



Analysis of National Energy and Climate Plans including commentary on their attention to incentivising investment in R&I

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Disclaimer

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List of acronyms

DH: District Heating

EED: Energy efficiency directive

EPBD: Energy performance of buildings directive

IWG5 Buildings: Implementation Working Group on Energy Efficiency in Buildings

LNG: Liquefied Natural Gas

NECP: National energy and climate plan

NZIA: EU's Net Zero Industrial Act

NRRP: National recovery and resilience plan

NZEB: Nearly Zero Energy Buildings

RED: Renewable energy directive

RES: Renewable energy Sources

RHC-ETIP: European Technology and Innovation Platform on Renewable Heating and Cooling

RIC: Research, Innovation and Competitiveness (5th dimension of NECP)

SET Plan: Strategic Energy Technology Plan

Executive Summary

This report seeks to identify policy measures to boost the introduction of innovative technologies at pre-commercial or at early commercial stage that have potential to decarbonise Europe's buildings in the coming decade. The analysis looks specifically into several drafts published in the summer-autumn of 2023 of National energy and climate plans (NECPs). These documents presented by national governments summarise EU countries' proposed policies to modernise and decarbonise their economies.

This analysis looks at eight areas of NECPs with potential to support innovation in buildings: (1) Starting point; (2) public buildings; (3) target for innovative renewable energy; (4) links to SET Plan; (5) phaseout of fossil fuel boilers; (6) financial incentives for R&D; (7) skills; (8) other measures.

The section on "Methodology and areas of NECP analysis" explains the rationale behind each area, how they link to innovation in the buildings sector and to policy measures in EU legislation under the Fit for 55 package. The outcomes are presented as general recommendations in the section "Main results". More details and country-specific recommendations can be found in the "country fiches" in Annex I. The NECPs of the following six countries were analysed: Spain, Italy, the Netherlands, Slovakia, Sweden and Germany.

Introduction

One of the main messages from the IEA's flagship report "Net Zero by 2050" is that "to reach net zero [carbon emissions] almost half the reductions will have to come from technologies that are currently only at the demonstration or prototype phase."¹ As Europe and other parts of the world make massive investments into buildings and energy infrastructure to speed up their transition into carbon free economies, it is essential to continue developing and introducing new technologies to market that will - among other things - reduce overall costs and improve sustainability.

The construction sector is key part of this. All buildings in the EU combined are responsible for around 40% of its energy use and 36% of its carbon emissions when counting construction, usage, renovation and demolition.² To improve efficiency and reduce both material and energy impact, it is essential to speed up the integration of innovative building products and services. Some of the areas that show great promise are new insulation materials, digital solutions, advanced ventilation systems, thermal storage and renewable energy production (both onsite and offsite).

In this context, the Implementation Working Group on Energy Efficiency in Buildings ([IWG5 Buildings](#)), a sub-group of the [Strategic Energy Technology \(SET\) Plan](#), regularly discusses technology advances and gaps in the built environment. IWG5 Buildings brings together researchers, industry and policy-makers from the national and EU levels to set innovation targets in buildings, as defined in its [Implementation Plan](#). In 2023 the group prepared two technical white papers on: [Prefabricated Active Modules for Façades and Roofs](#); [Sustainable new building materials](#).

The Fit for 55 defines the climate and energy objectives for 2030 and the European Climate Law sets the aim of climate-neutrality by 2050. The NECP process will be a crucial step towards translating this into concrete policies and measures that mobilise all levels of government, industry and society at large. In this context, at the time of this publication several European networks were preparing comments and recommendations on NECP drafts. Relevant examples are the report by [The Coalition for Energy Savings](#) titled "[Planning for the 2023 EED: Are EU countries up to the task?](#)", also [CAN Europe's report](#), "[Time to step up national climate action](#)".

To avoid overlaps with other analyses, this report focuses on recommendations on measures to boost the application of innovative technologies in buildings. It will be presented to the experts of IWG5 Buildings and other relevant actors, with the aim to contribute to the discussion around policies for 2030 and beyond.

¹ IEA, 2021: [Net Zero by 2050](#)

² European Commission, 2020: [Energy efficiency in buildings](#)

1. Methodology and areas of NECP analysis

1.1 Legal basis and structure

The NECP review process is ruled by the Governance Regulation [2018/1999](#), which includes the report's structure under Annex I. The European Commission provided further information on the 2023-24 NECP review process in its "Guidance to Member States for the update of the 2021-2030 national energy and climate plans" [2022/C 495/02](#). It is expected that the 2023-24 drafts go beyond the previous NECPs from 2019 and incorporate the raised ambition of the new Fit for 55 measures and revised targets. The measures analysed are from mainly three EU directives:

- [Renewable Energy Directive](#) - adopted in October 2023, to be published in late 2023
- [Energy Efficiency Directive](#) 2023/1791 - published in Official Journal
- Energy Performance of Buildings Directive. Status: in trilogue negotiation as of October 2023. [European Parliament's position](#); [Council of the EU's General Approach](#)


The timeline for Member States to publish their NECPs is as follows: drafts by June 2023; final NECP versions by June 2024 that integrate comments from the European Commission (and other stakeholders). Most of the Fit for 55 legislation was either adopted or agreed before the summer of 2023, giving at least a few months to Member States to add measures in their NECPs. The EPBD - a key text for buildings – was the exception with no agreed text by October 2023. For these reasons, only one policy measure was considered in this analysis, based on the positions of the co-legislators.

At the time of publication of this analysis (December 2023), 21 NECP drafts out of the EU27 countries were published, with several countries missing the deadline including Poland. Out of these 21 drafts, this report opted to do a closer analysis of six, choosing countries based on population size and geographical spread across EU subregions. The countries studied where: Spain, Italy, the Netherlands, Slovakia, Sweden and Germany.

The following section "Main results" presents general trends and recommendations, along with numerical ratings for the innovation measures in the countries that were studied. Annex I of this report has "country fiches" presented as a table for each of the countries studied, with a short analysis, recommendations and numerical ratings for the eight areas that were assessed. The recommendations are indicative and should be considered by Member States as an encouragement to continue developing their plans.

1.2 Areas of analysis

Our analysis spanned the 8 areas below. Each area has a short text description in the country fiche, followed by a numerical rating out of 10 points. Low scores (1-3) indicate that either the EU measure is not directly mentioned in the NECP, or instruments are counterproductive/ineffective. Scores in the mid-range (4-6) show that the EU measure is addressed to an extent, but more efforts are needed. High scores (7-10) indicate that the EU

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measure is well addressed with a set of targeted instruments and/or at least one instrument goes beyond what is required.

1. Starting point - This is a qualitative comparison of the broad lines in terms of ambition and narrative between the previous final NECP from 2019 and the 2023 draft. It helps to introduce the draft NECP and to check whether there is a risk business as usual scenario or a substantial increase in efforts.
2. Public buildings – Buildings owned and/or operated by public bodies have the potential to showcase mature innovations with high environmental value, that otherwise are not as price-competitive as more established technologies (e.g. low carbon construction materials; building-integrated PV). Two provisions under the EED are considered:
 - [Article 6 on exemplary role of public buildings](#) requiring that “at least 3 % of the total floor area of heated and/or cooled buildings that are owned by public bodies is renovated each year to be transformed into at least nearly zero-energy buildings or zero-emission buildings”
 - [Article 7 on public procurement](#) requiring that public authorities “purchase only products, services, buildings and works with high energy-efficiency performance”. We also assess whether, countries’ public procurements also consider “wider sustainability, social, environmental and circular economy aspects”, which is encouraged by Article 7.
3. Target for innovative renewable energy – A new target was recently created for innovative renewable energy technology. This is expected to support a variety of RES technologies to enter the market, some producing energy directly in buildings (e.g. integrated PV; next-generation heat pumps), others providing offsite energy via grids (e.g. floating offshore wind; ocean energy; concentrated solar power; biomethane) and DH networks (e.g. next generation geothermal or large heat pumps). The innovative RES technology target is defined in RED as follows:
 - [Article 2 on definitions](#): “innovative renewable energy technology” means renewable energy generation technology that improves, in at least one way, comparable state-of-the-art renewable energy technology or that renders renewable energy technology that is not fully commercialised or that involves a clear degree of risk exploitable;
 - [Article 3 on RES target](#): “Member States shall set an indicative target for innovative renewable energy technology of at least 5 % of newly installed renewable energy capacity by 2030.”
4. Links to SET Plan – The SET Plan is an important tool to coordinate national energy research efforts at EU level and to set common objectives at sectorial level, such as speeding the deployment of new energy efficiency and digitalisation technologies in buildings. The [Governance Regulation](#) 2018/1999 requires under article 25 that NECPs translate “to a national context the SET Plan objectives and policies”, it also asks countries for “cooperation with other Member States in... policies and measures in the context of the SET Plan”. It is expected that Member States integrate SET Plan priorities and elements into their R&D policies. For buildings, the most relevant SET Plan groups are IWG5 buildings and RHC-ETIP.
5. Phaseout of fossil fuel boilers – Individual gas boilers dominate heating in most EU countries due to several factors including low a price of installation, high flexibility and

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extensive gas networks. Without clear dissuasive measures, this dependence on natural gas can put at risk Europe's decarbonization efforts and its energy security. Moreover, there is a risk that gas boilers block the rollout of clean heating technologies and innovation, particularly in existing buildings. The authors of this report consider that giving a policy signal that gas boilers will be phased out is a precondition for a big share of consumers and businesses to move away from this technology (as it is being done in many countries with coal and diesel). The EPBD's European Commission proposal and the Council's General Approach, allow for clear legal basis for national bans of fossil-fuelled boilers. The European Parliament's position goes further, supporting a mandatory ban of fossil fuels in buildings by 2035 or 2040 at the latest.

6. Financial incentives for R&D – Here we evaluate the adequacy of incentives for R&D relevant for buildings (usually described under the dimensions “Energy Efficiency” and “Research, Innovation and Competitiveness”).
7. Skills – To succeed with the clean energy transition it is essential to have a well-trained and large work force along the whole chain. For example, the recently created [Renewable Energy Skills Partnership](#) estimates that the EU will need another 3.5 million jobs in the renewable energy sector to meet its 2030 targets. EU countries will need robust strategies to skill and reskill workers in the construction sector to design, manufacture and install new equipment. It is expected that draft NECPs are based on solid impact assessments that consider skills. As legal basis for this point, we take point 5.2 of the Governance Regulation on “Macroeconomic and, to the extent feasible, the health, environmental, employment and education, skills and social impacts, including just transition aspects (in terms of costs and benefits as well as cost-effectiveness) of the planned policies and measures described in section 3 at least until the last year of the period covered by the plan, including comparison to projections with existing policies and measures.”
8. Other measures – This area allows to bring up measures and instruments particular to a country that may not be covered by the previous seven points. There are often measures that go beyond EU requirements and that could serve as best practice to other EU Member States. For example it can be round tables with public authorities and industrial sectors to agree on sectorial energy efficiency targets, or mainstreaming measures to reduce embodied carbon emissions in buildings.

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2. Main results

This analysis looks at the results of the six countries fiches (see Annex I) from Spain, Italy, the Netherlands, Slovakia, Sweden and Germany. It outlines their different national priorities, the instruments to achieve of them and judges their ambition. There are also several similarities between plans that will be discussed below.

The Starting point (1) sets analyses the country's NECP drafting process. Some countries struggled with the tight deadlines of integrating fresh EU objectives of the revised directives into their plans. Italy and Spain integrated EED and RED provisions, Germany went further by also trying to adopt EPBD measures (that were still under negotiation in late 2023), while the other three countries mostly did not include measures from these 3 directives, resulting in big gaps in their drafts.

We recommend that countries with significant gaps resubmit a complete draft before the spring of 2024 to allow for public scrutiny before they publish their final versions in June 2024. Many impact assessments required under the Governance Regulation are missing in all six NECP drafts that were analysed in this report. We recommend completing and strengthening impact assessments on key objectives and targets, preferably submitting them in an updated draft before the final deadline in June 2024. Overall, we recommend that all six countries resubmit a second NECP draft in spring of 2024 to give 1-3 months to stakeholders to comment on them.


The Public building (2) decarbonisation efforts were significant in the plans of Slovakia, Spain, Italy and Germany, where green public procurement was often combined with financial instruments for renovation. The remaining two countries did not address the EED articles on this subject.

The new target for innovative renewable energy (3) was not addressed comprehensively by any country although, Spain's NECP contains a measure appearing to be inspired by the target. We recommend that plans have a sub-section for this target listing specific RES technologies and their projected installed capacity alongside measures to support these technologies and to keep the list up to date.

Links with the SET Plan (4) were made by all six countries and several have also mentioned Mission Innovation, Horizon Europe and the European Co-funded Partnerships, like the Clean Energy Transition Partnership. However, none of these drafts set out a country's vision for its contribution to the SET Plan.

On the phase-out of fossil fuel boilers (5), five countries had no provisions. Germany had a partial ban for new buildings that still allowed for hybrid heating systems with up to 35% fossil fuels. Slovakia had measures capable of reducing the prevalence of gas boilers: increasing taxation on natural gas and ramping up district heating. Several of the other countries had counterproductive measures, including tax cuts on fossil fuels and plans to build new gas infrastructure.

Financial incentives for R&D (6) is an area that was reasonably well covered by all six drafts. A concern is that several EU member states rely mostly on EU money (including the Recovery and Resilience Facility) to cover their research and investment needs. We recommend that


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countries try to strike a balance between grants and other financial instruments like loans and guarantees.

The topic of Skills (7) missed in all plans an assessment of gaps in green jobs and for the most part did not propose concrete measures to address these gaps. Germany, Spain, Italy and Sweden still presented several relevant programmes and information tools for workers.

The Other measures (8) presents innovative elements with high potential for building technologies, such as starting a programme for pre-commercial public procurement and setting decarbonisation objectives in partnership with industry and public authorities. Details on best practices can be found in the country fiches under point 8.

All six plans showcase well-defined climate & energy strategies, as well as a genuine effort to reflect on how to update their policies. We consider that to align with the agreed Fit for 55 objectives, all plans need to be further developed in terms of ambition and in defining in more detail what combination of instruments are needed to implement measures effectively. The iterative review process built into NECP-writing offers this opportunity, especially where Member States solicit comments on their drafts. At the time of publication of this report, EU Member States had seven more months to collect views and finetune their plans.

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Conclusion

Weak NECPs would put Europe's decarbonisation targets (and credibility) at risk, but fortunately the mechanics of NECP-writing process allow gaps and inconsistencies to be identified, queried and corrected. They allow ambition across the Member States to be "levelled-up" if the European Commission draws attention to best practice in one NECP that other countries could replicate. NECPs are enriched from the input of industry, academia and civil society; they must be closely involved in the substantial work that many NECPs still need before a version that can be called 'final' is ready. Second drafts [should be put on the EC's website](#). In case that a plan is not ready or is inadequate by June 2024, A Member State should not compromise on quality nor detail, instead the European Commission should provide flexibility with the timeline (possibly allowing a country to hand in parts later).


As a leader in energy efficiency and RES innovation, Europe is well positioned to upscale and bring to market new technologies. The direction of travel is clear, but there is no time to slow down. The biggest hurdle of the coming years may not be technological or financial, but the outsized share of the market taken by natural gas boilers as the dominant heating system. To meet our 2030 objectives for buildings, a new political impetus may be needed from the European level (EPBD trilogues/new legislation) or from pledges of a group of governments (COP process/informal coalitions).

Annex I: Country fiches


Spain country fiche – Overall score 47/80	
Area's N° and title	Assessment of measures, recommendations and score
1. Starting point	<p><u>Measures and recommendations:</u></p> <p>Spain's 2030 energy efficiency target in the 2019 final NECP was of 39.5% under the PRIMES model. The 2023 NECP draft presents a significant increase with savings of 44% by 2030.</p> <p>The updated 2023 draft increases the pace of renovations between 2021 and 2026, mainly with the help of the additional funding from its NRRP (see in 2023 draft and 2019 NECP the figure “Figure 3.5. Annual indicative forecast of dwellings with an energy upgrade, 2021-2030”). However, the rate of renovated dwellings between 2027 and 2030 remains the same under both the 2019 NECP and the 2023 draft. Spain should consider raising the number of renovations in 2027-30, foreseeing the introduction of ETS to buildings (carbon pricing) and new funding opportunities under the Social Climate Fund.</p> <p>The requirements on public sector buildings are significantly increased, particularly via the creation of Measure 2.11 to support larger investments to renovate public buildings. The 2023 draft measures for energy efficient public procurement are also strengthened (Measure 2.17) and new instruments are foreseen to encourage public procurement for innovative and pre-commercial technologies (Measure 5.5).</p> <p><u>Score:</u> 7/10</p>
2. Public buildings	<p><u>Measures and recommendations:</u></p> <p>Measure 2.11 ‘Energy efficiency in buildings in the tertiary sector’ commits to meeting the targets to renovate the public building stock at a rate of 3 % per year and to reduce the consumption by public bodies by 1.9 % per year in final energy compared to 2021. The plan estimates a total of 2.000€ million going to the renovation of public buildings under the EU NRRP. This is a substantial amount, much of it being earmarked for local and regional administration, with social housing being a priority, where under the EED renovating these public buildings is optional. At national level the FNEE 2022 is</p>

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	<p>expected to finance 100€ million in energy renovations of public buildings. This shows that the country relies mainly on EU funding to renovate its public building stock, with limited dedicated financing tools at national and subnational level.</p> <p>Other non-financial interventions of interest in this measure includes an online platform that was developed by the IDAE to train energy managers in public buildings. The plan also foresees to prepare guides and manuals on energy efficiency for public sector employees as well as a targeted information campaign. Additional policy measures will be taken to recover and recycle materials from the renovation and demolition work that will be needed, thereby improving material efficiency and reducing operational carbon. These measures are interesting, although there is no mention of timelines and budgets, or of how these actions would be shaped and executed, which is a shortcoming.</p> <p>The measure 2.17. “Public sector: accountability and efficient public procurement energy” aims to introduce in public administrations the purchase of goods, works and services with the lowest environmental impact and the highest energy efficiency possible. The measure seeks to train and bring in contact energy managers of public buildings. It is expected to systematically include in public procurement tenders for energy with environmental clauses. This shows that the NECP is compatible with provisions of the EU’s NZIA. It will also raise awareness among staff on energy use. The measures target primarily national government buildings, although there are mentions of regional and local levels. It is advised that more emphasis is put at the local and regional level, with the central government informing and supporting as much as possible subnational authorities.</p> <p><u>Score:</u> 8/10</p>
3. Target for innovative renewable energy	<p><u>Measures and recommendations:</u></p> <p>Measures to support several innovative RES sectors are listed, although the plan mostly lists actions that were dated at least 1-2 years before target was decided, including projects funded by the NRRP and government sectorial strategies. Less deployed renewable energy technologies, like geothermal, are mentioned although as something to be deployed in the future and with little detail as to how. There is no mention of the volumes needed in Spain to meet the target of innovative RES. The next version of the NECP report should calculate the total of innovative RES needed by 2030 in installed capacity, and make a split in capacity per innovative RES technology.</p> <p><u>Score:</u> 5/10</p>

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4. Links to SET Plan	<p><u>Measures and recommendations:</u></p> <p>Spain mentions the structure of the SET Plan and its contribution to its implementation to all working groups in the draft's measure 5.2. The 2023 draft keeps the previous technology priorities to decarbonise buildings under SET Plan Action 5 and it adds 2 more important elements: heat pumps; Smart energy management systems in buildings. It is positive that Spain is open to the "creation of new working groups for other low-carbon technologies". However, the link is missing to actions and objectives at national and sub-national level. Additional efforts to prioritise objectives would be useful.</p> <p><u>Score:</u> 5/10</p>
5. Phaseout of fossil fuel boilers	<p><u>Measures and recommendations:</u></p> <p>The draft's main measures on buildings (2.8-2.13, 2.17, 2.19-2.23) do not mention a timeline to phase out new or existing fossil boilers. This will make decarbonization by 2050 more difficult and it risks putting more strain on people and businesses once ETS applies to buildings in 2027. Spain should consider introducing end dates for existing and new fossil boilers in line with its estimated GHG emission trajectory and compatible with the EU climate law.</p> <p>Measure 4.9. "Gas market integration" plans to make new investments into gas infrastructure, such as regasification plants and storage capacity. This is expected to help to maintain the dominance of gas boilers in Spain. The resources should go instead to additional measures in energy efficiency and renewables, with the purpose of reducing gas demand to the point that no new methane infrastructure is needed (other than essential investments at distribution level).</p> <p><u>Score:</u> 1/10</p>
6. Financial incentives for R&D	<p><u>Measures and recommendations:</u></p> <p>Measure 2.22 on "Financial measures: National Energy Efficiency Fund" is a continuation of an existing fund for industry to support the renovation of buildings. The fund continues to envisage combining its resources with other funds. This is positive, although the measure does not list additional actions. The NECP should provide direction for areas of priority.</p> <p>Measure 2.8 on "Energy efficiency in existing buildings in the residential sector" has significant resources for the period of 2021-2030 with 3.067€ million. It is expected that it will attract a further 23.772€ million of private investment. Tax</p>


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	<p>deductions and exemptions are offered, which should also encourage renovations. Nonetheless, most of the money for renovations had already been committed under the RRF and European structural and investment funds, which pre-date the adoption of the EED.</p> <p><u>Score:</u> 7/10</p>
7. Skills	<p><u>Measures and recommendations:</u></p> <p>Measure 2.19 on “Training in energy efficiency” is based mainly on the NRRP measure C23.I3 “New skills for the green, digital and productive transition”, which commits to have given at least 825.000 trainings of an average of 65 hours each by the end of 2025, with a minimum climate expenditure of 30% and also 30% for digital training. The 2.19 NECP measure intends to use this NRRP mechanism to finance training and re-skilling for workers in the building, transport and food sectors. While this is good use of EU funding, this money had already been committed to training people for green and digital jobs. It is unclear how much of this money will go to the buildings sector and whether other priorities covered in NRRP C23.I3 will receive less funding as a consequence. Measure 2.19 should remain linked to the NRRP; it should receive fresh funding; and the amounts to its three target areas should be broken down.</p> <p><u>Score:</u> 7/10</p>
8. Other measures	<p><u>Measures and recommendations:</u></p> <p>Measure 5.5. on “Public Procurement of Innovative Technology (CPTI) and Pre-Commercial Technology (CPP)” is a promising tool to bring new technologies with innovative goods and services to market. The national Law on Science foresees this novel tool, making Spain a forerunner. This goes beyond the measures evaluated in the public procurement section and it is a clear incentive for pre-commercial technologies. We recommend to earmark funding for this measure in the next version of the NECP and ideally include sectorial priorities.</p> <p>As described in measure 5.16 “Mission Innovation 2.0, Spain is active in three missions, where Urban Transition has particular relevance for the building sector. This is positive but the plan could give more details of what it wants to do in the coming years in Mission Innovation and indicate tentative budgets.</p>


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	<p>Spain has the policy that “the maximum period of validity of the Energy Efficiency Certificate is reduced to 5 years when the energy rating is G, instead of 10 years for all other cases,” which is an interesting (albeit soft) measure to focus the minds of the owners of inefficient buildings.</p> <p><u>Score:</u> 7/10</p>
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Italy country fiche – Overall score 46/80	
Area's N° and title	Assessment of measures, recommendations and score
1. Starting point	<p><u>Measures and recommendations:</u></p> <p>The draft plan generally acknowledges the new Fit for 55 objectives, including those in EED and RED. It also expects to match a higher ambition in EPBD (under negotiation) by increasing “the renovation rate of buildings, with significant penetration of technologies for electrification of consumption, automation and control, and widespread deployment of dispersed surface insulation.”</p> <p>The plan has a focus on clean energy manufacturing and makes a link to the EU’s NZIA. It states that its “focus is on net-zero emission technologies at TRL 8 or higher level, which are expected to make a significant contribution to the Fit for 55 target of reducing net greenhouse gas emissions by at least 55 %”.</p> <p>On the downside, the country expects to develop new LNG infrastructure and build new gas-powered plants to meet electricity peaks.</p> <p><u>Score:</u> 6/10</p>

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2. Public buildings	<p><u>Measures and recommendations:</u></p> <p>The energy efficiency programme PREPA (previously PREPAC) has been reviewed recently following commitments made in the NRRP. New measures will make an inventory of the public buildings falling under the renovation obligations, there will be a monitoring system of reforms and also a regulatory framework linking national renovation mechanisms with the local and regional level. This coordination between the national and sub-national level, as well as between different existing instruments, is important and should be done in close consultation and cooperation with regional-local authorities. It is suggested to review the coordination measures that were proposed under the NRRP to ensure that they are in line with EED and EPBD requirements.</p> <p>Italy claims undefined “operators” in energy are “required” “to equip themselves with big data capabilities both to improve their operations and to offer new services” by taking advantage of “the accessibility of a huge amount of data generated outside the energy system (e.g. IoT).” This is promising, but the European Commission should probe Italy on how exactly the access to this data is to be ensured, with reference to the Data Act and or to the Common European Energy Data Space. The closest Italy gets to referencing CEEDS is that it considers a “main area of research” to be “[...] architectures that provide widespread access to shared scalable computing resources.”</p> <p>A study is being carried out on whether to create “Standard Energy Performance Contract for Public Buildings” that could help public bodies to reduce or eliminate investment costs, where the risks would be carried by a private partner. This is positive. Ideally the study is ready in the coming months and the plan can include more details, or if not, at least include provisions on its potential implementation.</p> <p>The draft mentions green public procurement provisions that were set out under the NRRP. In addition to committing to high environmental and transparency standards for public purchases, there are provisions to “develop innovative products and services that are not yet available on the market” under the Innovation Partnership. Both instruments have great potential. They should be accompanied in the final NECP with a list of the types of buildings covered, ideally including all publicly held and/or run buildings by authorities at local, regional and national level.</p> <p>The draft proposes to improve “Cooperation between central and local authorities on energy efficiency” that will foster the dialogue between different administrative levels to improve instruments and apply monitoring. A governance model to set up dialogue on energy efficiency across the public sector is being prepared. We recommended that this new instrument looks into at least the following two priorities: reduce carbon footprint of public administration at all levels; discuss measures and best practice that can be shared to support the decarbonization of buildings in the private sector.</p>
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	<p>Lastly, the draft lists a series of large investments under the NRRP for schools, social housing, theatres and other buildings. The government should consider in view of the increased ambition of the 2030 targets whether additional funding for public buildings is required.</p> <p><u>Score:</u> 8/10</p>
3. Target for innovative renewable energy	<p><u>Measures and recommendations:</u></p> <p>680 M EUR of grant funding is budgeted for 200 MW innovative renewable energy technologies. This money is from the Resilience and Recovery Programme and was first mentioned in Italy's NRRP. There is no update on how much of it has been spent so far, or on what, which is a shortcoming. The average CAPEX, is >3 €/Wp, 10x more than PV module prices (at non-dumping prices), giving the impression that only technologies far from the market will be supported. The European Commission should ask for details.</p> <p>The country recognises that measures beyond CFDs and PPAs might be needed "to support plants based on innovative technologies." A piece of legislation to support the deployment of innovative renewables "FER-2", awaited since 2021 is "being drawn up" to support "under competitive procedures" 4.5 GW of capacity in offshore wind, ocean energies, thermodynamic solar energy, geothermal and PV (floating and in agriculture). Given the amount of time Italy has already taken to gestate this "FER-2", the European Commission should ask for more details than are currently offered.</p> <p>These elements are positive and the plan could further develop this, with the following measures:</p> <ul style="list-style-type: none"> - Indicate that the measures and objectives in the section 3.1.2 "Ad hoc tools for new plants based on innovative technologies" are linked to the target for "innovative renewable energy" of RED (currently there is no direct mention of the target). - Include innovative heat pumps in the scope of section 3.1.2 so that this measure helps the energy performance of buildings <p><u>Score:</u> 6/10</p>
4. Links to SET Plan	<p><u>Measures and recommendations:</u></p>

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	<p>Section 3.5 on “Research, innovation and competitiveness” claims high involvement of Italy in SET Plan Implementation Working Groups. Yet the section remains vague on how this has translated in allocating funding or fostering cooperation for projects. We recommend that the plan gives indications of Italy’s priority areas in the SET Plan, if possible divided between relevant groups (e.g. individual IWGs and ETIPs). It is also possible to include ideas to increase the SET Plan’s impact and visibility.</p> <p>Italy has a mechanism to mirror ETIPs nationally: “The national contact points of each [IWG] have in turn set up ‘consultation groups’ composed of representatives of industry, research and academia, able to provide qualified input to [Implementation Plan] drafting.”</p> <p>Italy is supportive of the European Co-funded Partnerships in energy that it participates in (“This cooperation should be consolidated and intensified, if possible also under the Horizon Europe programme.”) Yet it provides highly unattractive funding rates, and concedes that “the Italian system was perhaps not prepared” for them.</p> <p>Italy should</p> <ul style="list-style-type: none"> • Address the problem of low co-funding rates for Italian researchers under CETP or DUT calls • Explain why the “enlarged board’ of H 2020”, which ran until 2021 stopped. <p><u>Score:</u> 5/10</p>
5. Phaseout of fossil fuel boilers	<p><u>Measures and recommendations:</u></p> <p>The draft does not include measures to phase out or reduce gas and oil boilers in the heating sector. The closest to a gas reduction measure is the “White certificates” obligation on gas distributors to achieve savings, although this is not enough to dissuade costumers to change their heating system. Without additional measures to encourage the switch away from fossil boilers in existing installations, industry and households will not get a clear signal to look for cleaner options.</p> <p>Under the Energy Security Dimension, the draft lists the impressive efforts that were made over the last 2 years to diversify gas supply away from Russian imports in line with the REPowerEU strategy. Improving existing infrastructure, increasing storage and adding connections with neighbouring countries is justified to support national and European energy security needs. However, the new regasification projects that are considered in the plan risk becoming stranded assets as Europe phases out fossil fuels and reduces natural gas dependence. The plan’s proposal to build new open-cycle gas-fired thermal</p>

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	<p>power plants to balance the grid undermines the country's decarbonization efforts, risks being uneconomical (assuming they run mainly on more expensive LNG) and would clash with demand for heating.</p> <p><u>Score:</u> 2/10</p>
6. Financial incentives for R&D	<p><u>Measures and recommendations:</u></p> <p>The “Conto Termico” provides grants to individuals and public authorities to make energy efficiency improvements and install renewable energy sources in their buildings. The instrument was created in 2016 and it is popular, with a total of 100.000 applications in 2021 and 496,1€ million in public funds that were granted that year. According to the draft NECP an upcoming reform will extend it to renovations in private non-residential buildings, it will also support investments to connect to district heating and create synergy with renewable energy communities. These additions are positive. Since more buildings and measures will be covered in the future, it is advised to reassess the needs and increase funding accordingly in the final version of the plan.</p> <p>The draft lists the current tax deductions that are available to renovate buildings and it describes an extensive and ambitious revision of these measures to meet the new 2030 targets. Priorities will include simplification, deep renovation, digitalization and renewables. In addition to the estimation of CO2 savings that is presented, it is advised to include in the final version the planned number of buildings and/or built surface that is expected to be renovated with this instrument. Moreover, the plan could give a timeline for the review of these tax measures.</p> <p>The Green Transition Fund was created in 2022 to provide direct and indirect risk capital investments for start-ups and venture capital active in the ecological transition. This instrument can give a boost to the country's clean technology sector. It is suggested to include measures to strengthen and widen it in the coming years, provided that the Green Transition Fund has a good start.</p> <p><u>Score:</u> 7/10</p>
7. Skills	<p><u>Measures and recommendations:</u></p> <p>The plan includes a programme for information and training on energy efficiency to raise awareness among the population. The programme runs until 2030 and has a budget of 3€ million per year coming from carbon allowances. The budget of this</p>


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	<p>pre-existing programme should be increased and adapted to reflect the ambition of the new 2030 targets. Moreover, it should consider the impacts of including buildings in ETS as of 2027.</p> <p>The plan says little on how the country will address the skills gap to achieve the objectives of RED and EED. Lack of energy workers is a problem across Europe that needs solving by creating new training programmes and reskilling workers. The plan should present concrete measures to train and retrain technicians, architects, engineers and among other sectors relevant for buildings. Ideally, the prospect of higher salaries or better benefits should incentivise workers to learn new skills.</p> <p><u>Score:</u> 5/10</p>
8. Other measures	<p><u>Measures and recommendations:</u></p> <p>Section 4.6 of the draft on RIC measures gives a good overview of Italy's participation in European and international energy research, notably via Mission Innovation, Horizon Europe, Important Projects of Common European Interest and the coverage of innovation in its NRRP. It is suggested that the final version of the plan includes its expectations for some of these programmes and what it could do to achieve them. For example, what priorities/challenges does Italy want to focus on under Mission Innovation, or what measures would be needed to increase the success rate of Italian applicants to Horizon Europe calls?</p> <p>Table 75 gives a good overview of public and private spending going to energy R&D up to 2017, but the European Commission should ask Italy to explain the giant leap in private R&I spending 2014->2015, apparently not correlated with an increase in public spending from (the sum of 'A' and 'B' in the table). We suggest Table 75 is extended to make a projection of funding (at least from the public sector) for the years to 2030. In addition, the plan could mention the main focus areas/technologies where it intends to achieve competitiveness results (one example is 1.04 GW of agri-PV (by when?) – more are needed and would also be useful input for the SET Plan's Implementation Plans).</p> <p><u>Score:</u> 6/10</p>


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The Netherlands country fiche – Overall score 35/80


Area's N° and title	Assessment of measures, recommendations and score
1. Starting point	<p><u>Measures and recommendations:</u></p> <p>Some of the Netherlands's 2030 national objectives surpass the objectives from its 2018 NECP. This was done via revisions of national legislation over the last four years. This is a good starting point, although as the draft acknowledges in its introduction, the Fit for 55 revision will require raising national objectives once again.</p> <p>The draft incorporates some Fit for 55 objectives, including RED and ETS, although it doesn't take account of important building legislation like the EED (decided in 2023) and EPBD (forgivable as negotiation was still underway in October 2023). The Netherlands carries out an annual impact assessment called the National Climate and Energy Outlook (KEV) every September. The draft's projections are based under KEV 2022 when most Fit for 55 legislation was not yet agreed. For these reasons this draft is not yet aligned with many of the building requirements that are analysed in this report.</p> <p>In view of this draft's large gaps on measures related to buildings (and other sectors), The Netherlands should present a revised public draft before spring 2024 that incorporates the last missing targets and related measures, along with a new impact assessment (i.e. either an early year KEV or a stand-alone assessment). A final version should follow by the June 2024 deadline.</p> <p><u>Score:</u> 5/10</p>
2. Public buildings	<p><u>Measures and recommendations:</u></p> <p>There is almost no information on efforts to decarbonise public buildings and on public procurement measures. New EED measures are not mentioned. A new draft should develop on EED article 6 and 7.</p> <p><u>Score:</u> 1/10</p>

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3. Target for innovative renewable energy	<p><u>Measures and recommendations:</u></p> <p>The draft plan mentions an upcoming national package with instruments to increase ambition for 2030, 2035 and 2040 . It includes a “commitment to industrial research, experimental development, pilot and demonstration projects to generate sufficient solutions eligible for scale-up towards 2035 and 2040”. This is positive and the next draft should include more information tentative measures and objectives.</p> <p>It is positive that the government links industrial research with future scaleup post-2035. However, there is no mention in the draft of a key scaleup instrument in the new Fit for 55 package: the new innovative renewables indicative target. Fortunately, there are a few mentions of plans to deploy technologies that could fit the description. The most significant element that could contribute to this target is the setup of 1 GW of offshore solar energy parks (next to wind parks) shortly after 2030. Other sectors mentioned in the draft that may contribute to this target are biomethane from next generation biogas plants and in rooftop PV, the use of high efficiency PV technologies and integrated PV. We recommend that the final version of the plan refers to the innovative renewable energy target, listing the technologies and the installed capacity expected to come from each by 2030.</p> <p>The Netherlands is a pioneer in the use of non-price criteria for tenders for wind parks (“Non-price criteria can strengthen innovation on key challenges for an accelerated, Cost-efficient and responsible discharge of offshore wind”), positioning it well for the NZIA era.</p> <p><u>Score:</u> 5/10</p>
4. Links to SET Plan	<p><u>Measures and recommendations:</u></p> <p>The draft NECP states, “The Netherlands actively participates in the Steering Group and several Implementation Working Groups (IWGs) of the SET-Plan. The IWGs provide a forum to exchange knowledge and experience between Member States. Relevant knowledge [...] is used in national contexts.” The commitment to align with SET Plan is weak, but at least stated openly: “National subsidy schemes can be used for this purpose, provided that the activities benefit the Dutch economy or other Dutch interests.”</p>

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	<p>A clearer statement of the Netherlands's expectations of the SET Plan would be welcome.</p> <p><u>Score:</u> 6/10</p>
5. Phaseout of fossil fuel boilers	<p><u>Measures and recommendations:</u></p> <p>The draft does not include measures to phase out or reduce gas and diesel boilers in the heating sector. The text acknowledges that optional national bans of fossil fuel boilers are being considered in the EPBD revision, but it does not comment on the matter. Without additional measures to encourage the switch away from fossil boilers in existing installations, industry and households will not get a clear signal to look for cleaner options. Moreover, the hydrogen sector – that the Netherlands expects to grow to 3-4 GW in electrolyser capacity by 2030. –would benefit from regulatory certainty coming from an end-date for natural gas in boilers. The Dutch measures to transition out of coal by 2030 can give valuable lessons on how to do this.</p> <p>In a drive to “lower energy costs for households”, it is expected that the Dutch government will give a “reduced rate to a certain gas consumption”. These measures seem to make no distinction between revenue brackets and are expected to prolong the use of fossil fuels in buildings. A preferable option would be to maintain prices for the first cubic meters of consumption, and use the revenue from “increased tariffs above the new bracket” to help less advantaged households to finance energy renovations.</p> <p><u>Score:</u> 2/10</p>
6. Financial incentives for R&D	<p><u>Measures and recommendations:</u></p> <p>Overall, the Netherlands has a strong system of subsidies and incentives to support decarbonization in buildings. According to Figure 4.23 of the draft (RVO study 2022), Dutch public investment in energy research has more than doubled from 200€ million in 2017 to 421€ million in 2021, with 234€ million going to energy efficiency and 53€ million to renewables in 2021. In comparison, only 11€ million of public research money went to fossil fuels in 2021.</p> <p>A large part of the huge growth in energy efficiency spending between 2020 and 2021 seems to be due to the National Growth Fund, an important tool to finance climate and energy technologies, financing 200€ million in research and innovation for heat infrastructure, and 876€ million for the scale-up of renewable hydrogen from two rounds of funding</p>


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	<p>since the start of 2021. The figure for hydrogen is hard to square with the 62€ million indicated for that technology in Figure 4.23 – the European Commission should seek a clarification. The last call included relevant proposals for the construction sector, including circular concrete and biobased materials. We advise keeping energy efficiency technologies in buildings as the focus of upcoming calls.</p> <p>The Investment Subsidy Sustainable Energy and Energy Savings (ISDE) provides grants for investments for (hybrid) heat pumps, solar thermal systems, insulation measures, heat network connections, and electric cooking supply. This instrument had a budget of 350€ million in the form of flat-rate subsidies to support homeowners and businesses to make energy-related improvements to their buildings. In view of the increased ambition of the EED and the EPBD, we advise reevaluating the budget and measures covered; revised data should be presented in the second draft of the plan.</p> <p>The draft expects to double the DH connections in the Netherlands between 2020 and 2030. We recommend that the 2023 Warmtenetten investment subsidy (WIS) supporting this is combined with the European Regional Development Fund, either under its current 2021-27 programming or in the next one starting from 2028.</p> <p>The Netherlands also has measures to support SMEs with energy savings. It has an instrument that covers 80% of the costs of energy advice on energy efficiency. There is also a dedicated credit scheme for SME under BMKB-Groen. This new targeted instrument for SMEs could be used as a test to create (or evolve into) a measure under the Social Climate Fund to support small business (one of its three targets).</p> <p><u>Score:</u> 7/10</p>
7. Skills	<p><u>Measures and recommendations:</u></p> <p>The draft outlines the 4 pillars of the 2023 “Green and Digital Jobs Action Plan” under section 1.2 “Overview of current policy situation”. The draft shows awareness of the challenges in training and reskilling workers in green and digital sectors, however, it lacks detail on specific challenges and measures. Figure 4.31 claims it shows “projected labour demand in the period 2019-2030” by the chart is truncated at 2018. The Netherlands includes a subheading “Number of researchers in head count” but can’t quote a number more recent than from 2010. We advise that the next draft includes an analysis of the gaps in the Dutch clean jobs market in key sectors like renewables, construction and transport, so as to fulfil its 2030 targets. It should be assessed to what extent measures are sufficient under the 2023 “Green and Digital Jobs Action Plan”, and whether additional policies are required.</p>


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	<u>Score:</u> 2/10
8. Other measures	<p><u>Measures and recommendations:</u></p> <p>The draft proposes to launch in 2023 a programme on energy savings where “indicative national targets will be discussed by sector”. This participatory approach is a positive way to find solutions from the bottom up per sector. We recommend to add to the plan an indication of the general aims and measures that could be introduced (e.g. incentives, certification, etc).</p> <p><u>Score:</u> 7/10</p>


Slovakia country fiche – Overall score 34/80	
Area's N° and title	Assessment of measures, recommendations and score
1. Starting point	<p><u>Measures and recommendations:</u></p> <p>The draft's introductory summary mentions the updated overall 2030 EU target to reduce GHG emissions by 55% compared to 1990. However, Table 1 in the introduction appears to show outdated EU and Slovak targets that do not reflect the new Fit for 55 targets for 2030 (e.g. 32% EU RES target by 2030, instead of the updated 42,5%). This impacts the ambition and focus of the whole NECP. It is advised that the country resubmits a new draft before spring of 2024 that uses as point of reference the updated Fit for 55 targets and adapts measures accordingly.</p> <p>The introduction also lists “Measures to ensure environmental sustainability”. It is positive that it prioritises using ETS funds to decarbonise the Slovak economy. A bullet point that should be removed from the list is the “use of natural gas” as a sustainability measure, which goes against the REPowerEU objectives and risks to lock in gas boilers for years to come.</p>

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	<p>The plan advocates for a wide range of decarbonised heat sources that use existing district heating networks, including renewables (biomass, biomethane and geothermal, large heat pumps) and nuclear plants' waste heat (existing and new reactors). This is an efficient approach to cover heating needs that pre-requires important investments in district heating (upgrading and building new networks). The NECP outlines a role for Small Modular Reactors. Given that these machines are today hypothetical, no NECP should foresee anything more than their use in demonstration projects.</p> <p><u>Score:</u> 3/10</p>
2. Public buildings	<p><u>Measures and recommendations:</u></p> <p>The draft does not mention the new EED requirement to renovate every year 3% of the building stock owned by public bodies. Therefore, it is advised that the next version of the plan takes this target as the reference point to develop public building measures.</p> <p>Nonetheless, it is worth mentioning below several instruments in place to renovate public buildings.</p> <p>The Environment Fund has financed energy efficiency projects in public buildings for the last 3 years at an average yearly rate of 19€ million. It is positive that the government plans to use a higher percentage of the auctioned ETS allowances to finance this instrument. We advise that the next version of this plan includes an estimate of the desired annual amount to renovate public buildings in line with new EED requirements.</p> <p>The Slovak 2021-27 Operational Programme (OP) foresees energy efficiency investments for several types of buildings, including public ones. We suggest to consider in the next draft whether any changes on this point are needed in the 2021-27 OP.</p> <p>REPowerEU will support the renovation of public buildings and it will also finance data collection in selected public buildings of elements in the energy performance certificate. The data collected will feed into a national database and the planning of future building policies. We recommend Slovakia that it connects this data with people who would want to use it via the Common European energy data space.</p> <p>Slovakia has green public procurement rules, based on its National Action Plan for Green Public Procurement 2016-2020 (NAP GPP III). The plan looks at environmental criteria going beyond price. It is mentioned that "green public procurement</p>

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	<p>will cover at least 70 % of the total value of all public procurements”. More information on the measures needed to achieve this is required.</p> <p>More generally, the next NECP version should present today’s public procurement rules and integrate new EED public procurement requirements.</p> <p><u>Score:</u> 6/10</p>
3. Target for innovative renewable energy	<p><u>Measures and recommendations:</u></p> <p>The draft has no mention of the innovative renewable target in the newly revised Renewable Energy Directive. Some of the renewable energy technologies in Table 12 may fit the innovative renewables definition, in particular next generation biomethane plants, advanced geothermal (particularly if combined with mineral extraction), onshore wind turbines above 10MW and photovoltaic installed with agriculture, floating on water or integrated into building facades. Other technologies that may count are new generation large heat pumps and high temperature solar thermal. It is suggested to add a table for innovative renewables with the expected installed capacity per technology by 2030 under section 2.1.2. “Renewable Energies”.</p> <p><u>Score:</u> 2/10</p>
4. Links to SET Plan	<p><u>Measures and recommendations:</u></p> <p>The draft makes a short mention of only one of the SET Plan groups. It is advised that the plan lists the groups, platforms and projects that Slovakia wants to focus on. It should also add priorities and expectations from the SET Plan structure.</p> <p><u>Score:</u> 3/10</p>
5. Phaseout of fossil fuel boilers	<p><u>Measures and recommendations:</u></p> <p>There is no mention of a fossil fuel phase-out for heating in the draft. We suggest that the next version of the plan proposes a phase-out date for natural gas in heating appliances and CHPs that feed into district heating networks. This phase-out</p>

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	<p>should be linked to the uptake of renewable hydrogen and biomethane that feature prominently in the NECP draft, although the use of hydrogen for heating is very inefficient.</p> <p>The draft plan supports moving away from heating buildings with gas boilers to using district heating networks, although these networks are expected to be fueled primarily with natural gas and bioenergy. While running natural gas CHPs is more efficient than single boilers, it is still risky to make new natural gas investments in the current international context. Moreover, they will become stranded assets as deeper decarbonisation is required.</p> <p>The draft considers the possibility of “increasing taxes on all fuels used for heating”, thereby harmonizing it with higher taxes on “mineral oil” and incentivizing consumers to reduce emissions. This is positive and helps consumers to transition into ETS II. It is advised that the next draft includes an action plan to increase taxes on fossil fuels for heating, while maintaining measures to protect those at risk of energy poverty.</p> <p><u>Score:</u> 5/10</p>
6. Financial incentives for R&D	<p><u>Measures and recommendations:</u></p> <p>Several financial support measures for heating and cooling are listed under section 3.1.2. “Renewable energies”. There is support from ETS allowances to finance the construction of plants generating heat for district heating networks. There are also several support systems for RES co-generation plants (often with connection to district heating networks). The next draft should make an assessment per financial instrument of the amount of funding need up until 2030 to meet Fit for 55 targets.</p> <p>There is a voucher system supporting households to install RES equipment, such as biomass boiler and PV. This system should consider including more RES equipment such as heat pumps and solar thermal.</p> <p>The draft mentions that fiscal measures may be added to “increase the share of RES in the heating and cooling sector.” The next version should include more concrete proposals on tax deductions for people and companies.</p> <p>Overall in the draft, support schemes for renewable heat plant operators tend to be more robust, while measures supporting households and businesses to renovate their buildings (e.g. subsidies and tax deductions) could be strengthened.</p>


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	<u>Score:</u> 6/10
7. Skills	<p><u>Measures and recommendations:</u></p> <p>The draft does not mention gaps in skills nor measures to develop them in the energy efficiency sector. It is advised that the next draft makes a needs assessment of the skills required in key sectors, then sets targets and measures for 2030.</p> <p><u>Score:</u> 1/10</p>
8. Other measures	<p><u>Measures and recommendations:</u></p> <p>The draft strongly prioritises the use of DH networks for their potential to bring large carbon savings, reduce costs to consumers and improve air quality. Section 3.1.2. on measures for “Renewable energies” lists measures under 2022 legislation to strengthen DH by: extending network’s coverage; making DH more appealing to customers; introducing a mandatory target to integrate renewables.</p> <p>Taking inspiration from the Netherlands, these promising DH measures should be accompanied by specific targets in terms of thermal energy provided and users connected by 2030.</p> <p><u>Score:</u> 8/10</p>


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Sweden country fiche – Score: 39/80


Area's N° and title	Assessment of measures, recommendations and score
1. Starting point	<p><u>Measures and recommendations:</u></p> <p>The draft plan does not integrate Fit for 55 targets and measures that were agreed (or were in negotiation) in 2023, including those in EED, RED and EPBD. Therefore, most areas examined in this report are not sufficiently covered in this first version of the Swedish NECP. The draft report acknowledges that there are elements missing and the Swedish government commits to present an updated final plan with increased ambition. We recommend that Sweden prepares new energy scenarios and presents a second 2nd draft covering all Fit for 55 legislation before spring of 2024, so that the European Commission and stakeholders have time to comment on it before the final plan is published in June 2024.</p> <p>Sweden already has a robust national framework for climate and energy. As of 2021, the country had the highest share of renewables in the EU, at 63% of total energy consumption, and 69% in the heating and cooling sector (Table 25 of its NECP). The Climate Act of 2017 sets a path to net zero GHG emissions by 2045. More recently in 2022 the Tidö Agreement of the coalition government changed the Climate Act so that full decarbonisation by 2045 is achieved from “100 % fossil-free” energy rather than “100% renewable” energy, opening the door to new nuclear capacity. We recommend that this does not reduce the ambition to deploy RES by 2030, as Sweden’s contribution will be needed to reach the common binding EU RES target.</p> <p><u>Score:</u> 5/10</p>
2. Public buildings	<p><u>Measures and recommendations:</u></p> <p>The drafts does not include targets or measures to renovate public buildings. We recommend that the new EED requirements are included.</p> <p>The draft mentions Sweden’s Public Procurement Act and the country’s ambition to “be at the forefront and</p>

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	<p>remain a model for green public procurement and that a life-cycle approach should be taken into account”. This is a good basis to build on. We recommend that the next draft includes a reflection on how to update the 2016 Public Act to meet and surpass the new public procurement requirements in the EED.</p> <p><u>Score:</u> 2/10</p>
3. Target for innovative renewable energy	<p><u>Measures and recommendations:</u></p> <p>The new RED is not considered in this draft, therefore there is no mention of the target for innovative RES. We recommend that the next version includes the main innovative technologies to be deployed together with estimated installed capacities by 2030, a process for keeping the list of “innovative technologies” up to date, and supporting measures.</p> <p>There are elements of renewable energy deployment that may be relevant for the innovative RES target. The Swedish Energy Agency is looking for sites that would boost the production of offshore wind electricity by 90 TWh. We recommend to give more details on the type of wind offshore technologies, particularly where innovative technologies may be used.</p> <p>The next draft should also include more information on the future of areas set aside on land, as well as the type of technologies used and estimates on their installed capacities.</p> <p>The national bioenergy strategy is expected before November 2023. It is expected that it will contribute to decarbonise the heating sector and that its main actions will be added to the next version of the NECP. Innovative uses on solid biomass, biofuels and biomethane can also count towards the innovative RES target.</p> <p><u>Score:</u> 3/10</p>
4. Links to SET Plan	<p><u>Measures and recommendations:</u></p> <p>The draft explains in some detail Sweden’s participation in the SET-Plan and its involvement in both Implementation Working Groups and European Technology & Innovation Platforms. It mentions two key SET Plan groups for buildings: IWG5 and ETIP-RHC. It is suggested that the next draft gives indications of Sweden’s R&D priorities and any potential recommendations on the functioning/focus of the SET Plan and its groups.</p>

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	<p>Other important R&D networks and programmes are mentioned, including Horizon Europe, Mission Innovation, the CET Partnership and Nordic Energy Research (NEF).</p> <p><u>Score:</u> 6/10</p>
5. Phaseout of fossil fuel boilers	<p><u>Measures and recommendations:</u></p> <p>According to the draft, natural gas in Sweden accounts for only 3% of total energy use and the national gas network is relatively small. Gas boilers in individual buildings are relatively uncommon, although several district heating networks are powered by CHP plants.</p> <p>According to the draft, “there are currently no forecasts for the development of the Swedish natural gas network”. The European Commission should press for clarification of whether this absence of a forecast is only temporary, or whether the government intends not to expand the network.</p> <p>While most of Sweden’s heating and cooling sector is RES-based, the government has recently passed tax reductions for several fossil fuels, including natural gas and DH networks powered by it (Tables 10 and 30 of its NECP). It is advised that Sweden does not reverse fiscal policy and that it maintains its high taxes on fossil fuels to be able to ensure energy efficiency. This additional revenue could be used to support more clean energy investments that will ultimately reduce costs to consumers.</p> <p><u>Score:</u> 3/10</p>
6. Financial incentives for R&D	<p><u>Measures and recommendations:</u></p> <p>The programme for energy efficiency in single-family houses provided over 100€ million in 2023 to homes to replace gas and electric boilers with green alternatives. This is a strong and targeted measure to remove polluting heating systems from people’s residences. We recommend that the next version of the plan considers whether similar measures are needed for buildings in other sectors, for example for SMEs.</p>


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	<p>The section on EU financing measures for energy efficiency (3.2.1.8) using Cohesion Policy Funds only mentions two instruments in little detail. It is suggested that the next NECP version lists all main EU instruments supporting energy efficiency efforts, together with an estimate of the amount of money committed 2021-27 operational programme.</p> <p>National energy research and innovation funding programmes under the Swedish National Agency are expected to provide total funding in 2023 of around 1.4 billion SEK (120 € million). Section 3.4 on Research, innovation and Competitiveness presents Sweden's research and innovation priorities for 2021-24 (Bill. 2020/21:60). Is its recommended that the next draft gives more information about the potential priorities of the post-2024 research and innovation agenda.</p> <p><u>Score:</u> 7/10</p>
7. Skills	<p><u>Measures and recommendations:</u></p> <p>The draft does not include an impact assessment on social issues (section 5.2); it is indicated that this will be submitted in the next version of the NECP. This is essential to evaluate skills gaps and measures to address that.</p> <p>The draft presents a new grant introduced in 2022 “to enable workers to study for at least 80 % of their salary for up to one year in order to strengthen their position in the labour market”. This is a strong measure to improve people's skills. We recommend that the next NECP draft mentions how this measure could speed up the energy transition.</p> <p>The Swedish Energy Agency has developed a web-based tool to “disseminate targeted information on energy use and energy efficiency” for households, businesses and civil servants. There are also online training programmes available for architects, engineers, building project managers, managers and operational technicians. We recommend that the online trainings for construction professionals encourage them to take in-person trainings to further develop skills related sustainable buildings.</p> <p><u>Score:</u> 6/10</p>
8. Other measures	<p><u>Measures and recommendations:</u></p> <p>The government in cooperation with industry sectors has developed by 2020 a total of 22 “fossil-free competitiveness roadmaps”. including one on energy efficiency from the Fossil-Free Sweden initiative. This public-private sectoral</p>


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	<p>cooperation on decarbonization is valuable, apparently rather like The Netherlands ‘Top Sector Energy’ model and could be showcased to interested parties outside of Sweden. Slovakia, for example, has written (English translation) “In the field of Research and Innovation, the problem is fragmented and, in particular, undercapitalised manufacturing. Expenditure on business R & D is low in Slovakia. In innovation, cooperation between universities and businesses on R & D is poorly evaluated.”</p> <p><u>Score:</u> 7/10</p>
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Germany country fiche – Score: 51/80	
Area's N° and title	Assessment of measures, recommendations and score
1. Starting point	<p><u>Measures and recommendations:</u></p> <p>The draft plan integrates all Fit for 55 targets and measures that were agreed in 2023, including those in EED and RED. It also includes several provisions of the EPBD, a text that was under trilogue negotiations in November 2023 when Germany published its plan. The inclusion of most Fit for 55 measures makes it easier to assess the draft, compared to other countries that had significant gaps.</p> <p>We recommend that Germany presents an updated draft by the spring of 2024 to allow for public scrutiny ahead of submitting its final NECP in June 2024. This second draft should add the following elements for the building sector: take provisions of the final EPBD compromise (expected in late 2023), including the update of its “National Renovation Plan”; complete impact assessments on skill gaps (section 5.2), investments (section 5.3), energy prices (section 5.4) and on the development of gas infrastructure (section 4.5.3).</p>

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	<p>In general terms, the draft seems set to meet the higher ambition of the EU's 2030 climate and energy policies. Compared to the previous 2030 NECP, this includes higher targets for renewable energy and energy efficiency, as well as more focus on measures to decarbonise buildings. A significant gap is the omission of a natural gas phase out, or at least measures to limit its dominance in space heating.</p> <p><u>Score:</u> 8/10</p>
2. Public buildings	<p><u>Measures and recommendations:</u></p> <p>Under section 2.2 on energy efficiency, the draft commits to make a building inventory and renovate 3% of the heated floor area in public buildings into ZEBs or NZEBs. This is in line with new EED requirements. The draft commits to send by December 2023 more details on an “alternative approach showing equivalent savings”. These measures should be presented in a new draft in early 2024.</p> <p>The draft acknowledges the new EED requirements for public procurement and commits to align legislation by 2025.</p> <p>It is positive that Germany sets additional energy requirements for federal buildings, both for building renovation and public procurement. This is expected to support the deployment of novel technologies and to serve as best practice in other countries. We recommend that the next draft gives more information on the main objectives for federal buildings by 2030 and the types of technologies and/or interventions covered.</p> <p><u>Score:</u> 8/10</p>
3. Target for innovative renewable energy	<p><u>Measures and recommendations:</u></p> <p>The draft has no mention of the new target for innovative renewable energy in RED. The focus in renewables is to deploy at a large-scale wind energy and PV, along with modest increases in bioenergy and geothermal. Germany expects to increase renewable electricity to 80% by 2030.</p> <p>We recommend that the next version includes the main innovative technologies to be deployed together with estimated installed capacities by 2030 under NECP section 2.1.2.11. In addition, a mechanism should be defined to update regularly what technologies are considered as innovative under the definition of the Renewable Energy Directive. Section 3 should include policy measures to achieve the innovative renewables target. We recommend assessing whether part of the new</p>

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	<p>installed capacity for wind and PV may come from innovative technologies (e.g. floating wind turbines; next generation PV) or applications (e.g. agrivoltaics; integrated solar in buildings).</p> <p><u>Score:</u> 3/10</p>
4. Links to SET Plan	<p><u>Measures and recommendations:</u></p> <p>The draft presents Germany's involvement in the SET Plan and its groups, including a brief mention of the groups on buildings and H&C. It also mentions the Clean Energy Transition Partnership, a key funding instrument linked to the SET Plan. The mention of the SET Plan is brief and descriptive.</p> <p>We suggest that the next draft gives indications of Germany's R&D priorities and any potential recommendations on the focus of the SET Plan.</p> <p>Other relevant international energy networks and programmes are mentioned that discuss innovation and decarbonisation, including the The Pentilateral Energy Forum and the North Seas Energy Forum</p> <p><u>Score:</u> 6/10</p>
5. Phaseout of fossil fuel boilers	<p><u>Measures and recommendations:</u></p> <p>The draft NECP presents the country's coal phase out. Moreover, the recent Building Energy Act has a requirement on heating systems in new buildings from 2024 to "be operated with at least 65 % renewable energy". This technology neutral requirement is positive in terms of being open to different RES technologies and innovation, but at the same time it allows to continue installing new gas boilers in hybrid systems. Moreover, it is unclear when existing fossil boilers will be banned. We recommend that the next NECP version includes measures and incentives to ban existing fossil fuel boilers up to 2045, possibly differentiating between different fractions of the building stock.</p> <p>The government commits to a "regular sustainability assessment of all subsidies carried out every two years". This is a positive measure. We recommend that the next NECP draft considers the conclusions of the last German Subsidy Report from August 2023 and takes actions to remove fossil fuel subsidies.</p>

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	<p>Germany has a national emission trading system in place since 2021 that covers fuel suppliers of the transport and building sectors. In 2023 the carbon price was fixed at 35€ per ton of CO₂ and this is expected to increase to 55-65€ by 2026. Its structure is similar to the European system that will cover buildings and transport in 2027, although there are several differences (e.g. limits in pricing). We recommend that the next draft outlines how the government intends to transition to the new EU-wide system by 2027.</p> <p>The draft plan highlights that the German gas industry “is making intensive efforts to develop gas infrastructure (pipelines and storage) and to further diversify gas purchases.” This also includes the further extension of LNG infrastructure. While it is necessary that the country ensures its security of gas supply (particularly over the next few years following the start of the war in the Ukraine), new infrastructure should take into account a decline in gas demand with an eventual phaseout. We recommend to regularly assess all gas infrastructure investments to avoid the risk of creating stranded assets.</p> <p>Overall, there is a partial ban on new fossil boilers and a series of support measures on taxation and subsidies. We recommend that Germany defines in this decade how it intends to phase out all fossil fuel boilers to meet its net zero target by 2045. If a clear signal is not given in the next few years, people are at risk of investing in a heating system that they may not be able to use throughout its expected lifespan (often around 20-25 years).</p> <p><u>Score:</u> 6/10</p>
6. Financial incentives for R&D	<p><u>Measures and recommendations:</u></p> <p>The target for “funding energy research in 2020-2022 is of around EUR 1.3 billion per year.”</p> <p>According to the draft, Germany’s 7th Federal Government’s energy research programme of 2018-2022 has “given high priority” to “space heat and process heat”. As the 7th programme is currently closing, we recommend including in the next version the priorities of the new 8th programme starting in 2023.</p> <p>As listed in section 3.1.1.111, the federal Climate and Transformation Fund (KTF) is expected to provide between 2024 and 2027 around 60,7€ billion in funding to decarbonise buildings. This funding instrument gives security to building owners for the next four years. In order to secure continuity until 2030, we suggest that the next version of the NECP mentions projections post-2027 for the KTF’s priorities and expenditure.</p>

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	<p>Climate change contracts are a promising way to decarbonise and modernise German industry. This can significantly reduce embodied emissions in buildings from materials like steel, glass and cement. We recommend that the draft gives an estimate of the support that could be given to industry up to 2030 using latest estimates of carbon prices.</p> <p>There is bonus support in federal government funding for “industrial pre-production of facade and roof components and a standardised installation”. This measure has big potential to mainstream active modules in construction.</p> <p>The 2020 measure for Tax support of up to 20% of the cost of energy renovation of buildings is a good measure to support the renovation wave. We recommend raising the maximum of 40,000€ per residential property when a significant share of innovative or pre-commercial products for energy efficiency or renewable energy generation are used in the renovation.</p> <p><u>Score:</u> 7/10</p>
7. Skills	<p><u>Measures and recommendations:</u></p> <p>The draft does not include an impact assessment on social issues (section 5.2) that includes skills. It is indicated that this will be submitted in the final version of the NECP. We recommend that it is presented in a new draft before the summer to allow stakeholders to see how this is linked to other elements in the plan.</p> <p>We recommend that the next version of the plan gives more detail on how the 2023 Skilled migration act can meet labour shortages in key energy sectors by 2030.</p> <p>The Federal Support for Energy Advisory for Housing (EBW) will extend energy advisory covering residential buildings to also include SMEs, NGOs and municipal enterprises. We recommend that the NECP evaluates whether there will be an increase in demand that requires to reinforce the staff of the existing advisory centres, as well as the possibility to train advisors in new building technologies in renewable energy, energy efficiency and ventilation.</p> <p>The plan in section 3.2.11 mentions that stakeholders agreed to measures to “improving the availability of [heat pump] professionals” in context of the “Heat pump offensive” to install in Germany at least 500.000 heat pumps a year from 2024. We recommend making an impact assessment on the labour force required to meet the heat pump target, and where necessary include measures to skill and reskill workers.</p>

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	<p>The NECP commits to further develop the Innovation Programme for Future Construction to pursue “application-oriented construction research” to decarbonise buildings and improve affordability. We recommend giving more details on the objectives and means of the programme up to 2030 and relate it to developing skills in the construction sector.</p> <p>The 2023 Timber construction initiative has the potential to boost sustainable wood construction by 2030. It is positive that it focuses on skill transfer and training.</p> <p><u>Score:</u> 6/10</p>
8. Other measures	<p><u>Measures and recommendations:</u></p> <p>Under section 2.2.1 on Energy Efficiency, the draft outlines efforts to reduce embodied carbon emissions “associated with the production of building materials, components, plant engineering” and other elements. The draft details concrete measures by using life-cycle assessment tools in the Sustainable Building Quality Label (QNG) into the Federal Funding for Efficient Buildings (BEG) and in the climate friendly new building support programme (KFN). This is important for overall decarbonisation efforts, as the proportion of embodied emissions is expected to grow while operational emissions from energy use in buildings decline. We recommend mainstreaming the priority to reduce embodied carbon emissions across all relevant policy areas, such as taxation, industrial policy, research and funding.</p> <p><u>Score:</u> 7/10</p>