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COMMISSION STAFF WORKING DOCUMENT

Assessment of the draft National Energy and Climate Plan of Germany

Accompanying the document

Commission Recommendation

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

{C(2019) 4405 final}

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1. SUMMARY

Main observations¹

- ✓ Germany's draft integrated national energy and climate plan (NECP) addresses the country's energy transition (Energiewende), based on a 'triangle' of three policy objectives: affordability, security of supply and environmental soundness. The energy transition has a strong focus, so far, on electricity, and on emission reductions, but also relates closely to other policies. The draft plan largely relies on existing documents due to several still ongoing political processes, including the identification of planned policies and measures relevant for the final NECP, in the context notably of the German 'Climate Cabinet'. The set-up of national targets outlined in the German draft plan could provide a good basis for addressing policy interactions, providing clarity on measurable forward-looking objectives for almost all Energy Union dimensions, with the exception of the national contribution to the Union's 2030 headline targets on energy efficiency.
- ✓ Germany's 2030 target for **greenhouse gas (GHG) emissions** not covered by the EU Emissions Trading System (non-ETS) is -38 % compared to 2005, as set in the Effort Sharing Regulation (ESR)². With the existing policies and measures outlined in the draft NECP Germany is not on track to achieve this target.
- ✓ While Germany's national and sector-wide greenhouse gas emission reduction **targets for 2030** are in line with the German long-term strategy (National Climate Plan 2050), these are not always reflected in sector-specific national contributions (e.g. to the EU energy efficiency target) and policies and measures (e.g. in the transport, building and agriculture sector).
- ✓ The draft plan does also not address yet how the no-debit commitment for the **Land use, Land Use Change and Forestry (LULUCF)** sector will be achieved i.e. emissions do not exceed removals.
- ✓ Germany's proposed share of 30 % of energy from renewable sources in gross final consumption of energy in 2030 as **national contribution** to the EU 2030 target for **renewable energy** is in line with the results of the formula under the Governance Regulation on which the Commissions bases its assessment of Member States' renewable energy contributions. Moreover, Germany plans for the years 2022, 2025 and 2027 a more ambitious delivery of its national contribution for renewables than the required reference levels. 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.

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.

- ✓ The information provided on **policies and measures**, in a 2030 perspective, **for all renewable energy sectors** is too general to allow for an assessment of the sufficiency of policies and measures in the light of the national ambition level for renewables. This is also true for the assessment of sectorial renewable objectives (transport, electricity and, to a lesser extent, heating and cooling).
- ✓ While Germany has a 2050 objective for energy efficiency, the draft plan lacks clarity on Germany's **energy efficiency contribution to the EU target** of at least 32.5 % in 2030. Therefore, no conclusion can be drawn on the level of ambition of Germany's contribution to the Union's 2030 headline targets on energy efficiency. The draft plan also does not provide detailed information on the policies and measures beyond the already existing ones which will be in place until 2020.
- ✓ General policy objectives for **energy security** are provided by the German draft plan and could be further substantiated by specific policies and measures. Specific objectives such as for demand response and energy storage could be set out in the final plan which could also include information on the phase out from nuclear.
- ✓ As regards the **internal energy market**, Germany's action plan for the reduction of grid congestion, which sets out appropriate measures to remove structural congestion in the electricity grid within the bidding zone should be an important element of the final plan together with further details on market functioning. The draft plan does not specify the level of electricity **interconnectivity** that Germany aims for by 2030. On energy poverty, the draft plan lacks a detailed assessment on the numbers of energy-poor people in Germany, as well as on the policies and measures to reduce energy poverty.
- ✓ International cooperation in **research and innovation** is well described. A solid final plan would develop on national objectives for this dimension and consider the impact of policies and measures on **competitiveness**.
- ✓ The draft plan provides an estimate of significant **investment needs** for additional electricity transmission infrastructure of EUR 50 billion until 2030 (annually around 0.1 % of current GDP). However, only few additional elements on investment needs and expenditures, national, regional and Union funding sources, market risks and barriers are reflected, therefore 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 final plan would benefit from complementing the analysis of the interactions with **air quality and air emissions** policy, and presenting the impacts of policies and measures on air quality.
- ✓ The final plan would benefit from details on **just and fair transition** issues, for example related to the transition of coal, carbon-intensive or industrial regions, and considerations in terms of costs and benefits and cost-effectiveness of planned policies and measures in the area of employment, education and training of affected workers by this transition.
- ✓ A list of all **energy subsidies**, in particular for fossil fuels, and actions undertaken and planned to phase them out, needs to be included in the final plan.
- ✓ There are **good practice** examples on cross-border cooperation. Germany is member of the Pentilateral Energy Forum which acts as a forum for regional cooperation regarding the development and monitoring of the national energy and climate plans. Germany also

funds the European Climate Initiative to foster cross-border dialogue and cooperation as well as exchange of knowledge and experience on climate policies within the Union. Germany reflected most recent policy developments (most notably the results of the commission for growth, structural change and employment) in its consultation of other Member States and third countries on the draft plan.

Preparation and submission of the draft plan





Germany notified its draft integrated National Energy and Climate Plan (NECP) to the European Commission on 20 December 2018.

The draft plan largely relies on existing documents. Elements required for a solid final plan were not reflected in the draft plan due to **ongoing political processes**, including the identification of planned policies and measures relevant for the final NECP, in the context notably of the German ‘Climate Cabinet’. These include the work of various governmental commissions (e.g. commission for growth, structural change and employment), national strategies to be developed (e.g. the strategies on the future of affordable and sustainable mobility and on energy efficiency), as well as legislation (e.g. to implement the economy-wide 2030 climate target of 55 % total emission reductions compared to 1990). The **public consultation** on the draft plan has recently started. Further consultations are planned in the course of 2019. **Regional cooperation and consultation of neighbouring Member States** has started and Germany has started the consultation of other Member States and of third countries, including on most recent policy developments that are likely to affect the final plan.

Overview of the key objectives, targets and contributions

The following table presents an overview of Germany’s objectives, targets and contributions under the Governance Regulation³:

³ 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.

	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) (%)	-3	-14	-38	As in ESR. Total GHG 2030 -55 % to 1990
	National target/contribution for renewable energy: Share of energy from renewable sources in gross final consumption of energy (%)	15.5	18	30	In line with 30 % (result of RES formula)
	National contribution for energy efficiency: Primary energy consumption (Mtoe) Final energy consumption (Mtoe)	298.3 218.7	276.6	Not provided	N/A
	Level of electricity interconnectivity (%)	9	13	Not provided	N/A

Sources: EU Commission, ENERGY STATISTICS, Energy datasheets: EU28 countries; SWD(2018)453; European Semester by country⁴; COM/2017/718; German draft NECP.

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

Dimension decarbonisation, renewable energy

Greenhouse gas emissions and removals

The **2030** greenhouse gas emission target for sectors not part of the EU emissions trading system (**non-ETS target**) for Germany under the Effort Sharing Regulation⁵ is -38 % compared to 2005. Germany has a separate indicative national target of a 55 % total GHG emission reduction in 2030 compared to 1990. This target is consistent with the national long-term objective of 80-95 % emission reductions.

The national 2030 target has been broken down into indicative targets for energy supply, industry, buildings, transport as well as waste and other. According to Commission estimates, if these targets were met, they would enable the domestic achievement of the non-ETS target. The

⁴ 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.

⁵ 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.

key sector reductions compared to 1990 are 66 to 67 % for buildings, 40 to 42 % for transport and 31 to 34 % for agriculture (excluding LULUCF).

This assumes that the no-debit commitment under the LULUCF Regulation i.e. that land use, land use change and forestry emissions do not exceed removals, is respected; which is unclear in the draft plan. With respect to the National Forestry Accounting Plan including the national Forest Reference Level, submitted by Germany, as required by Article 8(3) of the LULUCF Regulation⁶ the Commission has put forward technical recommendations requesting action on a number of issues, detailed in in SWD (2019)213.

The gap to target “with existing measures” in effort sharing sectors is estimated to be 15 percentage points in 2030, derived from the figures provided in Annex I part 2 of the draft plan. However, this expected gap is not discussed and the draft plan does not explain how the non-ETS target would be achieved, nor is indicated if Germany intends to use flexibilities provided by relevant legislation to meet its non-ETS targets.

The draft plan describes **policies and measures** on renewable energy, transport and some elements on energy efficiency, but does not demonstrate that these are sufficient to achieve the 2030 targets.

For **transport**, responsible for more than a third of effort sharing emissions, 13 measures are identified, with a focus on alternative fuels and electromobility and the underpinning charging infrastructure. The draft plan recognises that additional policies and measures will be necessary in the transport sector due to increasing emissions from transport, and the final plan would benefit from more details on such measures.

The final plan would benefit from a description of the main concrete mitigation actions considered for the decarbonisation of the **agriculture** sector.

Renewable energy

The expansion of the use of renewable energy is one of the core pillars of Germany’s energy transition (*Energiewende*). So far, Germany has demonstrated ambition to expand renewable electricity, in particular. In that context, the draft plan mentions the challenge of planning a future for already existing installations. Moving ahead, increased attention will also be required for renewable energy sources in the transport, heating and cooling sectors.

The German draft plan sets out a 30 % share of energy from renewable sources in gross final consumption of energy as contribution to EU renewable energy target for 2030. The share of 30 % is in line with the result of the formula in Annex II of the Governance Regulation. Germany sets out an indicative linear trajectory for each year between 2021 and 2030 which is more ambitious in terms of delivery than the levels of the reference points indicated for the years 2022, 2025, 2027 in line with the percentage shares required by the Governance Regulation. It remains unclear, for many of the policies and measures on renewables included in the draft plan, whether they remain in place in the ten year period up to 2030. This limits the possibility to carry out an assessment of the impact of these policies in light of the national contribution.

⁶ 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.

The draft plan only provides a partial overview of national renewable objectives and trajectories at the sector level. These are available for the heating and cooling sector, partially available for renewable electricity, but not for the transport sector. Such gaps prevent a detailed assessment of renewable energy as part of the decarbonisation dimension.

For **renewable electricity**, while the indicated auction volumes for wind, photovoltaics and biomass provide some investment certainty, it is unlikely that these would be sufficient to meet the upper end (65 %) indicated for the 2030 target for renewable electricity. Total planned installed renewable energy capacity, split by new capacity and re-powering per technology in the final plan would provide clear signals to the market across sectors and technologies.

For **renewable energy in the heating and cooling** sector, an indicative target of 27 % renewable energy is set out in the draft plan, reflecting yearly steps of 1.3 percentage points in line with applicable legislation. According to the draft plan, Germany also intends to meet the target for renewable energy of an increase by at least 1 percentage point in district heating and cooling (if waste heat is used), in line with applicable legislation, without underpinning policies and measures being specified. In that context, the role of waste heat remains unclear. The draft plan makes reference to several programmes to support investment in renewable heating and cooling in private and public buildings, as well as in industry. While certain programmes, such as the promotion of heating grids of fourth generation, which would allow for increased shares of renewable energy, may prove to be effective, it remains unclear what contribution to expect from these support programmes in view of target achievement.

In the **transport** sector, the target still needs to be set and policies and measures put into place, which does not allow an assessment of the adequacy of the draft plan at the moment. The final plan would benefit from including the contributions of all eligible fuels, setting out the limits for conventional fuels produced from food and feed crops, and addressing the multipliers in accordance with Articles 25-27 of the Renewable Energy Directive⁷.

Dimension energy efficiency

Energy efficiency is another core pillar of Germany's energy transition (*Energiewende*) and significant funds are being spent, for example, to address energy efficiency in buildings. According to preliminary figures referred to by the draft plan, households are the only sector where improvements in final energy consumption were achieved between 2008 and 2017, whereas the business, commerce, and services stagnated. Final energy consumption in the industry and transport sectors increased over the same period.

The draft plan reconfirms the existing national objective for energy efficiency (based on the national energy concept of 2010) which is to halve primary energy consumption by 2050 compared to 2008 (20 % reduction by 2020). At the same time, Germany did not commit to a **national contribution** to the EU's 2030 **target for energy efficiency**. The draft plan mentions that the national contribution, policies and measures would be approved in the process of adopting a national energy efficiency strategy in 2019. The draft plan includes an estimate of a national objective for 2030 that would be in line with the national 2050 objective, based on a linear trajectory, corresponding to approximately 230 Mtoe of primary energy consumption in 2030. However, the basis for the calculation were national statistics and once Eurostat data are used the value of such estimated national objective for 2030 primary energy consumption

⁷ 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.

corresponds to 220 Mtoe. A corresponding figure for final energy consumption is not provided. The “deducted” primary energy consumption (PEC) target of 230 Mtoe would represent a reduction of 16.8 % compared to the German national 2020 target for primary energy consumption, representing a reduction of 32.2 % compared to Germany’s primary energy consumption in 2017. The final plan could use figures that can be compared across all Member States, based on Eurostat data.

Preliminary **cumulative energy savings** under Article 7 of the Energy Efficiency Directive⁸ were provided with the German draft plan. Regarding **buildings**, Germany included general information relating to policies and measures for buildings that could be implemented as part of its long-term renovation strategy, including indicative milestones. Given the significant contribution of a cost-effective transformation of existing buildings into nearly zero-energy buildings to the EU’s energy efficiency target, realistic and ambitious measures and policies for the implementation of a coherent long-term renovation strategy could be part of a robust final plan.

The plan would benefit from better covering measures that contribute towards more efficient organisation of the mobility system and thus towards improved energy efficiency and emissions reductions (e.g. incentivising multimodality and modal shift, intelligent transport systems, digitalisation and automation).

As regards **other energy efficiency policies and measures**, the draft plan only includes a description of already existing measures for achieving the 2020 energy efficiency objective. Existing measures are described in detail, but without quantification of their expected impact. In some instances there are indications that certain building sector measures would continue after 2020.

Overall, the draft plan is largely incomplete as regards energy efficiency. On the basis of the information provided in the draft plan, it is not possible to assess the national contribution to the EU energy efficiency target for 2030, the adequacy of the measures proposed, or the robustness of the methodology used as a basis for the draft plan.

Dimension energy security

Germany’s energy dependency, i.e. the proportion of energy that the German economy is importing, is currently slightly higher than EU average. The draft plan describes in detail measures in the event of an imminent security of supply crisis both as regards different fuels as well as in the electricity sector. As regards long-term preventive actions, the draft plan merely states that the gas and oil industry ensures that supplies are and will remain sufficiently diversified.

While oil and coal imports are sourced from liquid world markets and supply routes are flexible and mostly use shipping, the situation in the gas sector is different. The draft plan does not convincingly explain how this approach is sufficient to ensure security of gas supply against the fact that not all suppliers operate in liberalised energy markets. The draft plan does not outline policies and measures ensuring that the purchasing decisions by the gas industry are in line with the stated objective of the German government that gas will be supplied from different transit routes.

⁸ 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.

Germany expects to phase out nuclear energy and decrease coal-fired capacity in the period 2021-2030 and the final plan could provide more detail on these key developments. In addition to the policies and measures and regional cooperation initiatives presented in the draft plan, which provide some answers to these developments, Germany's views on the use of demand-side management and the long-term options offered by digitalisation would be relevant additions to the final plan. Moreover, the final plan could address how the supply of nuclear fuel is ensured until the phase-out, including levels of strategic reserves.

Dimension internal energy market

Not least due to its geographic location, Germany plays a key role for the internal energy market, in particular in the area of electricity. Germany faces the challenge to organise the energy transition while preserving market signals and avoiding undue impacts on cross-border trade of electricity. Further development of the electricity transmission and distribution networks are also among the key challenges for a more flexible electricity system in Germany and reduced congestion.⁹ The German draft plan recognises these challenges notably for transmission grids and points to the planned extension of the electricity transmission grid by some 8,700 km by 2030 with investment needs estimated to amount to approximately EUR 50 billion.

Moreover, the draft plan states that Germany supports the development of further interconnectors. Germany expects to comply with all **interconnection** indicators if interconnectors already under construction and planned interconnections are available as of 2020. The draft plan does not specify the level of electricity interconnectivity that Germany aims for by 2030.

As regards the **wholesale electricity market**, the draft plan stresses that both a unitary German bidding zone and a large European market area for electricity is expected to contribute to a cost-effective electricity system. However, specific measures to avoid trade-offs between a unitary German bidding zone and a large European market area for electricity are not outlined in the draft plan. This is especially relevant in the light of the fact that internal congestion within the German bidding zone currently results in significant loop flows through neighbouring countries.

The areas of **retail markets and system flexibility** are not addressed in a structured manner and the description of the current situation is incomplete. Whereas general goals are provided in several instances, no discrete national objectives or related policies and measures are available. For example, there is no information available on barriers for new market participants (e.g. aggregators) and on the expected uptake of different sources of flexibility (demand response, storage, distributed generation). Elements on smart meters are descriptive, covering the legal framework and latest technical prerequisites/specifications without drawing the link to providing the sources of flexibility that are necessary for a successful energy transition. The draft plan does not specify in detail policy objectives related to retail markets and policies and measures that are planned to reach those objectives. A solid final plan would identify, in particular, the potential and the sources for increasing system flexibility and describe in detail policies and measures that promote flexibility and non-discriminatory participation of new market participants. Moreover, a solid final plan would also clarify plans for smart meters for all energy market segments, including most notably households.

⁹ For more details on this matter see SWD(2019) 1004 final. The German draft NECP also indicates that a national action plan for the reduction of grid congestion is developed in parallel.

The draft plan provides generic information on affordability and poverty. However, it is not clear if a dedicated assessment of **energy poverty**, as required by the Governance Regulation, has been carried out; an element which would be relevant also in the light of the level of household electricity prices in Germany. This assessment, expected to build on existing social and other relevant policy, would serve as an indication of what objectives specific to energy poverty are warranted in the final plan. Moreover, policies and measures for energy poverty in the draft plan are not available with the exception of energy consultancy for low-income households. Further developing this section, as appropriate, appears necessary in light of the overall objective of “affordability” of the German energy transition (*Energiewende*).

Dimension research, innovation and competitiveness

The Federal Cabinet agreed the 7th Energy Research Programme in September 2018, including financing for the period up to 2022 in order to promote research, development, demonstration and testing of future-proof technologies and concepts. The programme addresses topics relevant for the future of the energy system, including digitalisation, resource efficiency and system integration. Beyond this programme the draft plan provides a description of the current level of public research spending (0.03 % of Germany’s GDP), as well as estimates of private funding and number of people employed as research and development personnel in the field of energy research.

The draft plan lacks a clear identification of **research and innovation objectives** to be achieved by 2030 at national level, and is limited to the identification of main research domains for the current programme up to 2022. While Germany is active in the context of the **Strategic Energy Technology (SET) Plan**, its implementation priorities are not clearly reflected in the draft plan.

Policies and measures set out in relation to industrial innovation has two major focuses. One is to improve and accelerate the transfer of technology and innovation to maintain Germany’s world leading position in identified industrial activities, e.g. by preventing or using waste heat, or through the enhancement of sector coupling solutions. The second focus is to promote cooperation at the European and international level on emerging and/or strategic technologies, e.g. on specific programmes on digitalisation, storage and on Carbon Capture and Utilisation (CCUS) options (within the North Sea Basin task force). Financing measures supporting the funding targets are not identified for the period after 2020.

There is no general assessment of the impact of planned policies and measures on **competitiveness**. However, competitiveness aspects are addressed in the draft plan in terms of a general description of the benefits of innovation, competitive price formation and market liberalisation, and of full or partial exemptions from energy taxation. The final NECP would benefit from presenting a comprehensive analysis on where the low-carbon technologies sector, including for decarbonizing energy and carbon-intensive industrial sectors, 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.

3. COHERENCE, POLICY INTERACTIONS AND INVESTMENTS

The German draft plan describes the set-up of national targets very well; an example of good practice to enable for informed debate on coherence between the different targets. However, **interactions** with EU-level targets for 2030 (in particular energy efficiency), between different policies and measures at EU and national level, and between different Energy Union dimensions

are only superficially addressed. Providing more details on national infrastructure objectives, on interconnection targets to be reached by 2030 and on the adequacy of underpinning policies and measures in the final plan, would better address interactions between the internal energy market dimension and other Energy Union dimensions. It would also address sector coupling more thoroughly (which was flagged in various instances throughout the draft plan). Elaborating further on sector coupling and the related incentive structure across different sectors of the economy, would provide a good basis for a more complete discussion of the consistency of policies and measures within and between Energy Union dimensions.

The sustainable supply of biomass for energy purposes in Germany and its impact on the LULUCF sector and on biodiversity has not been quantified. Climate change impacts are not mentioned as risks for energy security, although Germany's National Adaptation Plan includes such measures for the energy sector. 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 line with relevant assessments of impacts and vulnerabilities.

A quantitative overview of the development of different sources of flexibility required to integrate the rising share of renewable energy in the electricity system, including demand response, self-consumption and storage, could help to address additional interactions between Energy Union dimensions in the final plan.

Energy security objectives could reflect elements on storage that are set out in the most recent ten year network development plans (published after submission of the German draft NECP), the agreed phase-out of nuclear power, plans for the future of electricity generation from coal and lignite, and national targets and contributions related to the decarbonisation dimension of the Energy Union (e.g. increased use of renewable energy).

In addition, the draft plan has limited information on interactions with relevant policies like the circular economy or biodiversity. It acknowledges that trade-offs with other environmental, nature and biodiversity protection issues need to be properly resolved, but it does not provide information on specific policies and actions. Considering their relevance also for greenhouse gas emission reductions, the final plan could reflect such interactions. The draft plan also has limited information on interactions with air quality and air emission policies.

The final plan would benefit from details on **just and fair transition** issues, such as information on the applicability of the concept of just transition in the national context, for example related to the transition of coal, carbon-intensive or industrial regions, and considerations in terms of costs and benefits and cost-effectiveness of planned policies and measures in the area of employment, education and training of workers affected by this transition.

Information on how the **energy efficiency first principle** is taken into account in national policies and measures across various Energy Union dimensions could be included in the final plan more comprehensively.

The draft plan does not provide a comprehensive overview of the **investment needs**. It provides an estimate of investment needs for additional energy transmission infrastructure of EUR 50 billion until 2030 (annually around 0.1 % of current GDP), expected to constitute one of the key areas of energy-related investment in the next decade. The estimate doesn't cover investment needs in other sectors, such as in the industrial sector, which however accounts for 20 % of German GDP. Only a few additional elements on investment needs and expenditures, funding sources, market risks and barriers are reflected in the draft plan. Investment needs related to the

phase out of coal and nuclear power, as well as the resulting socio-economic impacts that this may entail, would be an important element of the final plan. 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 Germany and with any relevant legislation.

Links with the European Semester

Identifying financing needs and securing the necessary funding will be key to deliver on energy and climate objectives. The Commission had addressed that question as part of the 2019 European Semester process. Based on the 2019 Country Report for Germany, published on 27 February 2019¹⁰, the European Commission's recommendation for a Council recommendation for Germany issued on 5 June 2019¹¹, in the context of the European Semester, highlights in particular the need to invest in 'sustainable transport as well as energy networks'. When preparing its overview of investment needs and related sources of finance for the final plan, Germany should take into account these recommendations and links to the European Semester.

The draft plan points to some of the existing **energy subsidies**, in particular for fossil fuels, and refers to the phasing out of coal subsidies. Beyond this, there is no indication of other national policies, timelines and measures planned to phase out energy subsidies, in particular for fossil fuels. Therefore, the description of energy subsidies is incomplete. When completing this, consideration can be given to preventing sudden impacts of shifting prices by ensuring a gradual phase out with long term visibility for consumers. Specific attention also could be given to mitigating the impact on vulnerable consumers through energy poverty measures, including where these are part of social policy.

4. REGIONAL COOPERATION

Regional cooperation is very well addressed in the draft plan. Nine areas of **regional cooperation and coordination with neighbouring Member States** are mentioned: bilateral cooperations with France and Belgium, the European Climate Initiative, the Baltic Energy Market Interconnection Plan, the North Seas Energy Forum, the Pentalateral Energy Forum, the Pentalateral Gas Forum, the Transeuropean Network Energy and Electricity Neighbours.

The declaration signed on 4 March 2019 by Austria, Belgium, France, Germany, Luxembourg, the Netherlands and Switzerland provides a political mandate to the Pentalateral Energy Forum to act as a forum for regional cooperation regarding the development and monitoring of the final national energy and climate plan in particular on issues with substantial cross-border effects. The approach taken, including the setting up of a dedicated Committee to coordinate regional cooperation on the draft NECPs, can be regarded as a **good practice** that can inspire other Member States.

The platform for exchanges provided by the North Seas Energy Cooperation allowed developing concepts for potential joint wind offshore projects and coordinated electricity infrastructure.

A solid final plan would address the indicators of the urgency of action for interconnectivity in close cooperation with the Member States affected and include measures for regional cooperation when assessing system adequacy as foreseen in the Electricity Regulation. An assessment of

¹⁰ Commission SWD(2019) 1004 final.

¹¹ COM(2019) 505 final.

whether regional cooperation could ensure resource adequacy in a more cost-effective way than a strategic reserve would be useful.

The importance of maintaining the German unitary bidding zone is stressed, but justified on the grounds of securing that electricity is produced by the most cost-effective installation within Germany. Since the renewable energy target for 2030 is an EU-wide target, the final plan should assess how regional cooperation can support increasing shares of renewable energy from an EU-wide perspective and how it can be avoided that renewable electricity production in neighbouring countries is hampered by internal congestion within the German bidding zone and by limits to the interconnector capacities available for cross-border electricity trade.

Although Germany is a signatory to the political declaration for the Clean Energy for EU Islands Initiative, it has not mentioned this in the draft NECP. Germany could consider doing so in its final plan, and enhance cooperation with other Member States and island regions.

A **good practice example for cross-border cooperation** in the climate domain is the European Climate Initiative, a financing instrument to foster cross-border dialogue and cooperation as well as exchange of knowledge and experience and communication processes on climate policies within the EU, with more than 60 projects. Among the target groups are governments and municipalities, with primary focus on collaboration with central, eastern and southern Member States of the Union.

Germany has consulted a large number of other Member States and third countries on its draft plan. In that context, Germany has addressed implications of the coal and lignite phase-out suggested to the German government by the commission for growth, structural change and employment for other Member States and the internal energy market. The approach of reflecting shifts in policy with significant implications for other Member States in regional cooperation constitutes another example of good practice, which could be replicated by other Member States.

5. COMPLETENESS OF THE DRAFT PLAN

Information provided

While the German draft plan addresses many elements required by the relevant template, many sections remain incomplete. Targets, objectives and contributions to be provided in the final plan could build more consistently on rules set out in applicable legislation. In many instances, the draft plan lacks sufficient information on planned policies and measures and information on the sufficiency of those policies and measures in light of policy objectives.

As regards the **decarbonisation dimension** of the Energy Union, the contribution of existing policies and measures to achieve the German **greenhouse gas** target for sectors not covered by the EU ETS is only presented to some extent, and lacking e.g. for agriculture and forestry sectors. The draft plan lacks information on the estimation of annual emission reduction trajectory for 2021-2030 under the Effort Sharing Regulation (ESR)¹², and does not yet apply the accounting rules set out in the Land Use, Land Use Change and Forestry (LULUCF) Regulation¹³ to make the LULUCF no-debit commitment and projections operational. Policies addressing non-energy

¹² Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030.

¹³ Regulation (EU) 2018/841 on greenhouse gas emissions and removals from land use, land use change and forestry.

related GHG emissions and removals, e.g. on agriculture and land use are not yet covered. Germany does not describe its adaptation goals and policies in the draft plan.

Similarly, elements are only partially provided for targets, objectives, policies and measures and investment needs for the area of **renewable energy**. Sectoral targets are available for the heating and cooling sector, while there are different possible targets for renewable electricity and no targets for the transport sector except from the obligatory advanced biofuel target. Planned capacities are generally described but are not split between new capacities and repowering. There is no inclusion of trajectories on biomass supply (by feedstocks and origin), no trajectories for forest biomass, no assessment of its source and impact on the LULUCF sink. Measures regarding power purchase agreements (PPAs) and related to the enabling framework to promote and facilitate development of renewable self-consumption, energy communities and simplification of administrative procedures are partially included with limited information.

The sections of the draft plan on the **energy efficiency dimension** follow the required structure defined by the Governance Regulation¹⁴. However, the national contribution to the EU energy efficiency target, trajectories on energy consumption for 2021-2030, additional policies and measures and a quantification of impacts of existing policies and measures are missing. While some elements regarding the long-term renovation strategy are available, information on the renovation of public buildings is missing.

While the German draft plan sets out a general policy objective for the **energy security dimension** of meeting energy demand at all times, more specific objectives such as for demand response and energy storage could be set out in the final plan. The final plan also could address topics becoming more relevant for energy security in a 2030 perspective, such as cybersecurity, a reflection of preventive action, and national objectives for the diversification of gas suppliers and transit routes.

On the **internal energy market dimension** of the Energy Union, the draft plan contains only limited quantitative parameters on the functioning of national retail and wholesale electricity and gas markets, preventing a full assessment of the draft plan. Strategies to reduce the large share of regulated price components in the German electricity price and to re-activate effective price signals which reflect demand and supply and send the necessary price signals for customers are missing. Additional information on elements concerning market integration also would be necessary to understand how Germany intends to implement recent market design legislation. Aspects related to system flexibility and energy poverty could be addressed more comprehensively as part of the final plan or, in the absence of further elaborations, the reasons for not addressing these sections. Similarly, indicators on infrastructure would be required for a complete assessment on the basis of the final plan. Measures for increasing capacity of interconnectors available for cross-border electricity trade remain to be specified, accompanied by a concrete timetable and quantitative targets.

The information provided on the **research, innovation and competitiveness dimension** of the Energy Union is detailed, but in several instances incomplete. No details on German competitiveness objectives are provided; no general assessment of the impacts of the planned policies and measures on competitiveness linked to the five dimensions of the Energy Union. While the Federal Government plans to provide EUR 6.4 billion for research, development and demonstration during the period 2018-2022, the draft plan does not provide objectives or funding targets for 2030. Objectives related to the deployment of low-carbon technologies are not

¹⁴ Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

included. Such objectives would be particularly relevant to support Germany's ambitious objective for renewable energy development, sector coupling and the export of low-carbon technologies.

Robustness of the German draft National Energy and Climate Plan

The German draft plan addresses some of the required elements of the **analytical basis**. It reports with existing measures (WEM) projections in the main document. The with additional measures (WAM) projections will be provided once Germany's new climate change programme for 2050 (*Maßnahmenprogramm des Klimaschutzplans 2050*) is agreed. Data sources include the Federal Environment Agency, the Federal Ministry for Economy and Energy, the Federal Network Agency and European statistics.

The **WEM projection** largely covers the five dimensions of the Energy Union. Additional information would be desirable for WEM and WAM projections on some variables, such as (i) the differentiation of sectoral GHG emissions per IPCC gas, (ii) the differentiation of sectoral GHG emissions between those covered by the EU ETS and those falling under the Effort Sharing Regulation, (iii) GHG emissions from domestic and international aviation emissions, (iv) livestock non-CO₂ emissions, (v) non-GHG air pollutants, (vi) energy-related investment needs for the overall economy, (vii) cross-border interconnection capacities for gas and electricity, and (viii) the total number of passenger and freight kilometres.

All key parameters have been documented and data sources are provided. Improving details on models and tools used for the WEM projections would increase understanding of the analysis. Clearly identifying among the policies and measures described in the draft plan which are taken into account in the WEM scenario (as opposed to indicating that those are the ones in place at the end of 2017) would allow a more detailed assessment of the final plan. Using the voluntary template on policies and measures provided by Commission services could be helpful in that respect.

The key model parameters are in line with the EUROSTAT figures for the base year 2015 with the exception of (i) renewable energy share for transport and (ii) total primary and final energy consumption. The draft plan follows the Commission recommendations on ETS carbon price assumptions but uses its own for international fuel prices.

The impact assessment of planned policies and measures will be included in the final plan. It should include, macroeconomic and, to the extent feasible, the health, environmental, employment and education, skills and social impacts, including just transition aspects.