55% RES contribution. The plan presents policies, measures and descriptions of planned tenders that contribute to the renewable objective.

On **energy efficiency**, Denmark **partially addressed** the recommendation to: (i) propose more ambitious policies and measures; (ii) substantially increase the level of ambition for energy efficiency; and (iii) provide more clarity on the actual measures capable of delivering on the ambition for cleaner and more efficient transport. In particular, although the NECP does not contain major new energy-efficiency measures, some progress has been made with the adoption or implementation of certain measures that were under preparation at the time of the draft NECP submission. Many of these measures were related to transport. However, the recommendation to substantially increase the level of ambition for energy efficiency was not addressed: the contribution in primary energy consumption was only slightly reduced, while it remained the same for final energy consumption. On buildings, the information in the NECP is improved but remains limited. Denmark submitted its long-term renovation strategy⁸.

On the **internal energy market**, Denmark **partially addressed** the recommendation to set clear, measurable and forward-looking objectives for market integration. However, given Denmark's objective of having the most integrated, market-based and flexible energy system in Europe, its plan lacked detail on competition, liquidity and forward-looking objectives, in particular for gas.

On **R&I and competitiveness**, Denmark **partially addressed** the recommendation to: (i) further elaborate on objectives and funding targets; and (ii) underpin these objectives with specific and adequate policies and measures. Denmark has further elaborated on the national objectives and funding targets for R&I. However, further clarifications – for instance on quantitative targets for funding – will be needed.

Denmark **largely addressed** the recommendation on **regional cooperation**. Denmark has continued to work together with the other North Seas Energy Cooperation countries, in particular to explore the possibilities for joint offshore-wind projects.

The recommendation on **investment needs** was **fully addressed**, since Denmark provided an overview of the investment needs by sector between 2018 and 2040.

⁸ Denmark submitted a long-term renovation strategy in accordance with Article 2(a) of Directive 2010/31/EU on the Energy Performance of buildings on 10 March 2020.

Denmark **largely addressed** the recommendation to list actions already undertaken – and plans for the future – to **phase out energy subsidies**, in particular for fossil fuels. A list of both renewable and (indirect) fossil-fuel subsidies has been included in the plan. The plan also contains a political commitment to phase out both renewable and fossil-fuel energy subsidies.

The recommendation on interactions between air pollutants and **air quality** was **partially addressed**, since projections for air pollutants were included in Denmark’s plan. However, these projections are not the same as those used in the sections of the plan dealing with energy and GHGs.

Finally, Denmark **partially addressed** the recommendation to better integrate **just and fair transition aspects**. In particular, Denmark presented measures to address energy poverty via social policy measures and some initiatives in the area of skills. However, the employment and distributional impacts of the policies and measures over the period covered by the plan are not addressed in the NECP.

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 2019⁹, Denmark received one country-specific recommendation¹⁰ on climate and energy, calling on it to ‘focus investment-related economic policy on [...] sustainable transport to tackle road congestion’. In the 2020 country report¹¹ adopted on 20 February 2020, the Commission found that Denmark 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 as soon as possible and promote private investment, including through relevant reforms, notably in the digital and green sectors. In this context, Denmark received a country-specific recommendation¹² stressing the importance of focusing investment on the green and digital transitions, in particular on clean and efficient production and use of energy, sustainable transport as well as research and innovation.

The Governance Regulation requires Member States to ensure that their national energy and climate plans take into consideration the latest country-specific recommendations issued in the context of the European Semester. Denmark’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 sources to meet them.

⁹ 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.

¹⁰ Recommendation for a Council recommendation on the 2019 National Reform Programme of Denmark and delivering a Council opinion on the 2019 Convergence Programme of Denmark, COM/2019/504 final.

¹¹ SWD (2020) 503 final. Commission Staff Working Document. Country Report Denmark 2020.

¹² Recommendation for a Council recommendation on the 2020 National Reform Programme of Denmark and delivering a Council opinion on the 2020 Convergence Programme of Denmark, COM/2020/504 final.

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

In addition to the binding target for **non-ETS emissions** of a 39% reduction by 2030 compared to 2005 set in the Effort Sharing Regulation¹³, Denmark has set the objective of achieving climate neutrality by 2050. The government has reached a cross-party agreement on a new Climate Act that was adopted by the parliament in June 2020. The Act includes a legally binding target to: (i) reduce total domestic GHG emissions by 70% by 2030 compared to 1990 levels; (ii) reach net-zero emissions by 2050 at the latest; and (iii) set milestone targets based on a five-year cycle. The country's long-term strategy is also based on these targets. This likely implies that the binding target for non-ETS emissions of a 39% reduction is also reached domestically.

Based on the scenario with existing measures, the Commission estimates that Denmark would miss its 2030 non-ETS target by 13 percentage points and have a deficit of 28.3 million tonnes of CO₂ equivalent (Mt CO₂eq) over the period 2021-2030. This scenario uses policies that were adopted by May 2019. Denmark did not provide any scenario with planned additional measures.

Denmark estimates that over the period 2021-2030, it will generate more than 14.6 million **LULUCF** credits¹⁴, which is the amount the country may use to comply with its commitments in the ESR. The NECP does not explain in detail how these credits will be generated, nor does it confirm whether Denmark intends to use such flexibility. Although Denmark has notified to the Commission its intention to use the cancellation of ETS allowances allowed for in the ESR, the plan does not mention whether the country plans to use this flexibility for complying with the obligations in the ESR.

Denmark plans to decide on **additional policies and measures** to meet the objectives after submitting its NECP. These additional policies and measures may include climate action plans. Sectoral strategies for agriculture, transport, energy, construction and industry will be included in the climate action plan to be adopted in 2020. As a result, the NECP does not specify Denmark's strategy for reaching its 2030 non-ETS target, but it makes reference to certain objectives and planned initiatives. The NECP does not discuss the expected impacts of these initiatives.

For **transport**, a key objective is to stop sales of new cars running exclusively on petrol or diesel with traditional internal combustion engines (i.e. non-hybrid or non-electric cars) by 2030. The government will also negotiate a new infrastructure agreement. According to Denmark's NECP, this agreement will also consider climate and environmental issues, including investments in public transport and cycling, to a much larger degree than the present infrastructure plan.

¹³ 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.

¹⁴ 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.

Denmark has also planned a major electrification of transport. The plan does not provide a clear indication of the contribution of transport to the achievement of the overall 70% target.

On **buildings**, the NECP states that the upcoming climate action plans will include energy-efficiency measures, for instance energy-saving requirements for public buildings. The Danish government also plans to allocate DKK 2 billion (EUR 268 million) in the period 2020-2029 to reducing GHG emissions from **agriculture**.

For **LULUCF**, the government considers establishing a **biodiversity package**, a forest fund and subsidies for the conversion of arable land on organic soils to nature. For forestry, measures include afforestation, greater biodiversity and more woodlands, including “more untouched woodlands and more cohesive nature areas where nature is allowed to spread out on more natural terms than is currently the case”, with clear targets for proportions of land designated. Through the announced biodiversity package, further links between biodiversity and carbon sinks are expected. Forest biomass is an important source for renewable energy (heat and electricity), but it will decrease in the future. A study on the sustainability of biomass for renewable energy is announced

The NECP describes **climate-change-adaptation** goals and refers to national adaptation planning.

Denmark notified its long-term strategy to the Commission on 20 December 2019. Denmark aims to achieve net-zero GHG emissions by 2050 at the latest. All sectors of the economy are included in the strategy, and the natural carbon sinks will compensate for the remaining emissions that are most difficult to abate. The Climate Act, passed in June 2020, has enshrined the 2050 objective in law and Denmark intends to update its long-term strategy on a regular basis. However, the long-term strategy misses some aspects required by Article 15 of the Governance Regulation, such as a report on public consultation or an assessment of socioeconomic impacts.

Renewable energy

For **renewable energy**, Denmark indicates a 55% share of renewable energy in gross final consumption of energy by 2030 as its contribution to the EU’s renewable-energy target for 2030. This is considered as sufficiently ambitious when compared to the 46% share resulting from the formula in Annex II of the Governance Regulation.

Modelling based on Denmark’s existing policies and measures indicate it will reach a share of 54% of renewable energy by 2030, thus indicating that additional policies and measures will be needed to reach the 55% share. Denmark’s NECP set out an **indicative trajectory** well above the reference points provided for in the Governance Regulation, with a surplus of 11% above the 2020 target being factored in as an early effort towards the 2030 target.

Denmark has not set any targets or objectives for sectoral shares of renewable energy, technologies used, or bioenergy demand. However, the Commission noted that the modelling presented in Denmark’s plan indicates the expected contributions from the various sectors and technologies to the 54% share of renewable energy.

According to the modelling for 2030, the share of renewable energy in **transport** will reach 1% in 2030; the share of renewable electricity consumption will exceed 100% by 2030; and the share of renewable energy in **heating and cooling** will reach 60% by 2030, of which there will be 80% renewable energy in the **district heating sector**. The 80% target represents an average increase of 0.88 percentage points in renewable energy in the district heating sector per year between now and 2030.

Only existing policies and measures are reported in the NECP; other planned policies and measures were still under discussion at the time Denmark submitted its plan.

Denmark will increasingly depend on relatively large imports of biomass used for heating and electricity, as approximately 50% of its biomass needs will be covered by imports. The sustainability issues this situation raises are currently addressed in a voluntary agreement in the energy sector, but an analysis has been initiated that will serve as input to the forthcoming climate action plan.

In regional cooperation to prepare its plan, Denmark emphasised the use of the North Seas Energy Cooperation. Within this forum, a list of areas and projects were identified that had potential for renewable-energy cross-border cooperation. In addition to this, the plan was discussed within the Nordic Council of Ministers where an ad hoc group was set up as a forum for cooperation on the NECPs.

Energy efficiency

Denmark's **national contribution for energy efficiency** in 2030 is 18.3 Mtoe for primary energy and 15.8 Mtoe for final energy consumption, illustrating a very low ambition in this area.

The plan provides descriptive information on **policies and measures** beyond 2020 targeting a variety of sectors, mainly industry and buildings. These policies and measures are considered sufficient in relation to the achievement of the target, simply because the target was set as the expected consumption level in a projection, including only already known and adopted policies and measures.

The plan also presents the **cumulative savings** to be achieved under Article 7 of the Energy Efficiency Directive¹⁵ as 6.414 Mtoe. Four measures to achieve this target have so far been identified: (i) a subsidy scheme for private enterprises; (ii) a subsidy scheme for buildings; (iii) improving the efficiency of existing buildings by other measures; and (iv) a subsidy scheme to replace oil burners with heat pumps in buildings outside district heating areas and gas grids.

These policies and measures are considered insufficient in relation to the achievement of the target, because their estimated impacts amount to less than 30% of the cumulative target.

On **buildings**, Denmark's final NECP presents an insufficient level of ambition. The country has not provided substantial information or clear policies and savings through measures to meet the potential for energy efficiency in the sector. More information on realistic and ambitious policies and measures for a coherent renovation strategy is presented in the national long-term renovation strategy¹⁶ and expected in the Danish climate action plan.

Energy security

Maintaining a high level of **security of supply** is a priority in the ongoing transformation of Denmark's energy system. The country has an ambitious objective of 55% renewable energy in gross final consumption in 2030, and for production of renewable electricity to be above 100% of consumption. When considering the risks to energy security, Denmark's plan refers to its intention to expand wind-power generation and the importance of electricity interconnections for imports. Denmark relies on electricity imports in times of low wind, and the plan points to varied

¹⁵ 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.

¹⁶ Denmark submitted its long-term renovation strategy on 10 March 2020.

electricity-generation profiles across Europe, partly due to different weather patterns for wind-power generation. Given this reliance on imports and Denmark's renewable-energy goals, the plan should better take into account the plans of the other connected Member States. The plan states that regional developments will be monitored, but does not spell out specific measures.

On gas, Denmark's main production facility, Tyra, is undergoing renovation from November 2019 to July 2022. This means that Denmark has moved from being an exporter of natural gas to being an importer of natural gas from Germany during this time. Denmark is also acting as a transit point for the Swedish gas market during this time. The plan outlines the increasing contribution that will be made by **biogas production** to security of supply. Biogas will account for an expected 15% of gas consumption in 2020 and 30% in 2025. Despite Denmark's goal of reducing GHG emissions by 70% by 2030 and the aim to achieve net-zero emissions by 2050 at the latest, natural gas and oil will continue to play a role in the years to come. Denmark therefore continues to support investments in oil and gas extraction in the North Sea.

The plan envisages an increased role for **energy storage** and making use of surplus wind energy. Specific policies and measures to ensure that storage will be able to play this key role would provide clarity and certainty as to how the electricity system will cope with the increase of renewable energy in electricity generation. Although the plan presents policies and measures to increase interconnectivity and draw up a smart-energy plan, it is vague on details to address the implications of electricity being increasingly based on variable generation.

The plan does address other risks for the energy system, in particular **cybersecurity** and risks from climate change. The plan refers to the emergency plans for gas, although not to emergency plans for electricity and oil, provided for by the applicable sectoral rules.

Internal energy market

The plan states that Denmark's current interconnectivity level is 50.6%, well above the EU target of 15% for 2030. However, it does not contain any specific target for the level of electricity **interconnection** by 2030.

The share of **renewable energy in electricity** is projected to be more than 100% in 2030. For this reason, the Commission welcomes that Denmark's NECP provides an overview of the development of the different sources of flexibility that will be necessary to integrate the rising share of renewable energy into the electricity system.

Denmark's Energy Agreement sets an objective of having the most integrated, market-based and flexible energy system in Europe. Given this objective, the plan could provide a better overview of current **market conditions** for gas and electricity, in particular for levels of competition and liquidity of markets. The plan outlines: (i) intraday and day-ahead market coupling; (ii) the use of interconnectors; and (iii) the creation of a joint balancing zone with Sweden for gas. Nevertheless, forward-looking and measurable objectives would be a useful addition to the NECP. The plan also refers to the market-based procurement of energy and non-energy services by transmission-system operators to improve price signals. However, it does not contain policies and measures on other aspects of **market integration**.

The Commission takes note of the improvements made in this part of the plan compared to the draft NECP. However, the plan would still benefit from a selected number of clear and detailed objectives for: system **flexibility**; smart grids; demand response and aggregation; storage; distributed generation; consumer protection; and competitiveness in the retail sector.

Although the plan describes a much greater number of policies and measures designed to increase system flexibility (for instance funding for power-to-X projects) compared to the draft plan, it could still benefit from a deeper analysis of key issues such as market barriers for new participants.

Denmark provided a rudimentary description of the current situation on **energy poverty**. The plan includes a satisfactory description of social policies, which are considered credible to address the issue of energy poverty. However, Denmark's general intention to consider vulnerable consumers further under the Electricity Market Design Directive could be strengthened by a target of reducing energy poverty, or by maintaining already low levels of energy poverty through the energy transition.

Research, innovation and competitiveness

In the 2018 Energy Agreement, Denmark committed to spend DKK 50 million (EUR 6.7 million) in 2020 on **research, development** and demonstration of new energy technology. With the research reserve agreement in 2020, spending on green research, development and demonstration will be increased by DKK 1 billion (EUR 134 million) in 2020 in addition to the existing spending targets. However, the NECP does not describe a quantitative funding target at this stage.

The target of reducing GHG emissions by 70% by 2030 will require new technological solutions, whilst research and innovation is considered as a 'transversal' instrument relevant for all the other aspects of the energy union. Examples of research innovation include: (i) the research funding Denmark has allocated to limiting GHG emissions from the agricultural sector (DKK 90 million, approximately EUR 12.1 million, for the period 2019-2021); (ii) the creation of an energy-storage fund of DKK 128 million (EUR 17.2 million); and (iii) the funding for power-to-X projects for large-scale production and storage of green hydrogen.

Denmark considers hydrogen as a particular priority in its research agenda. Its NECP focuses on describing new solutions that will be developed in the energy sector thanks to research and development and demonstration programmes on new renewable-energy technologies, including hydrogen, fuel cells, and energy storage.

In its NECP, Denmark declared that its **strategic energy technology (SET) plan** is being implemented through the Horizon 2020 and ERA-Nets programmes for funding research. The plan NECP did not provide details on the funds allocated to each implementation plan. The NECP says that the Danish energy-technology development and demonstration programme is in line with the objectives of the SET plan. However, the plan does not explain how this contributes to reaching Denmark's national energy-and-climate objectives. Denmark's strategy is to invest in areas in which there is a particularly good match between global demand for new energy technology on the one hand, and 'Danish strongholds' (i.e. areas where Danish businesses are already strong, such as wind power, district heating, energy efficiency, bioenergy, smart grids and system integration) and business potential on the other.

On **competitiveness**, the main elements are the 'green entrepreneurialism' priority of delivering green solutions to the fast-growing global market support green diplomacy. Instruments in Denmark's export scheme (totalling DKK 174 million, approximately EUR 23.3 million, from 2019 to the end of 2024) include funding for export-promotion activities allocated through tenders and subsidies. Denmark has also made a strong connection between its competitiveness objectives and its technology development and demonstration strategy, the latter being at the service of the former.

In addition, at the end of 2019, the government and other parties agreed to support green diplomacy by strengthening the government's effort of posting energy advisers to growth markets. The aim of this was to deploy Danish expertise within energy systems and the green transition. Denmark has allocated DKK 5 million in the period 2020-2021 (EUR 0.67 million) for this work.

Denmark does not have any **funding target** for private R&I in the energy union. The most recent figures on private spending date back to 2015, when private companies spent approximately EUR 536 million on research and development in energy research.

On patents, the plan states that Denmark holds approximately 42 patents per million inhabitants in technologies related to mitigating climate change.

With an excess production of renewable electricity planned in the course of the next decade, and a need to decarbonise all sectors of its economy, Denmark is promoting research and development in energy-storage technologies. As a specific action, the country set up a fund of EUR 17 million to support demonstration projects in energy storage¹⁷. Danish pension funds announced they would invest EUR 47 billion to support the green transition by 2030, which is more than the investment needs identified by Denmark. This implies that Denmark has sufficient financing to deploy low-carbon technologies.

4. COHERENCE, POLICY INTERACTIONS AND INVESTMENTS

Overall, Denmark's policies and measures are consistent across the different areas of the NECP. The plan is also consistent between its policy part and its analytical part on reductions in GHG emissions reduction.

On decarbonisation, Denmark's NECP makes reference to **interactions** between reducing GHG emissions and increasing renewable energy. The NECP also identifies other interactions, in particular between decarbonisation and energy efficiency. However, there is no clear explanation of how the 'energy-efficiency first' principle was considered or applied.

The NECP lacks a consolidated quantitative **macroeconomic assessment** of the impact of the planned policies and measures, in particular the relative efficiency of investments.

The chapter of the plan devoted to objectives and targets also contains information on how climate-change risks might affect energy supply, and especially how windstorms might impact power networks. However, this discussion is not followed up by specific actions in the chapter on policies and measures. The climate risks identified for the energy sector need to be followed up on with specific policies and measures, while energy-efficiency measures need to be mindful of co-benefits and trade-offs under future climate scenarios.

The NECP also lacks information on adaptation co-benefits for energy efficiency, such as in the thermal management of buildings.

The Commission noticed a good practice in the NECP: the plan describes in some detail the prioritised budget for the policies and measures of the Danish 2018 Energy Agreement up to 2025. It describes **investment needs** for the scenario with existing measures. The plan also includes planned public investments up to 2025 to implement the 2018 Energy Agreement. The NECP indicates that investments are expected to increase gradually and amount to DKK 2.8

¹⁷ In 2019, funding was granted to two power-to-X projects, which will establish large-scale production and storage of green hydrogen in near-market conditions.

billion in 2025 (EUR 375 million, roughly 0.1% of GDP). The cumulated public and private investments initiated by the Energy Agreement are estimated in the range of DKK 100-180 billion (EUR 13-24 billion) between now and 2030, or approximately DKK 10 billion (EUR 1.34 billion) per year. The largest investments are required in the installation of new renewable-energy capacity, while significant investment needs are also identified in households (energy efficiency and conversion of heat supply), industry, biogas, and district heating.

Private capital is expected to constitute a substantial proportion of the funding. Except for the mention that Danish pension funds have recently announced that they plan to invest DKK 350 billion by 2030 in an effort to support the green transition, this is not further detailed in the plan. Funding from EU sources or the use of revenues from auctioning ETS allowances are also not mentioned in the plan.

The NECP's description of existing **energy subsidies** appears to be based on internationally used definitions. The figures and categories of both fossil-fuel and renewable-energy subsidies are in line with the figures and categories in the European Commission's third report on energy prices and costs in Europe¹⁸. A timeline to phase out energy subsidies – in particular fossil-fuel subsidies – is not mentioned in the plan.

On the **just and fair transition**, the plan describes to a limited extent the current impacts of the transition on skills, employment and energy poverty. However, neither a forward-looking evaluation nor an assessment of the transition's impacts on income distribution are included in the plan. The NECP points out the opportunities for the Danish economy to export energy technologies and services and the positive impacts this would have on employment. However, the plan could include a more specific consideration on the just and fair transition aspects and the impact on employment of the clean energy transition (including in relation to changes in employment levels in different sectors or industries, and the related impacts this will have on the need for different skills).

On **air quality**, the plan includes projections for air pollutants as reported under Directive 2016/2284¹⁹ in March 2019. However, the scenarios do not correspond to the scenarios used for energy and emissions. The NECP also did not describe synergies and trade-offs with air-pollution measures. Denmark has initiated an analysis to address the sustainability of Denmark's large consumption of biomass for energy purposes. The outcome of the analysis will serve as input to the forthcoming climate action plan.

The final plan describes **circular economy** plans. Their potential for GHG emissions reduction could be better acknowledged and quantified. Further efforts would be welcome, in line with the most recent scientific evidence.

The final version of the plan does not comply with **data transparency** requirements (data sources are mostly lacking).

¹⁸ 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 Final.

¹⁹ Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC.

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

Denmark needs to swiftly proceed with implementing its final integrated national energy and climate plan as notified to the Commission on 20 December 2019. This section provides guidance to Denmark 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, by pointing to possible priority climate and energy policy measures Denmark could consider when developing its national recovery and resilience plan in the context of the Recovery and Resilience Facility²⁰.

Guidance on the implementation of the national energy and climate plan

In its plan, Denmark confirms an economy-wide target for non-ETS **GHG-emissions reduction** by 2030, compared to 2005, of 39%, in line with the ESR. The plan presents only a scenario with existing measures, in which the target would be missed (by 13 percentage points). Planned policies and measures are not described and the plan does not clarify whether Denmark intends to make use of the ETS and LULUCF flexibilities.

Denmark's plan leaves still scope to further develop and reinforce policies and measures on both renewables and energy efficiency as to contribute more to the EU climate and energy targets and strengthen the green transition.

On **renewables**, Denmark committed to increase the share of renewables in gross final energy consumption to 55% in 2030. However more detailed policies are needed, notably for electricity. This includes building up supply chains and provide certainty for investors for offshore wind, advanced transport fuels and bio-energy. The sustainable use of biomass would require continued vigilance due to the high share of biomass in the energy sector.

On **energy efficiency**, Denmark would benefit from adopting and implementing additional policies and measures that would deliver additional energy savings by 2030 and allow increasing the level of ambition. The commitment in the NECP to increase Denmark's contribution to the EU's 2030 energy efficiency target beyond what has been notified so far is welcome, as there is room for Denmark to contribute more. The continuing growth in energy consumption in Denmark (2015-2018) indicates that here is potential for further measures and improvement of energy efficiency in several sectors.

There is still room for more policies and measures to be identified to meet Article 7 of the Energy Efficiency Directive (EED). Although additional measures regarding more efficient transport and vehicles have been identified, more can be defined, decided and fully implemented. A detailed elaboration of all the elements required by Annex III of the Governance Regulation would be

²⁰ On 17 September 2020, the Commission has put forward the Annual Sustainable Growth Strategy 2021 (COM(2020) 575 final), as well as forward guidance intended to help Member States prepare and present their recovery and resilience plans in a coherent way. This 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).

beneficial to ensuring achievement of energy saving obligation target under Article 7 EED. Denmark can also take further advantage of the energy efficiency first principle and strive towards better integration of policies relating to energy efficiency. It could be useful to establish additional funding mechanisms to scale up investments in energy efficiency and consider the opportunities provided in existing and new relevant EU initiatives. Improving and increasing the role of energy efficiency could be an important tool in Denmark's efforts to reach its legally binding target of reducing GHG emissions by 70% by 2030.

The improvement of 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** initiative²¹, there is scope for Denmark to intensify efforts to improve the energy performance of the existing building stock with concrete measures, targets and actions. Further support to the renovation of public and private buildings could be provided with increased public funding and by leveraging EU and national budgets with private money, combining grants, lending, guarantees and loan subsidies. Denmark would need to underpin the substantial energy saving potential of the existing building stock by implementing the long-term renovation strategy, in accordance with Article 2a of the Energy Performance of Buildings Directive²².

As to maintaining a high level of **security of supply**, Denmark would benefit from a strengthened cooperation with the other connected Member States. Since the plan puts forward a more important role for storage, having more concrete policies and measures would provide clarity and certainty as to how the electricity system will cope with the increase of renewable energy in electricity generation. The plan provides reference to the emergency plans for gas, but it would be beneficial for Denmark to have such plans available also for electricity and oil.

Concerning the **internal energy market**, Denmark has set the objective of having the most integrated, market-based and flexible energy system in Europe. Setting-up concrete measures, milestones and a clear timeline as regards system flexibility, smart grids, demand response, aggregation, storage, distributed generation, consumer protection and competitiveness in the retail sector would further support this objective. A deeper analysis of key issues such as market barriers for new participants would be beneficial in this regard.

On **research, innovation and competitiveness**, the recently adopted Climate Law will require further support to Denmark's research and innovation base in order to reach the target's ambition. The strategy to invest in areas where demand can match "Danish Strongholds" can prove supportive to competitiveness. However, the link between these research, innovation and competitiveness measures with the undertaken SET plan activities would need to be ensured.

Denmark indicated that **investments** are to increase gradually and amount to DKK 2.8 billion in 2025 (EUR 375 million, in the order of magnitude of 0.1% of GDP), based on the prioritised budget for the policies and measures of the Danish 2018 Energy Agreement up to 2025. Additionally, the national energy and climate plan contains estimates of Denmark cumulated

²¹ Communication 'A Renovation Wave for Europe – greening our buildings, creating jobs, improving lives', COM(2020)662 and SWD(2020)550.

²² Denmark submitted its long-term renovation strategy in accordance with Article 2(a) of Directive 2010/31/EU on the Energy Performance of Buildings on 10 October 2020.

public and private initiated by the Energy Agreement on the range of DKK 100-180 billion (EUR 13-24 billion) until 2030, or approximately DKK 10 billion (EUR 1.34 billion) per year. The largest **investment needs** are required in installation of new renewable energy capacity, while significant investment needs are also identified in households (energy efficiency and conversion of heat supply), industry as well as biogas and district heating. Private capital is expected to constitute a substantial proportion of the funding.

On **regional cooperation**, Denmark has continued to work together with the other North Seas Energy Cooperation countries, notably exploring the possibilities for concrete joint offshore wind projects that would be connected to and supported by several Member States. Denmark is invited to continue ongoing efforts on regional cooperation in view of intensifying exchanges and initiatives facilitating the implementation of its national energy and climate plan, in particular as regards relevant cross-border issues. Denmark is also invited to better exploit the potential of the **multilevel climate and energy dialogues** to actively engage and discuss with regional and local authorities, social partners, civil society organisations, business community, investors and other relevant stakeholders the different scenarios envisaged for its energy and climate policies.

On **energy poverty**, a target of reducing energy poverty, or maintaining already low levels of energy poverty as part of the energy transition, would support Denmark's general intention to consider vulnerable consumers through specific and measurable objectives. Denmark 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. Energy poverty could be mitigated, among other solutions, through specific support to social enterprises for applying socially innovative solutions (e.g. energy-awareness campaigns, retrain unemployed to energy poverty advisors, buy energy-saving appliances for social enterprises to rent out). It will also be important to ensure the upskilling of the workforce in the construction sector.

Denmark is invited to continue and update the identification and reporting on **energy subsidies** and continue actions to phase out subsidies, in particular for fossil fuels. The green transition in Denmark 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 specific 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, Denmark 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, Denmark 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. An overview of EU funding sources which should be available to Denmark during the forthcoming multiannual financing period (2021-2027), and EU funding addressed to all Member States and companies, is provided in tables 1 and 2 of annex I. 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 the EU level, funding will be available for Denmark from the Innovation Fund too, based on revenues from the auctioning of allowances under the EU Emissions Trading System, as well.

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 Denmark’s plan in that context. Nevertheless, the implementation of Denmark’s final integrated national energy and climate plan will need to fully take into account the context of the post-COVID-19 recovery.

In the context of the Recovery and Resilience Facility, which is, that is expected to be operational on 1 January 2021, **the final plan constitutes a strong basis for Denmark to design 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**²³. 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 Denmark’s green transition while contributing to economic recovery. In order to follow the commitment of the European Council to achieve a climate mainstreaming target of 30% for both the multiannual financial framework and Next Generation EU, **Denmark’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 Denmark’s final national energy and climate plan, and on the investment and reform priorities identified for Denmark in the European Semester, **the Commission services invite Denmark to consider, while developing its national recovery and resilience plan, the following climate and energy-related investment and reform measures:**

- Measures to promote a green tax reform while ensuring a just transition for the most affected households and companies;
- Measures to promote sustainable energy production, including clean hydrogen;

²³ Cf. Annual Sustainable Growth Strategy 2021 (COM(2020) 575 final), pp. 9-12.

- Measures to promote increased energy efficiency through building renovation, notably in the residential sector and primarily in social housing, as well as renovating heating and cooling technical building systems.

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 DENMARK, 2021-2027

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

Programme	Amount	Comments
Cohesion policy funds (ERDF, ESF+, Cohesion Fund)	0.5	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.	6.6	In current prices.
Recovery and Resilience Facility	1.6	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	0.1	In 2018 prices. Commitments both under the multi-annual financial framework (MFF) and Next Generation EU.
ETS auction revenue	0.2	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 - GHGs	Clarify how it intends to reach its 2030 GHG target for emissions not covered by the EU ETS of a 39% reduction compared to 2005	Not addressed	The final plan includes less, rather than more, information on how Denmark plans to meet its 2030 non-ETS target. Specifically, the plan presents only a scenario with existing measures, in which the target would not be met. Planned policies and measures are not described.
	Put in place further cost-efficient policies in the building sector. Further elaborate on its planned transport policies.	Not addressed	Policies and measures in the building sector may be outlined in the upcoming climate action plan, still not public at the time of submission of the final plan. Planned transport policies included in the draft plan are not presented in the final plan.
	Specify Denmark's intended use of the flexibilities between: (i) ESR; (ii) LULUCF; and (iii) ETS	Not addressed	The plan does not clarify whether Denmark intends to make use of the ETS and LULUCF flexibilities.
Decarbonisation - renewables	Underpin the welcomed level of ambition of a 55% renewable energy share for 2030 as Denmark's contribution to the Union 2030 target for renewable energy with detailed and quantified policies and measures that are in line with the obligations of Directive (EU) 2018/2001 of the European Parliament and Council, to enable a timely and cost-effective achievement of this contribution.	Partially addressed	There is a sparse overview of existing and additional policies and measures provided in the NECP. The plan also provides descriptions of planned tenders. The new policies and the associated action plan needed to reach the new ambitious national target of reducing GHG emissions by 70% were still under discussion at the time of submission of the final plan. These can have a significant impact on the pace and magnitude of the penetration of renewables in the energy system.
	Clarify among others, the level of the indicative trajectory that reaches all the reference points pursuant to Article 4(a)(2) of Regulation (EU) 2018/1999.	Partially addressed	The indicative trajectory presented in the final plan is similar to that in the draft plan. However, the analytical base in the final plan has been strengthened, and the projections with existing policies and measures now indicate a 54% share of renewable energy in 2030 instead of the 48% share in the draft plan.
	Put forward trajectories and corresponding measures in the transport sector to meet the transport target pursuant to Article 25 of Directive (EU) 2018/2001.	Partially addressed	The plan specifies that Denmark at present does not have individual targets or objectives for renewable energy by sector, including transport. But the modelling results presented in the plan indicate a share of 18.6% of renewable energy in the transport sector in 2030, above the 14% minimum share. This modelling is based on existing

			measures, and is primarily the result of increased electricity consumption from electric vehicles combined with a greater share of renewables in the energy mix. The current blending obligation for advanced biofuels of 0.9% will be sufficient to meet the specific target from the Renewable Energy Directive for advanced biofuels in 2022 and 2025, but not in 2030.
	Provide additional details on the specific measures to ensure sustainability for biomass supply and use in the energy sector, given the important contribution of biomass across the Danish energy mix.	Partially addressed	Denmark's NECP presents the 2016-2017 import share of biomass fuels of 50% as a good assumption for the near future as well. The sustainability issues are currently addressed in a voluntary agreement in the energy sector, but an analysis has been initiated to address the sustainability of Denmark's large consumption of biomass for energy purposes. The outcome of the analysis will serve as input to the forthcoming climate action plan.
Energy efficiency	Substantially increase its ambition towards reducing both final and primary energy consumption in 2030 in view of the need to increase the level of effort to reach the Union's 2030 energy efficiency target.	Not addressed	Contribution for primary energy consumption is a bit more ambitious, but for final energy consumption it is the same. Both are assessed as of very low ambition compared to the EU efforts.
	Propose more ambitious policies and measures that would compensate for the likely effects of substantially lowered funding levels for energy efficiency and for the agreed energy tax decreases, and that would deliver additional energy savings by 2030. Include new measures designed to, and capable of delivering the energy savings required under Article 7 of Directive 2012/27/EU. This is particularly important in the light of Denmark's decision to discontinue its existing energy efficiency obligation scheme which would lower the funding available for final energy savings actions.	Partially addressed	The final NECP contains more information about the specific energy efficiency measures compared to the ones included in the draft NECP, but more measures are yet to be elaborated. The plan states that 'no specific new energy efficiency measures for the period 2025-2030 exist as the Energy Agreement from June 2018 only covers the period of 2021-2024'. Most measures necessary to meet Article 7 of the EED have yet to be identified (a roughly 70% gap). The information provided on the renovation of the building stock is improved but remains limited.
	Provide more clarity on the actual measures capable of delivering on the ambitions as regards cleaner and more efficient transport and vehicles.	Partially addressed	There are some additional measures identified, but most are yet to be defined, decided upon or fully implemented.
Energy security	No recommendations	n/a	-

Internal energy market	Define clear, measurable and forward-looking objectives concerning market integration.	Partially addressed	The plan outlines: (i) intraday and day-ahead market coupling; (ii) the use of interconnectors; and (iii) the establishment of a joint balancing zone with Sweden for gas. Despite the Energy Agreement's objective of having the most integrated, market-based and flexible energy system in Europe, consideration of competition, liquidity and forward-looking objectives remain absent from the plan.
Research innovation and competitiveness	Further elaborate on 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 European Strategic Energy Technology Plan.	Partially addressed	The plan identifies relevant areas where R&I efforts are needed. These efforts are considered credible in relation to the achievement of the targets, because of the described policies and support measures. However it is still not clear whether funding levels will be maintained up to 2030. Competitiveness objectives are clear. The cooperation with the SET plan is well explained.
Investments and funding sources	Extend the provided analysis of investment needs by estimating the public and private investment needs of the planned policies to achieve the climate and energy objectives up to 2030; and indicating the likely sources to finance them.	Fully addressed	The NECP contains an overview of the investment needs by sector between 2018 and 2040. This overview is based on breakdown forecasts for each area, as they are detailed in the Governance Regulation. Given Denmark's high ambition for reductions of GHG emissions, the investment needs outlined appear credible, realistic and coherent. Information on possible funding sources is also provided. Given the significant investment needs, it will be important to ensure cost effectiveness. The NECP could have shed more light on the approach to this challenge.
Regional cooperation	Expand the already good regional cooperation arrangements, in particular with the other Nordic (Finland, Iceland, Norway and Sweden) and Baltic (Estonia, Latvia and Lithuania) countries to other cooperation mechanisms.	Largely addressed	The contribution to security of supply from biogas has historically been low. This is because the share of biogas in the natural gas grid has been limited, and there are ample opportunities for natural gas supplies from the North Sea and Germany. The Danish national transmission system operator Energinet is currently looking into various operational solutions in close dialogue with Danish stakeholders.

	Possible areas for enhanced cooperation in renewable energy include planned statistical transfers or hybrid renewable projects, where offshore wind electricity is connected to more than one market.	Largely addressed	Denmark works together with the other North Seas Energy Cooperation countries on the possibilities for joint offshore-wind projects that would be connected to – and supported by – several Member States. This includes work on possible ‘hybrid’ solutions that would: (i) use cross-border solutions for connecting offshore-wind farms to the grid; and (ii) seek synergies in both interconnection capacity between countries, and the corresponding market arrangements.
	In research and innovation, these include alignment of research programmes, coordinated funding, and identification of synergies with other Member States and with Union’s programmes and initiatives.	Partially addressed	ERA-NETS are mentioned, but more alignment could have been listed.
Energy subsidies	List all energy subsidies.	Largely addressed	In comparison with the draft plan, the final plan includes a quantitative overview of indirect fossil fuel subsidies and renewable energy subsidies.
	List fossil-fuel subsidies in particular.	Largely addressed	On fossil-fuel subsidies, the list appears to be largely in line with the figures and categories that have been identified in recent Commission analyses on energy subsidies.
	List actions undertaken as well as plans to phase them out.	Largely addressed	The political commitment to phase out both fossil-fuel and renewable energy subsidies has been expressed in the plan, but actions to achieve this are not fully developed. The plan makes reference to some indirect fossil-fuel subsidies that have already been phased out. On renewable energy, a strong political objective was expressed to promote future electricity production from renewable energy under market conditions free of subsidies.
Air quality	Complement the welcome integration of climate mitigation and air pollution policies with more quantitative information, at least including the required information about the projected air pollutants emissions under the planned policies and measures.	Partially addressed	From the information in the final NECP, the extent to which all measures planned in the final NECP are included in the air-pollution projections is not fully clear. Submission of Annex 7 would provide the necessary information to assess the extent to which the recommendation has been taken into account.

<p>Just transition and energy poverty</p>	<p>Integrate just and fair transition aspects better, notably by providing more details on social, employment, skills, income distribution impacts of planned objectives, policies and measures.</p>	<p>Partially addressed</p>	<p>The NECP only briefly addresses the impact on employment and skills, but not on income distribution. In this respect, it would be relevant to provide a distributional impact assessment on households' income (including impact on housing costs) of the planned transition measures. The plan lacks estimates, indicators and precise figures, notably for the period covered by the plan.</p> <p>A clear description of the social aspects of energy poverty has been provided, but the impact assessment is not sufficiently detailed. The NECP describes how the Danish income-transfer system is based on the cost of living, which includes energy costs and taxes.</p>
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