



Brussels, 14.10.2020
SWD(2020) 926 final

COMMISSION STAFF WORKING DOCUMENT

Assessment of the final national energy and climate plan of Sweden

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1. SUMMARY

Sweden's¹ 2030 target for **greenhouse gas (GHG) emissions** not covered by the EU emissions trading system (non-ETS), is to achieve a 40% reduction compared to 2005 levels, as set in the Effort Sharing Regulation (ESR)². Based on Sweden's projections, the Commission estimates that existing policies may be sufficient to achieve this target. Sweden has also set a national 2030 target to achieve a 59% reduction of non-ETS emissions compared to 2005. It must make at least a 50% reduction in Sweden's effort sharing sectors, which is more ambitious than the ESR target.

Land use, land use change and forestry (LULUCF) is important in Sweden due to its large forested area and to being an important part of its climate strategy. However, the plan does not sufficiently explain how Sweden would meet the no-debit commitment under the LULUCF Regulation³, which requires that accounted emissions do not exceed accounted removals. The NECP does not clearly set out climate **adaptation** goals, but it does provide extensive information on how adaptation is factored into the action plans for different sectors and regions.

Sweden has undertaken to contribute to the EU's 2030 target for renewable energy (as a share of gross final energy consumption) by reaching 65% of renewable energy. This is sufficiently ambitious, being above the 64% share calculated using the formula in Annex II to Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action (the 'Governance Regulation').⁴ The related trajectory is in line with the indicative reference points for 2022, 2025 and 2027. Additional policies and measures will be needed to achieve Sweden's 2030 target.

On **energy efficiency**, Sweden's target is to be 50% more efficient by 2030 in terms of primary energy intensity compared to 2005. Based on the underlying assumptions of the NECP and additional information submitted by the Swedish authorities, this translates into a contribution of 40.16 Mtoe for primary energy consumption and 29.67 Mtoe for final energy consumption. The translated energy efficiency contributions are considered to be modestly ambitious, both in terms of primary and final energy consumption⁵. The national energy and climate plan provides some information on the energy efficiency of buildings. Sweden submitted its long-term renovation strategy on 27 March 2020⁶.

Sweden focuses on well-integrated, functioning **energy markets** to ensure **energy security**. The plan describes measures to increase system resilience in view of the planned increase in renewables, including cyber security measures, and makes reference to regional cooperation in

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 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.

⁴ 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.

⁵ In accordance with the methodology as illustrated in SWD(2019) 212 final.

⁶ Sweden submitted its long-term renovation strategy under Article 2a of Directive 2010/31/EU on the Energy Performance of buildings on 27 March 2020. This assessment is based only on the building-related elements provided in the final NECP.

this area. The plan makes adequate links with emergency plans for gas, electricity and oil, under the corresponding sectoral rules.

The plan does not include a specific target for electricity **interconnectivity**. Sweden already exceeds the 15% target for interconnections, including an estimated interconnection level of 26% by 2030.

Sweden’s plan does not include national objectives or funding targets related to **research, innovation and competitiveness**, but it describes several funding schemes for energy and climate research between 2016 and 2027.

The plan does not specify an overall estimated amount of **investment needs**. It identifies the main areas for investment going forward, such as power production and distribution, for which it quantifies investment needs as SEK 150 billion (around EUR 14.5 bn), and it also emphasises the transport sector. In particular in the section on decarbonisation, the plan describes several measures based on government funding such as the ‘Climate Leap’ and the ‘Industrial Leap’.

Information on both **renewable and fossil fuel subsidies** is included in the final plan. The categories and figures on fossil fuel subsidies listed in the plan are in line with those identified in recent Commission analyses on energy subsidies. The final plan does not describe the action taken or planned to phase out energy subsidies, in particular fossil fuels.

The plan provides information on the interactions with **air quality** and air emissions policy by describing Sweden’s policy on air quality and how it interacts with other policy areas. This is relevant in view of the projected increase in **bioenergy**, which can have major impacts on biodiversity and air quality.




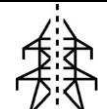
The plan covers issues related to the **just and fair transition**, providing limited information on social and employment impacts of the transition to a climate-neutral economy, such as employment in carbon-intensive industries and in low-emission sectors. Skills impact are not mentioned. It does not provide an analysis of planned policies and measures, such as identifying training needs for occupations that may generate demand for new skills. Sweden does not report the number of households in **energy poverty**, as it is considered to be an integrated part of the broader social policy.

There are **several examples of good practices**, such as providing a national framework for achieving the NECP objectives. Sweden’s Climate Act sets legally binding long-term targets, requires annual climate reports and sets up an independent Climate Policy Council.

The following table gives an overview of Sweden’s objectives, targets and contributions under the Governance Regulation⁷:

National targets and contributions	Latest available data	2020	2030	Assessment of 2030 ambition level
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⁷ 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.

	Binding target for greenhouse gas emissions compared to 2005 under the Effort Sharing Regulation (ESR) (%)	-25	-17	-40	More ambitious national target of at least -50
	National target/contribution for renewable energy: Share of energy from renewable sources in gross final consumption of energy (%)	54.6	49	65	Sufficiently ambitious (Above RES formula level of 64)
	National contribution for energy efficiency:				
	Primary energy consumption (Mtoe)	47	43.4	40.2	Modest ambition
	Final energy consumption (Mtoe)	32	30.3	29.7	Modest ambition
	Level of electricity interconnectivity (%)	26	28	27	N/A

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

2. FINALISATION OF THE PLAN AND CONSIDERATION OF COMMISSION RECOMMENDATIONS

Preparation and submission of the final plan

Sweden **notified** its final national energy and climate plan (NECP) to the European Commission on 17 January 2020.

It carried out a **public consultation** on the NECP in several stages. Many of the policies, measures and targets are based on the 2016 Energy Agreement and the climate policy framework presented together with Sweden's 2017 Climate Act. Sweden submitted a summary of the public's views providing during the consultation on the plan in September 2019, but not of how the results of the national consultation are reflected in the final plan. There is no indication of a strategic environmental impact assessment (SEA) developed on the NECP under Directive 2001/42/EC.

Consideration of Commission recommendations

In June 2019, the Commission issued 10 recommendations on Sweden's draft plan to consider in the final plan. Annex II to this staff working document gives a detailed account of how the Commission's recommendations were taken up in the final NECP. Overall, the final NECP **largely addresses** most of the Commission's recommendations. Specific details below.

The recommendation on **greenhouse gas emission reductions**, recommending Sweden to develop a strategy to achieve the LULUCF no debit commitment and to assess the impact of policies and measures on emissions trading system, effort sharing and LULUCF sectors, is **partially addressed**. The plan provides information on these topics, but does not contain

sufficient analysis/details on the LULUCF sector or how Sweden expects to meet its 2030 ESR target.

Sweden **largely addressed** the recommendations on **renewables**. Notably, it confirmed its renewable energy contribution and the proposed trajectory. However, the final NECP still lacks details on the initiatives planned to overcome the administrative burden, on promoting enabling frameworks, as well as on specific measures to ensure the long-term sustainability of biofuels.

On **energy efficiency**, Sweden **partially** the recommendation to increase the level of action to reduce final energy consumption. The calculated contributions in the final plan are lower than the draft plan, due to lower projections for GDP growth used to set the target. On buildings, the NECP provides some information but further details on the indicative milestones and relevant policies and measures are expected with the long-term renovation strategy, which has been submitted on 27 March 2020.

On **energy security**, Sweden **mostly addressed** the recommendation to specify the measures supporting the energy security objectives on diversification and reduction of energy dependency, including measures ensuring flexibility and electricity generation adequacy in light of the ambitious renewables target. The list of measures to ensure security of supply was amended to include measures to prevent disruptions and to prevent their consequences.

On **research, innovation and competitiveness**, Sweden **partially addressed** the recommendation to clarify national objectives and funding targets.

Sweden **fully addressed** the recommendation to boost **regional cooperation**, which is ongoing in different areas. Sweden shared its final plan with the Nordic countries for comments. Since the draft plan was submitted, the Nordic countries have signed a declaration on carbon neutrality and have formulated a 2030 vision for the Nordic electricity market.

Sweden **partially addressed** the recommendation on **investment** needs and funding, since the plan provides assessments only for electricity production capacity and distribution infrastructure, not for other sectors.

Sweden **largely addressed** the recommendation to list the action taken and plans to **phase out energy subsidies**, in particular for fossil fuels. The final plan includes a list of fossil fuel tax breaks and corresponding tax expenditure. However, the plan states that Sweden has not set deadlines for phasing out energy subsidies.

Sweden **largely addressed** the recommendation to complement the **analysis on air quality** with additional information on air quality and air pollution measures and their related links with energy policy measures.

Lastly, Sweden **has not addressed** the recommendation to better integrate **just and fair transition aspects**. The final plan provides additional information, including a basic analysis of the employment and social impact of the transition to a low-carbon economy, but it does not describe related measures. In particular, it mentions employment aspects but it lacks a thorough analysis, the plan does not cover skills, and mentions of social aspects are limited to gender issues.

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 2019⁸, Sweden received one country-specific recommendation⁹ on climate and energy, calling on it to “focus investment related economic policy on [...], maintaining investment in sustainable transport to upgrade the different transport modes, in particular railways [...]”. In the 2020 country report¹⁰ adopted on 20 February 2020, the Commission found that Sweden had achieved substantial 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, Sweden received a country-specific recommendation¹¹ stressing the importance of focusing investment on “the green and digital transition, in particular on clean and efficient production and use of energy, high-tech and innovative sectors, 5G networks and sustainable transport.”

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. Sweden’s national energy and climate plan can support the implementation of the European Semester recommendations, as it identifies the country’s investment needs and financial resources to meet them.

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

Decarbonisation

Greenhouse gas emissions and removals

The Swedish NECP confirms the commitment made in the Climate Act, which states that the country will achieve net-zero emissions of greenhouse gases by 2045 (with domestic emissions at least 85% below the 1990 level); and negative emissions thereafter. Up to 15% of the emission reductions to reach climate neutrality may be compensated through other measures such as carbon capture and storage or verified emission reductions through investment in other countries.

The act sets a target for Sweden to reduce its non-ETS greenhouse gas emissions in 2030 by at least 63% compared to 1990 emissions. This corresponds to an emission reduction of 59% compared to 2005, which is considerably more ambitious than Sweden’s -40% target under the

⁸ 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.

⁹ Recommendation for a Council Recommendation on the 2019 National Reform Programme of Sweden and delivering a Council opinion on the 2019 Stability Programme of Sweden, COM(2019) 527 final.

¹⁰ Commission staff working document, Country Report Sweden 2020, SWD/2020/526 final.

¹¹ Recommendation for a Council Recommendation on the 2020 National Reform Programme of Sweden and delivering a Council opinion on the 2020 Stability Programme of Sweden, COM(2020) 527 final.

ESR¹². At least 50% must be achieved in the effort sharing sectors, and 9% can be achieved through other means, such as carbon capture and storage.

The NECP includes a wide range of existing **GHG reduction policies** at both EU and national level covering all relevant sectors. However, the plan does not provide any information on the impact of individual or groups of policies. The policies and measures presented are not sufficiently quantified to determine whether or not Sweden will reach its EU commitments and national objectives. Nevertheless, based on Sweden's projections for existing measures submitted in 2019 under the Monitoring Mechanism Regulation, the Commission estimates that these policies may be sufficient to achieve Sweden's ESR target in 2030¹³.

The plan does not provide any information on planned additional measures, despite the fact that the government announced several new initiatives in its climate action plan on 17 December 2019.

The NECP presents **projections** for total GHG emissions until 2045 based on measures adopted until 1 July 2018. The plan states that, based on existing measures, total emissions will drop by 35% by 2030 compared to 1990. The projected decrease in 2030 is significantly less than national reduction targets. The description of trends and projections does not include a split into ETS and non-ETS/ESR emissions and therefore does not indicate whether Sweden expects to meet its ESR and national targets in 2030 with existing measures.

The plan does not provide information on the assumptions and methodologies used for the projections. It does not make projections based on additional measures, and does not include an estimate of the annual emission allocations under the ESR.

The plan highlights the **importance of land use and forestry policies** for Sweden's climate and energy objectives. It expects the LULUCF sector to continue contributing annual net removals until 2045, though it provides few details on how existing and planned policies would achieve this. Projections of long-term LULUCF removals under existing measures indicate a small reduction from 43.7 MtCO₂ (2017) to 40.6 MtCO₂ (2030).

Sweden's NECP does not explain how existing policies to reduce emissions by land and forests contribute to achieving Sweden's LULUCF commitment and overall non-ETS target in 2030. The plan does not indicate whether Sweden expects to generate LULUCF credits, nor whether it intends to apply the flexibility option to use these potential credits to achieve the effort sharing target.

The plan does not specify how the provision of biomass for renewable energy will affect the availability of biomass, the LULUCF sink, biodiversity and their sustainability. It does not describe the impact of other policies and measures on the LULUCF sector.

Sweden has a target to reduce by 70% its GHG emissions in the domestic **transport** sector (excluding aviation) by 2030, compared to 2010 levels. The plan identifies and describes in detail

¹² 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.

¹³ COM(2019) 559 final, figure 5. Report from the Commission to the European Parliament and the Council preparing the ground for raising long-term ambition. EU Climate Action Progress Report 2019.

several key policies in the transport sector. Most of the policies are designed to support the electrification of transport. However, the plan forecasts the emission reduction contribution to the target for only one policy (emission reduction obligations for fuels). **Electromobility** is supported via comprehensive measures including vehicle taxation, a *bonus-malus* system¹⁴, benefits for electric company cars, and support to install charging infrastructure. The plan does not cover measures to reduce emissions from sectors such as shipping and rail, and provides little information on measures to support the shift towards clean transport modes.

The plan describes existing policies in **agriculture**, including a comprehensive set of measures to promote decarbonisation and energy efficiency under the 2014-2020 rural development programme. However, it does not give any information on the expected emission reductions resulting from these measures.

The NECP refers to the national **adaptation** strategy adopted by the government in March 2018. This strategy includes extensive information on the institutional framework and on how adaptation is factored into action plans for different sectors and regions. However, it does not clearly define the adaptation goals.

Sweden notified its long-term strategy to the Commission on 19 December 2019. The country aims to achieve climate neutrality by 2045. This objective covers GHG emitted in all sectors of the economy and the natural sinks will compensate for the remaining emissions most difficult to abate. It also includes the possibility to use international credits. The long-term strategy addresses most of the aspects required under Article 15 of the Governance Regulation.

Renewable energy

Sweden's national contribution to the EU's 2030 target for renewable energy is specified in the plan and the **renewable share** is set at 65% of gross final consumption of energy in 2030. This is a sufficiently ambitious target, as it is above the share of 64% by 2030 that results from the formula in Annex II to the Governance Regulation. The indicative trajectory put forward in the plan is in line with all reference points¹⁵.

Sweden has not set any individual targets or objectives for sectoral shares of renewable energy, the technologies used, or bioenergy demand. However, it does present some modelling on the basis of the agreed energy and climate policy instruments up to 1 July 2018.

With regard to the **electricity** sector, Sweden has a target of 100% renewable electricity by 2040 and a projected contribution of 83% share of its electricity consumption from renewable energy sources by 2030. **Heating and cooling** in Sweden is already largely electrified, with an electrification share of 69%, expected to stabilise at around this level, rising just slightly to 72% in 2030.

¹⁴ Ministry of the Environment, 2 May 2017, *Bonus-malus system for new vehicles*, retrieved at <https://www.government.se/press-releases/2017/05/bonusmalus-system-for-new-vehicles/>.

¹⁵ Pursuant to Article 4(a)(2) of Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, 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.

For **transport**, Swedish policies are primarily driven by the ambition to reduce the CO₂ emitted by the sector e.g. via further electrification. It has several policies and measures in place to support this target, such as fuel blending obligations, differentiated tax for cars depending on fuel use and support to install electrical infrastructure. There are also measures in the railway sector and for heavy machinery. For Sweden to meet its national climate target, it should reduce its greenhouse gas emissions from domestic transport excluding domestic aviation by at least 70% by 2030 compared to 2010, which should create the conditions for Sweden to have net-zero emissions by 2045 at the latest. The indicative projections for 2030 with existing policies indicates a proportion of 47.7% renewable energy in transport, applying the Renewable Energy Directive II methodology (i.e. including double counting).

For **biomass**, there are currently relatively high levels of imports into Sweden for all three user sectors (heating, cooling, electricity and transport), although there is a significant potential for the country to source most of the raw materials domestically. Sweden does not have a policy to steer the balance between domestic production and imports as it considers that it should be market-driven.

Overall, the policies and measures described are not considered sufficient to achieve the renewable energy targets.

Energy efficiency

Sweden's **national contribution to energy efficiency policy** in 2030 is to be 50% more energy efficient than in 2005, which translates into 40.16 Mtoe for primary energy and 29.67 Mtoe for final energy¹⁶. The plan provides information on **policies and measures** beyond 2020 in areas such as buildings, transport and industry. The main policy driving energy efficiency in Sweden is the tax on energy and carbon, which provides strong financial incentives to reduce energy consumption. Several of the large government funding schemes such as the 'Climate Leap' make resources available for energy efficiency measures.

Overall, the policies and measures described are not considered to be fully convincing for the purpose of achieving the country's energy efficiency contribution. The plan does not include quantified evidence on whether the energy efficiency policies and measures and/or other developments can ensure that Sweden meets its overall energy efficiency target.

The plan presents the **cumulative savings** to be achieved under Article 7 of the Energy Efficiency Directive, with a cumulative amount of 117 TWh between 2021 and 2030. The main instruments to achieve the target under Article 7 of the Energy Efficiency Directive are CO₂ and energy taxation. They are complemented with administrative instruments, investment aid schemes and other measures, for which the expected savings are not quantified. However, the energy efficiency measures listed in the plan give a relatively high degree of confidence that the country can achieve its Article 7 target. Despite the wide range of Article 7 measures, the plan lacks clarity on how the measures can help vulnerable energy consumers or encourage them to carry out energy efficiency measures. On buildings, the plan refers to further policies and measures laid down in the long-term renovation strategy to gradually insulate and make buildings gas-free.

¹⁶ The figures were revised by the Swedish authorities to include international aviation, as required in the EED methodology.

Energy security

Sweden considers a well-integrated and efficient energy market to be the most important factor in ensuring a secure energy supply. With a target of 100% renewable energy in electricity generation by 2040 and a projected 65% renewable energy in final energy consumption, there is a need to strengthen system resilience. The plan envisages significant further measures and investments in demand-side response, in energy storage and smart metering, in its contribution to electricity system stability and in integrating renewables.

As regards the **diversification of energy sources and routes**, the plan does not specify a national target (neither for diversifying nor for reducing Sweden's dependency on energy imports from third countries). In 2017, Sweden's share of energy self-sufficiency was 44%. The plan also lacks projections for further gas grid developments in Sweden. When assessing the related risks, the plan generally takes account of the plans of the other connected Member States.

Sweden's plan includes considerations and measures to improve cyber security, and the expected development of renewable electricity resources is reflected in the action to strengthen system resilience. The Swedish Energy Agency is currently working on providing risk analyses and safety measures for the energy sector. The government has also presented a national strategy to develop and strengthen information and cyber security in Sweden, with related objectives identified for six priority areas.

The plan lists both preventive and mitigation measures to ensure security of supply, especially concerning potential energy shortages. Regarding the security of gas supply, Sweden meets the legislative requirements guaranteeing supplies to protected customers for at least 30 days in the event of a supply disruption or interruption. The final NECP cites the preventive action plan and the emergency plan on the security of gas supply provided for under sectoral legislation.

Similarly, as regards **oil supplies**, Sweden maintains emergency stocks of 90 days of net imports in line with the legislative requirements. Regarding gas supplies, Danish Drainat supplies most of the gas consumed in Sweden. The LNG terminal in Gothenburg is not connected to the transmission grid. As regards electricity supplies, Sweden should draw up the risk-preparedness plan by 5 January 2022 at the latest and update it every four years.

Sweden's policies and measures are considered to be consistent with targets and objectives, as well as the current energy security status.

Internal energy market

The NECP states that Sweden projects to achieve a degree of **interconnectivity** of 27% in 2030, which is significantly above the target set at EU level of 15%. The plan lists current projects of common interest that will increase interconnectivity and also reports on the main infrastructure projects planned. An analysis of planned and new links is ongoing as the network development plan of the Swedish Grid Development Plan is updated every two years.

The NECP also includes an analysis of how the rising demand for electricity affects the level of electricity interconnectivity and the need for infrastructure. It also clearly mentions ongoing internal network reinforcements with the aim to reduce bottlenecks between bidding zones and allow for further increases to cross-border interconnections. Notably, the "North-South programme" includes some 50 projects up to 2040, which will help strengthen the network.

Given the projection of 83% renewable electricity in 2030, the plan provides an overview of the different sources of **flexibility** needed and being developed to integrate the increasing share of

renewable energy into the electricity system. This is reflected in part in the section on market integration and smart metering.

The expected growth of renewable electricity resources is reflected in the action taken to enable market **flexibility** and properly integrate intermittent power production into the energy system.

The plan provides a sufficient overview of current **market conditions** for gas and electricity, although additional quantitative indicators would be useful. Although the plan recognises that high levels of competition and market liquidity contributes to the functioning and stability of the energy system, it does not set forward-looking objectives or targets for **market integration**.

The final plan includes policies and measures related to the internal energy market (e.g. measures to ensure the non-discriminatory participation of new market participants and different flexibility sources in all energy markets). An implementation plan to address residual market failures will be developed to ensure compliance with the electricity legislation and requirements for operating the strategic reserve.

Sweden does not report the number of households affected by **energy poverty**. Although the NECP states that energy poverty is addressed by social policy, it lacks a description of the social policies pursued to this end. However it does describe several policies to protect vulnerable consumers, and provides a definition of vulnerability under Swedish law.

Policies and measures are considered to be broadly consistent with the targets and objectives, as well as with the current status of the internal energy market.

Research, innovation and competitiveness

The NECP does not specify the research, innovation and competitiveness objectives that Sweden aims to achieve by 2030, describing only some financing of ongoing research programmes. The National Energy Research and Innovation Programme sets out an increase from SEK 1.3 billion in 2017 to SEK 1.6 billion in 2020.

Although the overarching objectives are very ambitious, the plan lacks specifics on how policies and measures are linked to research and innovation funding. The data mainly refer to the past few years and to overall funding goals, with little or no data on the intermediate steps, actions, and budget related to Sweden's ambitious targets.

Under the National Energy Research and Innovation Programme, Sweden is working to become a frontrunner in the transition to a sustainable energy system. The programme includes action on business development and commercialisation, and international cooperation.

The Swedish NECP does not comprise specific hydrogen-related measures or objectives, but does mention some specific hydrogen initiatives or projects, for instance with the aim of replacing coking coal with hydrogen.

Sweden mentions the **Strategic Energy Technology (SET) Plan** and provides a complete and consistent overview of its participation. In addition, Sweden links part of its national research programme to the SET Plan thematic areas, providing an accurate link between their national research and innovation programmes and the SET Plan working groups.

As regards **competitiveness**, the plan refers to the 2015 Fossil Free Sweden initiative, which invited all business sectors to produce roadmaps on how to become climate neutral by 2045 while

increasing their competitiveness. In October 2019, 27 measures were presented to promote ‘fossil free competitiveness’ in Swedish industry, based on the relevant roadmaps.

The competitiveness objectives described in the plan are generic. They reflect Sweden’s ambition to be among the leaders in the energy transition, while acknowledging the need to underpin this goal by national research programmes, business development, entrepreneurship, innovation and properly functioning competition.

4. COHERENCE, POLICY INTERACTIONS AND INVESTMENT

The final NECP provides a good assessment of the policy interactions between different aspects of the plan. The objectives of existing policies and measures and their reported effects, including corresponding assumptions in the “with existing measures” scenario, are well presented. However, the methodology is not described in detail. The plan does not provide scenarios based on additional policies or measures, nor does it include a cost-benefit-analysis.

The plan discusses, in general terms, the consequences of policies and interactions between them. It provides references to an assessment of the 2030 target, estimating the savings of a cost-effective climate policy of between 0.2-1.5% of GDP compared with a reference scenario¹⁷. The plan follows up on the recitals of the recommendation on policy coherence, in particular regarding the reference to further improving the internal electricity grid in preparation for increased renewable electricity production.

The plan discusses the **links** between the increased amount of renewables in the energy system and system resilience. As for compliance with objectives and targets in the national long-term strategy¹⁸, the NECP is consistent with the assumptions of the energy system in the strategy.

The NECP lacks information on how the impact of climate change may affect the energy supply (e.g. hydropower), and on the **adaptation** benefits for energy efficiency, such as thermal management of buildings.¹⁹ It lacks an analysis on the impact of biofuel and renewable energy objectives on the magnitude of removals in the LULUCF sector.

Although the final plan makes improvements compared to the draft plan, it still lacks clear and detailed objectives on system flexibility, smart grids, demand response and aggregation, storage, distributed generation, consumer protection and competitiveness in the retail sector. The plan describes some policies and measures designed to increase system flexibility, but does not present them in a systematic way, and it does not mention contextual conditions (e.g. market barriers for new participants or the uptake of different sources of flexibility).

Other than for electricity production capacity and distribution infrastructure, the NECP lacks a quantitative assessment of Sweden’s **investment needs** to achieve its climate and energy objectives. The needs in the other major sectors (transport/industry) are not quantified. For the power sector, it provides an assessment both in terms of GW, SEK and as annualised investment in SEK/year. Based on the plan, it is difficult to assess the detailed figures for different

¹⁷ *En klimat- och luftvårdsstrategi för Sverige. SOU 2016:47.*

¹⁸ <https://www.regeringen.se/rapporter/2019/12/langsiktig-strategi-for-minskning-av-vaxthusgasutslappen> Sweden submitted its long-term strategy to the European Commission in December 2019.

¹⁹ However, Sweden’s national adaptation framework does consider the energy sector critical to societal functions. Its portal for climate change adaptation provides information on potential climate impact on the sector.

technologies. The plan lacks a comprehensive summary and an assessment of the multiple sources of funding at EU, national or regional level.

The **fossil fuel subsidies** reported in the plan appear to be in line with internationally used definitions. It does not provide a timeline to phase out energy subsidies, in particular fossil fuel subsidies.

The **‘Industrial Leap’ programme** supports low-carbon innovation in energy-intensive industries, including innovation to reduce process-related GHG emissions. The government also supports measures to reduce GHG emissions at local and regional level under the **‘Climate Leap’ programme**. Climate Leap helps municipalities invest in charging infrastructure for electrical vehicles, switching to biofuels and district heating, cycle lanes and other cycling infrastructure.

Regarding **just and fair transition** aspects, Sweden’s NECP provides a basic analysis of the employment and social impact of the transition to a low-carbon economy. Skills impacts are not analysed and the social impact is limited to gender.

The plan includes a general discussion on the potential effects on **air quality**. This includes information on projected air pollutant emissions and analyses of the impact of NECP measures on air quality, particularly addressing transport and energy sectors, as well as fine particles (PM) and NOx pollutants. The plan highlights the opportunities that energy efficiency and saving measures offer to improve air quality and it stresses the strategic importance of the transport sector. It notes the synergies between transport and use of bioenergy, and the trade-offs between air pollution control and climate. The NECP makes links to the national air pollution control programme (NAPCP). The NAPCP provides well-substantiated reasoning for selecting air-climate synergetic measures, particularly for road transport.

The NECP refers to the creation of a consultative body to develop a strategy for making the transition to a **circular and bio-based economy**, both at national and regional level. Work will initially focus on three areas: plastic, public procurement and design for circularity. The NECP does not, however, provide sufficiently detailed descriptions of the circular economy measures.

The plan includes measures to preserve **biodiversity**, such as conservation and protection of areas containing both wetlands and forest ecosystems. The NECP indicates the use of forest biomass for biofuels, investment aid to fence off energy forests and energy plantations, and aid for the construction of bioenergy plants.

Although energy efficiency policy receives prominent attention in the plan, it does not explicitly mention the application of **energy efficiency first** principle. The plan recognises a risk of regional electrical capacity shortages in metropolitan areas, but it does not discuss alternative scenarios where action on energy efficiency could mitigate such risks.

Sweden is a signatory to the **Clean Energy for EU Islands initiative** but this is not reflected in the final plan.

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

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

Sweden needs to swiftly proceed with implementing its final integrated national energy and climate plan, notified to the Commission on 17 January 2020. This section provides some guidance to Sweden for the implementation phase.

This section also addresses the link between the final plan and the recovery efforts from after the COVID-19 crisis, by pointing at possible priority climate and energy policy measures Sweden could consider when developing its national recovery and resilience plan in the context of the Recovery and Resilience Facility.²⁰

Guidance on the implementation of the national energy and climate plan

Based on Sweden's projections for the plan, the Commission estimates that existing policies may be sufficient to achieve the 2030 target for **non-ETS greenhouse gas emissions** of -40 % compared to 2005 as set in the Effort Sharing Regulation. Sweden has also set a national target to reduce non-ETS emissions by 59% by 2030 compared to 2005. At least -50% must be delivered by Sweden's effort sharing sectors, which is more ambitious than its ESR target. To reach its ambitious domestic targets, particularly for **non-ETS greenhouse gas emissions**, Sweden would need to increase the annual rate of emission reductions (which has been below 1% since 2014), especially in the transport sector, which remains the single biggest source of GHG emissions.

Sweden's contribution to the EU's 2030 renewables target in the NECP is sufficiently ambitious, given the share resulting from the formula in Annex II to the Governance Regulation, which would indicate a modest level of ambition on energy efficiency. Therefore, Sweden's plan leaves scope to further develop and strengthen policies and measures on both renewables and energy efficiency to contribute more to EU climate and energy targets and to boost the green transition.

On **renewables**, Sweden committed to increase the share of renewables in gross final energy consumption to 65% in 2030. However, it also would be beneficial to implement administrative structures with simplified permitting procedures and support schemes to support the deployment of renewables. Moreover, it would be important to scale up investment in renewable power generation and distribution to enable the planned expansion of electrification. Given the high share of biomass in the energy sector, the sustainable use of biomass merits continued vigilance.

On **energy efficiency**, Sweden would benefit from taking further action on energy efficiency and from adopting and implementing additional policies and measures that would deliver additional energy savings by 2030. More details on the scale, the implementation timeline and the contribution of policies and measures to the overall energy efficiency target would help monitor progress. More clarity on how the measures could help vulnerable energy consumers or encourage them to improve energy efficiency would also be beneficial.

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

Improving energy efficiency in buildings has much potential for speeding up energy savings and contributing to the recovery of the economy after the COVID-19 pandemic. Building on the momentum of the **‘Renovation Wave’** initiative²¹, there is scope for Sweden to take further action to improve the energy performance of its existing building stock with specific measures, targets and action. It could provide more support for renovating public and private buildings by increasing public funding and by leveraging EU and national budgets with private money, combining grants, lending, guarantees and loan subsidies. Sweden would need to underpin the substantial energy savings potential of its existing building stock by implementing the long-term renovation strategy, under Article 2a of the Energy Performance of Buildings Directive.²² Sweden also can take the energy efficiency first principle further by fully taking into account the co-benefits of energy efficiency measures to reach other targets, in particular to reduce GHG emissions and secure reliable electricity supply in metropolitan areas.

In terms of **energy security**, bringing in and implementing measures on cyber security will improve the resilience and flexibility of the energy sector.

Regarding the **internal energy market**, Sweden is encouraged to set more detailed targets and objectives to improve system flexibility. Setting milestones and objectives for the retail market, including for smart grid implementation, aggregation and storage participation on the market, should improve overall system flexibility by integrating renewable electricity and new market participants into the system.

Sweden would benefit from having clear indicators to track progress on the milestones towards its **research and innovation and competitiveness** objectives. Over time, collecting granular research, innovation and competitiveness data will be useful to strengthen this process. Sweden would need to link this to the action taken under the SET Plan. It would also benefit from a stronger link between the competitiveness objective and the policies and measures to put in place for each sector by 2030.

Identifying investment needs and securing adequate funding will be key to delivering on Sweden’s ambitious climate and energy objectives. The industry roadmaps for fossil free competitiveness are examples of good practice, which will help identify **investment needs** in the different sectors. Sweden would also need to support the decarbonisation of the economy through ambitious policies to promote innovation and competitiveness. Sweden intends to reduce carbon emissions by electrifying the transport sector. Planned investment in rail infrastructure and waterways is important to facilitate a modal shift in transport and to meet Sweden’s ambitious climate objectives. It will also be important to implement planned measures for additional support to renewable energy and charging infrastructure for electric vehicles. Front-loading such public investment projects supporting the green transition can have an important role in fostering the economic recovery after the COVID-19 pandemic.

On **regional cooperation**, Sweden is invited to continue ongoing work to step up exchanges and initiatives facilitating implementation of its national energy and climate plan, in particular as

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

²² Sweden submitted its long-term renovation strategy under Article 2a of Directive 2010/31/EU on the Energy Performance of buildings on 27 March 2020.

regards relevant cross-border issues²³. Sweden is also invited to maximise the potential of **multilevel climate and energy dialogues** to actively engage with regional and local authorities, social partners, civil society organisations, the business community, investors and other stakeholders and to discuss with them the different scenarios envisaged for its energy and climate policies.

Sweden is encouraged to provide a description of the social policies and measures pursued to reduce **energy poverty**. Energy poverty could be, among other measures, be addressed through specific support to socially innovative solutions and social enterprises that work on addressing this challenge (e.g. energy-awareness campaigns, retraining unemployed as energy advisors, supporting green installations by cooperatives, buying energy-saving appliances for social enterprises to rent out). Sweden is invited to provide more clarifications on its current and future plans to reduce energy consumption to meet the 2030 energy efficiency targets and on how they target energy-poor households. In this regard, the momentum of the Renovation Wave initiative under the European Green Deal is an opportunity to step up action to tackle energy poverty by improving the energy performance of Sweden's existing building stock. Sweden 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.

Sweden is invited to extend and update its list of and reporting on **energy subsidies** and to step up action to phase them out, in particular fossil fuel subsidies. A rapid phase-out of the fossil fuel subsidies identified in the NECP and recent Commission analyses would further boost the green transition, by developing and implementing specific plans and setting associated timelines (coupled with any necessary measures to mitigate the risk of household energy poverty).

For all investments implementing the national energy and climate plan, Sweden 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, Sweden is invited to make the **best possible use of the multiple sources of funding available**, combining scaled-up public financing at all levels (local, national and EU funding) and leveraging and crowding in private financing. Tables 1 and 2 in Annex I provide an overview of EU funding sources expected to become available to Sweden over the next multiannual financing period (2021-2027), and EU funding addressed to all Member States and companies. For this next period, the European Council has committed to mainstreaming climate action into all EU programmes and instruments and to reaching 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 enshrined in the European Green Deal. At EU level, funding will also be available for Sweden under the Innovation Fund, based on revenue from auctioning allowances under the EU emissions trading system.

²³ In this context, the Commission will help address related issues in a strategic manner in its upcoming Strategy for Offshore Renewable Energy by identifying key actions in the area of maritime planning, upscaling technologies, and a new approach to infrastructure planning and offshore renewables capacity building.

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 Sweden's plan in that context. Nevertheless, the implementation of Sweden'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 expected to be operational on 1 January 2021, **the final plan constitutes a strong basis for Sweden 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, would need to 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**²⁴. In particular, the 'Power up', 'Renovate' and 'Recharge and refuel' flagships are directly related to energy and climate action and to the contents of the final national energy and climate plans. Measures under the 'Reskill and upskill' flagship 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 Sweden's green transition while contributing to economic recovery. In order to follow the European Council's commitment to achieve a climate mainstreaming target of 30% for both the multiannual framework and Next Generation EU, **Sweden'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 Sweden's final national energy and climate plan, and on the investment and reform priorities identified for Sweden in the European Semester, **the Commission services invites Sweden to consider, while developing its national recovery and resilience plan, the following climate and energy-related investment and reform measures:**

- Measures supporting investment in energy efficiency, including by investing in the renovation of buildings;
- Measures supporting new infrastructure for the electrification of road transport, in particular recharging infrastructure for electric vehicles and investment in research and innovation related to green technologies;
- Measures to continue the phase-out of fossil fuels subsidies against a clearly defined schedule.

²⁴ Cf. Annual Sustainable Growth Strategy 2021 (COM(2020) 575 final), pp. 9-12.

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

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

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

Programme	Amount	Comments
Cohesion policy funds (ERDF, ESF+, Cohesion Fund)	1.9	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.	6.3	In current prices.
Recovery and Resilience Facility	3.7	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	0.1	Indicative: average of actual 2018 and 2019 auction revenues. The amounts in 2021 to 2027 will depend on the quantity and price of auctioned allowances.

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

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

Note to both tables

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

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

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

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

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

Recommendations		Assessment	
Decarbonisation - GHG	Develop its strategy for achieving the commitment under Regulation (EU) 2018/841 of the European Parliament and of the Council (8) that land use, land use change and forestry (LULUCF) emissions do not exceed removals, based on the underpinning accounting rules. Pay particular attention to assessing the impact of policies and measures on emissions trading system, effort sharing and LULUCF sectors.	Partially addressed	The NECP does not contain sufficient analyses of emissions and removals from the LULUCF sector on a) its contribution to the 2030 GHG-related targets or on b) how the sector emissions will be affected by measures to promote the use of biomass in Sweden. Sweden expects the LULUCF sector to continue contributing annual net removals until 2045 but gives little detail on how existing and planned policies would achieve this or on expected changes under LULUCF accounting rules until 2030 and beyond. For the ETS sectors, the NECP lists a number of policies (e.g. carbon and energy tax on cogeneration and heat generation, the Industry Leap) designed to promote technical advances and reduce emissions from installations in Sweden’s energy system. It notes that these measures complement the EU ETS and may increase the number of allowances in the Market Stability Reserve. The NECP does not state whether Sweden expects to meet its ESR target in 2030 with existing policies and measures. The plan lacks an impact analysis of these measures and a breakdown of forecast data into ETS, ESR and LULUCF sectors.
Decarbonisation - renewables	Confirm the welcome level of ambition of a 65% renewable energy share for 2030 referred to in the draft integrated national energy and climate plan, as Sweden's contribution to the Union's 2030 target for renewable energy pursuant to Article 3 of Directive (EU) 2018/2001 of the European Parliament and of the Council (9) and to Article 4 of Regulation (EU) 2018/1999.	Fully addressed	The final NECP states that Sweden will have “a national contribution of 65% share of renewable energy in gross final consumption in 2030,” which is based on the Swedish Energy Agency’s 2016 reference scenario and confirmed by the Swedish government.
	This contribution should be underpinned by detailed and quantified policies and measures that are in line with the obligations laid down in Directive (EU) 2018/2001 in a way that enables a timely and cost-effective.	Partially addressed	The final plan provides very few additional policies and measures targeted to RES compared to the draft plan. The initial assessment suggests that the policies and measures reflected in the plan are not sufficient to meet the targets.

	An indicative trajectory that reaches all the reference points pursuant to Article 4(a)(2) of Regulation (EU) 2018/1999 should be included.	Fully addressed	The indicative trajectory reaches all reference points.
	Additional information relating to overcoming administrative burden should also be included, as well, as additional details on the enabling frameworks for renewable self-consumption and renewable energy communities, in line with Articles 21 and 22 of Directive (EU) 2018/2001.	Partially addressed	The plan does not include additional information on measures to facilitate the uptake of power purchase agreements. Market participants consider that this practice is already widespread. The NECP mentions that an assessment is underway of which authority could be designated as the single contact point for permit granting. In addition, work is ongoing to simplify some support schemes and to identify measures needed to implement Articles 21 and 22 of RED II. None of this has as of yet been implemented into national legislation or administrative frameworks.
	Additional details should be provided in relation to the specific measures planned to ensure the long-term sustainability of the use of biomass in the energy sector, given the important contribution of biomass to Sweden across the energy mix.	Partially addressed	The plan highlights an ongoing investment programme under the rural development programme for the plantation of multiannual crops and the construction of bioenergy plants. It also highlights several ongoing research into bioenergy. Specifically, regarding the promotion of the use of biomass including its sustainability, the government has set up a delegation to work on the circular economy. This work will include developing a strategy for the transition to a circular and bio-based economy. However this has not yet been implemented into the national legislation or administrative frameworks.
Energy efficiency	Increase the level of efforts towards reducing final energy consumption in view of the need to collectively reach the Union's 2030 energy efficiency target, and support it with policies and measures that would deliver additional energy savings by 2030.	Partially addressed	Sweden increased its level of ambition on energy efficiency modestly. It included some new information on policies and measures in the final plan, but for many measures the expected savings are not quantified. New modelling was carried out for the final plan. Depending on the assumption for GDP growth, the contribution can be considered as more or less ambitious, but overall the target contribution set for energy intensity can be deemed to be higher than it was in the draft plan. The NECP provides some information on the renovation of the building stock but further details on the indicative milestones and relevant policies and measures will be given in the long-term renovation strategy.

Energy security	Specify the measures supporting the energy security objectives on diversification and reduction of energy dependency, including measures ensuring flexibility and electricity generation adequacy in light of the ambitious renewables target.	Largely addressed	Sweden has included additional information on system resilience in view of the renewable energy target, including measures on regional cooperation between the Nordic countries. There could be more detail provided regarding policies and measures to ensure system flexibility.
Internal market	No recommendation	n/a	-
Research, innovation and competitiveness	Clarify the national objectives and funding targets in research, innovation and competitiveness, specifically related to the Energy Union, to be achieved between 2023 and 2030, so that they are readily measurable and fit for purpose to support the implementation of targets in the other dimensions of the integrated national energy and climate plan. Underpin such objectives with specific and adequate policies and measures, including those to be developed in cooperation with other Member States, such as the Strategic Energy Technology Plan.	Partially addressed	The plan identifies relevant areas where R&I action is needed. However, the objectives lack a specific timeline and quantified targets. For a substantial part of the objectives, specific policies and measures are presented only up to 2027. For that reason, the action planned on research and innovation is considered sufficient. As regards competitiveness, the objectives are barely mentioned. By contrast, the plan clearly covers cooperation with the Strategic Energy Technology (SET) plan.
Investment needs	Provide a general overview of the investment needs to achieve the climate and energy objectives, and a general assessment of the sources of that investment, including appropriate financing at national and regional level.	Partially addressed	Except for electricity production capacity and distribution infrastructure, the NECP does not contain an assessment of the investment needs or funding sources targeted to achieve Sweden's climate and energy objectives.
Regional cooperation	Intensify the already good regional cooperation arrangements between Nordic countries (Denmark, Finland, Iceland, Norway and Sweden), extending them to new areas and broadening the geographic reach to include the Baltic States (Estonia, Latvia and Lithuania). The focus of the regional exchanges should be on internal energy market and energy security areas, in view to the changes in the electricity systems accommodating higher shares of renewable electricity, which will increase electricity import and export and enhance the need for system flexibility.	Fully addressed	In terms of regional cooperation in preparing the plan, emphasis was given to engagement with the Nordic Council of ministers, under which an ad hoc group was set up as a forum for cooperation on the NECPs. It also made reference to the discussions on cooperation in the context of BEMIP and the North Seas Energy Cooperation (NSEC). Regional cooperation is still ongoing in multiple areas. Sweden shared its final plan with the Nordic countries for comments. Since the draft NECP, the Nordic countries have signed a declaration on carbon neutrality and formulated a 2030 vision for the Nordic electricity market, described in the final NECP.

Energy subsidies	List all energy subsidies.	Largely addressed	The plan includes information on renewables and fossil fuel subsidies. The categories and figures on fossil fuel subsidies listed in the plan are in line with recent Commission analyses on energy subsidies. Although the plan mentions renewable energy subsidies measures, it does not give total amounts.
	List in particular fossil fuels subsidies.	Fully addressed	Compared to the draft, the final plan includes a list of fossil fuel tax breaks and corresponding tax expenditure. The categories and figures on fossil fuel subsidies listed are in line with the Commission's third report on energy prices and costs in Europe.
	List actions undertaken as well as plans to phase them out.	Not addressed	In the final plan, Sweden calls for phasing out environmentally damaging subsidies both in Sweden and worldwide, though Sweden has not set deadlines for phasing out energy subsidies.
Air quality	Include an analysis of the interactions with air quality and air emissions policy, presenting the impacts on air pollution for the various scenarios, providing underpinning information, and considering synergies and trade-offs effects.	Largely addressed	The NECP includes a general discussion on possible effects on air quality, with information on projected air pollutant emissions. The recommendation is partially addressed in terms of the impacts on air pollution. The plan highlights the opportunities that energy efficiency measures offer to improve air quality and stresses the strategic importance of the transport sector for air quality. However, it does not present detailed impacts on air pollution for the greenhouse gas and renewable energy scenarios. The recommendation to provide underpinning information is fully addressed since analyses of the impact of NECP measures on air quality are provided. Regarding synergies and trade-off effects, the recommendation is partially addressed. The plan notes that transport and use of bioenergy offers synergies and trade-offs between air pollution control and climate.
Just transition	Integrate just and fair transition aspects better, notably by providing more details on social, employment and skills impacts of planned objectives, policies and measures.	Not addressed	Section 5.2 gives an overview of the macroeconomic impacts but does not go into just transition aspects. It mentions that some sectors will benefit, and other sectors will decline as a result of the transition. In the section on energy poverty (2.4) there is

			only an explanation that in Sweden, no distinction is made between energy poverty and other forms of poverty. The plan does not include any social, employment, or skills impacts of the planned policies, measures or objectives.
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