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**COMMISSION STAFF WORKING DOCUMENT**

**Assessment of the draft updated National Energy and Climate Plan of Portugal**

*Accompanying the document*

**COMMISSION RECOMMENDATION**

**on the draft updated integrated national energy and climate plan of Portugal covering the period 2021-2030 and on the consistency of Portugal's measures with the Union's climate-neutrality objective and with ensuring progress on adaptation**

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# 1 SUMMARY

## 1.1 Overview of key objectives, targets and contributions in the draft updated NECP


The European Green Deal, the fast-evolving geopolitical context and the energy crisis have led the EU and its Member States to accelerate the energy transition and set more ambitious energy and climate objectives. These include objectives to diversify energy supplies. These developments are reflected in the legislative framework adopted under both the ‘Fit for 55’ package and the REPowerEU plan.

Portugal’s draft updated national energy and climate plan (“the draft updated NECP” or “the plan”), submitted on 30 June 2023, partially takes into account this new geopolitical and legislative framework.

Table 1: Summary of key objectives, targets and contributions of Portugal’s draft updated NECP

		2020	Progress based on latest available data	2030 national targets and contributions	Assessment of 2030 ambition level
	Binding target for greenhouse gas emissions compared with 2005 under the Effort Sharing Regulation (ESR) (%)		2021: -17.5% 2022: -16.8% <sup>1</sup>	-28.7%	NECP: No ESR projections included. NECPR: -42%.
	Binding target for net greenhouse gas removals under the Regulation on Land Use, Land Use Change and Forestry (LULUCF)		Reported net removals -6.02 of Mt CO <sub>2</sub> eq. in 2021 and reported approximated net removals of -6.29 Mt CO <sub>2</sub> eq. in 2022	-0.968 Mt CO <sub>2</sub> eq. (additional removals target)  -1.358 Mt CO <sub>2</sub> eq. (total net removals)	PT is on track to achieve its LULUCF target if it maintains an appropriate management of its land.
	National target/contribution for renewable energy: Share of energy from renewable sources in gross final consumption of energy (%)	34% (SHARES) 31% (target)	34%	49%	PT contribution of 49% is slightly below the 51% required under the formula set out in Annex II to the Governance Regulation.
	National contribution for energy efficiency:				
	Primary energy consumption	22 500 ktOE	19 531 ktOE	20 800 ktOE	PT primary energy consumption

<sup>1</sup> ESR 2021 is final and 2022 is approximated inventory data, pre comprehensive review.

					contribution is 20 800 ktoe. Energy Efficiency Directive (EED) recast Annex I formula results: 15 164 ktoe
	Final energy consumption	17 400 ktoe	15 683 ktoe	14 400 – 14 900 ktoe (as in final NECP 2020)	PT final energy consumption contribution is 14 400 – 14 900 ktoe. EED recast Annex I formula results: 13 410 ktoe
	Level of electricity interconnectivity (%)	8%	13.2% <sup>2</sup>	15% <sup>3</sup>	Strengthening of interconnection capacity to meet the target is required

Source: Eurostat; Portugal's updated national energy and climate plan

## 1.2 Summary of the main observations<sup>4</sup>

**Portugal's draft updated NECP refers to the revised energy and climate targets recently agreed under the Fit for 55 package and the REPowerEU plan.** However, it does not always sufficiently elaborate on how these targets will be effectively reached.

Regarding the **reduction of greenhouse gas emissions under the Effort Sharing Regulation**, the plan does not provide evidence to demonstrate that Portugal is on track to meet its national greenhouse gas target of -28.7% in 2030 compared to 2005 levels. According to Portugal's projections submitted in March 2023, Portugal is nevertheless on track to meet its target both with existing and with additional policies and measures and would overachieve its target by 13.3 percentage points with additional planned policies and measures.

**On the Regulation on Land Use, Land Use Change and Forestry (LULUCF)**, the draft updated projections in the plan indicate that Portugal will overachieve the 2030 target with existing measures. However, these projections are not based on the latest methodological review carried out in the national greenhouse gas inventories. The draft plan does not provide a clear implementation timeframe nor quantification of the impacts of specific policies and measures. It also lacks information on the status and progress in ensuring

<sup>2</sup> The latest value indicated is for 2023, the value for 2021 was 13.7%.

<sup>3</sup> Calculated by the European Commission based on the ENTSO-E data (Winter Outlook 2022-2023). The 2030 level represents the general interconnectivity target of 15%. The level of ambition cannot be assessed, because the actual 2030 interconnectivity levels will depend on the implementation of the planned interconnectors and changes in the generation capacity.

<sup>4</sup> In addition to the notified draft NECP, this assessment also considers informal bilateral exchanges, which are part of the iterative process established under the Governance Regulation.

higher tier levels and geographically explicit datasets needed to ensure the robustness of net removal estimates.

**On Carbon Capture Utilisation and Storage (CCUS)**, the plan does not identify annual CO<sub>2</sub> emissions that can be captured, nor geological CO<sub>2</sub> storage capacity. No details on CO<sub>2</sub> transport are provided. The plan introduces a new measure meant to assess the need and feasibility of CCUS in the industrial sector to be implemented during 2020-2030, though more information could be provided.

The draft updated NECP reflects **some progress towards international commitments under the Paris Agreement**. While Portugal stopped coal-fired electricity production in 2021, the phasing out of fossil fuel subsidies is presented without many details.

**Regarding adaptation to climate change**, the draft updated NECP does not contain adequate analysis of the relevant climate vulnerabilities and risks for the achievement of the national objectives, targets, and contributions and the policies and measures in the individual dimensions of the Energy Union. Where vulnerabilities and risks are mentioned, they are not described in sufficient detail. The link to the specific Energy Union objectives and policies, which they support is not specified and quantified.

**For renewable energy, the draft updated NECP puts forward a contribution to the overall EU target of 49%** of renewables in the country's final energy consumption by 2030. This is below the share of 51% resulting from the formula in Annex II of Regulation (EU) 2018/1999 on the Governance Regulation of the Energy Union and Climate Action ("Governance Regulation"). The draft updated NECP includes indicative trajectories for renewables in the electricity, transport and heating and cooling sectors. However, the draft updated plan does not provide the share of renewable energy sources in industry and buildings, and sectoral targets such as for renewable fuels of non-biological origin (RFNBO). At the same time, Portugal's plan includes sufficiently detailed existing and planned policies and measures to support the proposed objectives, in most cases with references to legal acts, scope, timeframe, budget and expected impacts. Overall, the draft updated NECP to a large extent takes into account Directive (EU) 2018/2001 on the promotion of energy from renewable sources, as amended by Directive (EU) 2023/2413 ("revised REDII").

**On energy efficiency**, the Portuguese draft updated NECP introduces new planned measures to achieve the 2030 energy efficiency targets, reporting that all measures reflect the **energy efficiency first principle**. However, the draft updated NECP falls short in identifying the quantitative impacts of these measures, which compromises the assessment of their effectiveness and contribution to the targets. The draft updated NECP seems to maintain the same level of ambition on energy efficiency as the initial NECP (which was provided as a range), thereby not considering the increased ambition in the Directive (EU) 2023/1791 on energy efficiency and amending Regulation (EU) 2023/955<sup>5</sup> ("EED recast"). Portugal does not provide a target on final energy consumption.

**In relation to buildings**, the draft updated NECP does not set out more ambitious targets than those included in the Portuguese 2021 long-term renovation strategy (LTRS), but only recalls some of its main elements. Due to the lack of detailed information on energy savings, it is not possible to evaluate the contribution of the building sector to the overall

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<sup>5</sup> OJ L 231

achievement of the energy efficiency targets. In addition, the plan lacks detailed information on the investment needs and the barriers to implementation of the LTRS, as well as the use of financial instruments to leverage private investment for renovations.

**On the energy security dimension**, the draft updated NECP convincingly sets out targets and measures to enhance the security of Portugal's energy system. Specifically in the **gas sector**, the plan shows ambition in diversification (notably through LNG) and in ramping up renewable gases. In the **electricity sector**, the plan combines very ambitious targets for the roll-out of renewables with measures to support flexibility. The ambitious targets for the deployment of batteries and the increase in pumped hydro storage capacities are particularly welcome. In the **oil sector**, Portugal benefits from a diversified portfolio of suppliers, in compliance with EU oil stocks requirements. The country aims to significantly reduce national oil consumption. The plan does not, however, assess the adequacy of Portugal's oil infrastructure (refineries, oil stocks) in the long run, particularly in the light of the expected decline in oil demand.

**As regards the internal energy market dimension**, the draft updated NECP includes several measures to upgrade infrastructure and bring the benefits of renewables and low carbon technologies to consumers. Some measures to support the deployment of storage and energy communities are also included. However, the draft updated NECP does not provide detailed and concrete targets and measures, including deadlines and milestones for their implementation. A fully fledged adequacy assessment of the flexibility needs, and related objectives are also missing.

**On energy poverty**, the draft updated NECP does not refer to concrete targets and indicators but advances the imminent adoption of a Long-Term National Energy Poverty Strategy and the creation of a National Energy Poverty Observatory, which would significantly improve action across levels of governance. Some policies and measures to promote consumer empowerment are put forward, but an assessment of policies and measures to address energy poverty through energy efficiency, building renovations, consumer empowerment, access to renewables, and affordable prices is missing. Furthermore, synergies with structural policies as regards energy efficiency and building renovations are only partially mentioned.

**The research, innovation, competitiveness, and skills dimension** of Portugal's draft updated NECP provides an overview of policies and measures to support research and innovation (R&I) in clean energy technologies. While the plan sets out a target for energy-related R&I funding towards 2030, it does not provide a breakdown of investments per measure. Furthermore, the plan does not provide a sufficiently detailed quantitative analysis of the competitiveness aspects (including funding targets). The plan lacks information on targets, measures, and investments to support the manufacturing capacities for net-zero technologies, to reinforce the resilience of industrial supply chains, and to promote the digitalisation of the energy system. The plan does, however, set out objectives and measures to address skills gaps for the clean energy transition.

**Just transition** is partially addressed in the draft updated NECP. The plan lacks information on social, employment and skills impact, including distributional impacts, of the climate and energy transition. The plan refers to Portugal's intention to develop a just transition strategy protecting communities that are most vulnerable to the climate crisis, and a just transition compensation mechanism for those negatively affected by the transition. National objectives on competitiveness include a focus on the training and

reskilling programme of workers, through funding from the Just Transition Fund (JTF). However, the plan does not provide information on supporting employment more broadly in the context of the transition. Energy poverty, self-consumption and energy consumer participation and protection are presented as relevant elements of the draft updated NECP as well as social measures. The draft updated NECP does not explain the resources specifically devoted to supporting a just transition. Finally, the plan does not provide sufficient information for the preparation of the Social Climate Plan and how the consistency of the two plans would be ensured.

**On its strategic alignment with other planning tools**, the draft updated NECP makes references to reforms and investments included in Portugal’s Recovery and Resilience Plan (RRP). While some measures in the revised RRP are already included in the draft updated NECP, the current draft is not fully aligned. While the 2023 European Semester Country Specific Recommendations are reflected in the draft updated NECP, the plan does not substantially address them, notably in the areas of energy efficiency, smart grids, and skills.

The draft updated NECP does not include quantified information on the expected **investment needs and funding sources** to implement the planned policies and measures. Often the plan is lacking information on the sources of financing for each policy and measure in terms of national, EU and private funding, and on the lifetime of the measures. On the **analytical basis**, the draft updated NECP includes a description of both ‘with-existing-measures’ (WEM) and ‘with-additional-measures’ (WAM) scenarios but does not clearly explain the methodologies nor models used for the projections. In addition, it is not always clear which measures are included in each scenario, which hinders the assessment of the precise impacts of the additional measures. The macroeconomic impact assessment is qualitative and relies on the previous impact assessment submitted with the 2019 NECP.

## **2 PREPARATION AND SUBMISSION OF THE DRAFT UPDATED NECP**

### **2.1 Process and structure**

The draft updated NECP was notified on 30 June 2023. It is well developed and follows the structure provided in Annex I of the Governance Regulation. It covers all five dimensions of the Energy Union, and spells out clearly Portugal’s objectives, targets or contributions for each. These are backed with policies and measures that, however, are not always described in much detail or underpinned analytically, including on the basis of an impact assessment. The draft plan considers that the Strategic Environmental Assessment (SEA) carried out in 2019 remains valid, and there are no plans to update it.

Portugal’s draft updated NECP partly describes the national context in which the update was drawn up. The plan refers to the increased energy prices resulting from the Russian invasion of Ukraine but gives little detail on the effects of these high prices in Portugal. The draft updated NECP also refers to recent extreme weather events affecting Portugal, such as frequent droughts, large rural fires, heatwaves and deteriorating coastal erosion.

The draft updated NECP provides evidence that, in line with the whole of government approach, Portugal reached out and worked together with relevant authorities to update the plan, considering synergies and trade-offs across different portfolios.

Portugal has established a multilevel energy and climate dialogue as part of the NECP platform project, organising sessions with different local and regional representatives

as well as the NECP co-ordinating bodies. Moreover, Portugal includes the local and regional dimension of the energy transition in its draft updated NECP. The draft updated plan lists actions that are focused on the local and regional level and/or have local authorities as one of the responsible bodies. The actions tackle different sectors and address climate adaptation and the fight against energy poverty at local level. Such actions include reducing the carbon intensity of transport and logistics systems, encouraging business to develop carbon neutrality plans, disseminating good practices, containing the expansion of urban areas, regenerating urban centres, and promoting the development of municipal, regional and sectoral climate change mitigation and adaptation plans.

## **2.2 Public consultation**

The procedure outlined in Portugal's draft updated NECP generally planned for early public participation in the decision-making process. The first public consultation on the draft updated NECP took place between 15 March and 14 April 2023. The consultation was held via an online portal through which 59 participants provided their input. In addition, a technical session with stakeholders was organised on 22 March 2023 to discuss and validate assumptions on energy demand. As part of the preparation of the draft updated NECP, a regional tour of Participatory Assemblies was organised to involve civil society in the process of updating the NECP, raise awareness, and collect contributions for the NECP update.

The draft updated NECP does not provide clear information on what interest groups were identified and encouraged to take part in these three events, nor on the communication channels used to notify the public regarding their participation. The plan is also unclear on how Social Partners were consulted during the drafting process, which hinders the assessment on the fulfilment of a "whole-of-society" approach. Moreover, the plan is not clear on the type and quality of information that was provided to participants. The draft updated NECP contains only a synthetic summary of the public's views and does not explain how the opinions expressed were considered and addressed, or why they were not taken onboard.

A second period of public consultation will take place in 2024, following receipt and incorporation of the Commission's recommendations on the draft updated NECP.

## **2.3 Regional consultations for preparing the draft updated NECP**

There have been various interactions with neighbouring countries such as Spain and France on the draft updated NECP. Portugal participated in a presentation of the French draft updated NECP together with other EU Member States and held a session with Spain and France to discuss the internal energy market and energy security topics, in particular with regard to interconnections. Cross-border interconnections is a key issue for Portugal, as expressed in the compromise between Portugal, Spain, and France on building the infrastructure needed to operationalise an efficient and decarbonised internal energy market<sup>6</sup>. Furthermore, regular bilateral exchanges have taken place with Spain since the preparation of the initial NECP to discuss areas of cooperation ("Luso-Spanish summits").

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<sup>6</sup> On 9 December 2022, the Heads of State of Portugal, Spain and France endorsed the political commitment of a green hydrogen corridor between the three countries as part a "European hydrogen backbone".



Topics of cross-border relevance have also been discussed with Spain and France in the High-Level Group on interconnections in South-West Europe.

### **3 ASSESSMENT OF THE AMBITION OF OBJECTIVES, TARGETS AND CONTRIBUTIONS AND ADEQUACY OF SUPPORTING POLICIES AND MEASURES**

#### **3.1 Decarbonisation dimension**

##### *3.1.1 Greenhouse gas emissions, removals and storage*

The draft updated plan fully embeds the increased climate targets included in the ESR and LULUCF Regulation, as part of the Fit for 55 legislative package.

**The draft updated plan confirms Portugal's commitment to achieve climate neutrality by 2050.** WEM projections are updated in the draft plan and are more ambitious compared to those submitted in March 2023 under Art. 18 of the Governance Regulation, although they are with a time horizon of 2040 only. WAM projections are also updated (measures after June 2022, see page 202 EN version), but only for emissions from the energy (buildings, transport, industry, agriculture) and industrial processes sectors; emissions from agriculture, land use change and forestry and waste will be updated in the final updated NECP. Projections submitted in March 2023 show net GHG emissions (including LULUCF and excluding international aviation) of 19 million tonnes of CO<sub>2</sub> equivalent (CO<sub>2</sub> eq.) by 2050 considering existing measures and of 3 million tonnes of CO<sub>2</sub> equivalent with additional measures. This is equivalent to projected reductions by 2050, compared to 1990, of 71% and 96%, respectively. Despite the commitment to achieve climate-neutrality by 2050, the information provided in the draft updated NECP does not allow for a full assessment as to whether progress by Portugal is consistent with the achievement of the EU climate-neutrality objective. However, based on all the available information, progress by Portugal is likely to be consistent with the achievement of the EU climate-neutrality objective.

**The draft updated plan shows concrete pathways to 2030 and to 2050**, in line with its national long-term strategy and with the climate-neutrality objective set out in the European Climate Law. It refers to Portugal's carbon neutrality roadmap of 2019, which estimates that achieving climate neutrality by 2050 will require GHG reductions of 90% compared to 2005 with intermediary 2040 reductions of 65% to 75% and achieving carbon sequestration levels of between 9 and 13 million tonnes of CO<sub>2</sub> in 2050. In view of becoming a climate neutral economy, the plan also includes new measures to prepare a carbon budget (no 1.101.1) and a voluntary carbon market (1.11).

The draft updated plan sets an **economy-wide 2030 GHG reduction target of -55% below 2005 levels** (table 7), excluding LULUCF. The WEM scenario estimates a cost-effective potential for Portugal to achieve total emission reductions of 54% in 2030 compared to 2005 and 77% in 2040. The WAM scenario estimates greenhouse gas emission reductions of -55% by 2030 (table 59) and -78% by 2040, in line with the national

targets<sup>7</sup>. The plan explains that the relatively limited additional reduction is due to significantly higher expected energy demand by large-scale industrial projects, and despite higher renewables penetration.

**The Effort Sharing Regulation (ESR) sets Portugal’s 2030 ESR emissions reduction target at -28.7%**, compared to 2005 levels. The plan contains no numerical projections for the effort sharing sectors, referring only to economy-wide projections and to the need to ensure that annual GHG emissions from the ESR sectors do not exceed the Annual Emission Allocation (AEA) limits set by the linear trajectory between 2021-2030. In 2021, Portugal’s ESR emissions were below the annual emission allocation (AEA) by 2.4 Mt CO<sub>2</sub> eq. The data that Portugal reported in March 2023 under the Governance Regulation, included projections for the ESR sectors reaching -38.5% emissions in 2030 below 2005 levels in the WEM scenario and -42% in a WAM scenario. This would suggest that Portugal is on track to achieve its ESR target.

Member States have **flexibilities under the ESR** to comply with their targets. No specific use of ESR flexibilities is mentioned by Portugal. To assess whether Member States comply, the use of saved AEAs from previous years is taken into account.

Table 2: ESR target and projections in Portugal’s draft updated NECP

<b>ESR target and projections<sup>8</sup></b>					
	<b>2030 target*</b>	<b>2021 performance (inventory data) *</b>	<b>2022 performance (approximated data) *</b>	<b>2030 WEM projection*</b>	<b>2030 WAM projection*</b>
<b>Portugal</b>	-28.7%	-17.5%	-16.8%	-	-
<b>EU</b>	-40%	-14.5%	-16.9%	-27%	-32%

\*Compared with 2005 emissions as set out in Annex I of Commission Implementing Decision (EU) 2020/2126.

**The draft updated plan reflects the increased ambition of the new LULUCF Regulation** and the 2030 national target requiring Portugal to deliver additional -0.968 Mt CO<sub>2</sub> eq. of net removals to reach the value of -1.358 Mt CO<sub>2</sub> eq. of net removals in 2030. According to former projections that do not reflect the methodological review carried out in the national inventories, removals from the LULUCF sector in Portugal are projected to overachieve their 2030 target with existing measures. Still, Portugal considers using the flexibilities according to Art. 12, 13, 13a and 13b of the LULUCF Regulation, if achieving the target becomes difficult. Portugal notes it will incorporate in the final version of the NECP an update of its LULUCF projections that will reflect the review of their national inventories.

<sup>7</sup> For the purposes of the projections presented in the existing policy scenario, the policy instruments and measures approved and published by 30 June 2022 have been taken into account. The WAM scenario considers all policies and measures adopted or planned after that date. For the waste sector, agriculture (non-energy component), and for land use, land use change and forestry (LULUCF) activities, as well as F-Gases emissions, modelling work is still ongoing, and the results therefore reflects past projections.

<sup>8</sup> The comparison between the ESR target and emission projections does not take into account the flexibilities available for Member States under the ESR to comply with their 2030 targets. The ESR emissions will be comprehensively reviewed in 2027 (for the years 2021-2025) and 2032 (for the years 2026-2030).

**The draft updated plan describes policies and measures to support the LULUCF sector.** However, the plan provides only limited specific information on the implementation timeframe, the source of funding and, most importantly, the quantification of the impacts of the stated policies and measures. It acknowledges the necessity to address nature restoration as a solution to climate change mitigation and adaptation, including direct habitat restoration, increase in soil organic matter levels and more sustainable agricultural systems. Nature restoration measures are mainly focused on management of forest ecosystems, with some mentions to other systems (grassland, farmland, riparian galleries), but hardly refers to other important ecosystems with an undisputed carbon sequestration role. Nothing is said, for example, about coastal and marine ecosystems, whose restoration offers opportunities for climate change mitigation. Still, the draft updated NECP does not set out a clear pathway to increase the contribution of the land sector to the overall EU's enhanced climate target and does not quantify the mitigation potential of the planned measures because the update of the modelling exercise is still ongoing. Overall, the draft updated NECP does not clearly present how its policies and measures for Portugal's LULUCF sector will contribute to the long-term transition to climate neutrality by 2050. The link between LULUCF removals and biodiversity is vaguely mentioned.

The draft updated NECP does not provide information on the status nor the progress to be made in ensuring that these enhancements, such as to higher tier levels and geographically explicit **datasets**, in line with the provisions under Regulation (EU) 2018/1999 for monitoring, reporting and verification, will be implemented in the draft updated NECP.

**Portugal's draft updated NECP recognises the role of circular economy in climate-change mitigation** and highlights different national policies and measures to help achieve climate targets. This includes the Circular Economy Action Plan (CEAP), which embodies the main axes of environment and climate action policy, and the regional roadmaps that exist or are under development. The plan also recognises the role of circular economy in decarbonisation of the industry sector, by promoting eco-innovation and digitalisation encouraging circularity of material and water use, and the adoption of new business models. In waste management the plan promotes the recirculation of materials and water, the material efficiency of products, incentivising the bioeconomy, etc. The circular economy is considered an integral part of the narrative of the developed socio-economic scenario and was reflected in the sectoral assumptions that supported the modelling of GHG emissions.

**The draft updated plan includes policies and measures for improving access to zero- and low-emission mobility**, including public transport and electrified transport as well as shared mobility. The plan also includes measure to promote soft mobility. It is aligned with the provisions of the new Alternative Fuels Infrastructure Regulation (AFIR) alternative fuel infrastructure and support for mobile assets across transport modes, including retrofitting (e.g., of diesel trains to hydrogen trains), measures to support the deployment of recharging points and hydrogen refuelling stations. The plan includes roadmaps and measures for the production and deployment of sustainable fuels – focusing exclusively on biofuels. However, the plan does not notice the opportunities in relation to production of liquid sustainable e-fuels, mentioned in terms of provision with reference to the maritime sector.

The draft updated plan includes policies and measures in relation to **rail, sea and inland waterways**. The plan refers to sustainable aviation in the narrative, but actions lack details

on how **sustainable aviation fuels** (SAF) will be promoted to contribute to the ReFuelEU Aviation Regulation. Portugal will encourage the development of strategies related to the production of SAF. The plan underlines there is a need for access to various feedstocks, such as hydrogen and carbon, currently in small quantities on the market. Portugal intends to develop guidelines to prevent competition for raw materials. It will promote the phase-out of conventional biofuels also for use in aviation.

The plan does not identify the annual **CO<sub>2</sub> emissions that can be captured** from ETS emitters and from non-ETS sources nor any CO<sub>2</sub> storage capacity. The plan does not foresee the deployment of any dedicated CO<sub>2</sub> transport capacities. Funding targets and a long-term strategy have not been provided. Portugal does intend to promote projects supporting the capture and use greenhouse gas emissions from the purification of landfill gas and biogas from anaerobic digestion and gasification plants, with a view to their valorisation e.g., as raw material to produce synthetic gasses or use in chemical, construction and/or food industries (section 3.5). The plan also introduces a new measure meant to assess the need and feasibility of CCS and CCU in the industrial sector, to be implemented during 2020-2030 (measure 7.1.4).

**Regarding non-CO<sub>2</sub> emissions, there are no sectoral objectives or measures included for the reduction of methane emissions from the energy system**, including measures targeting the measurement, reporting and verification of methane emissions from oil, gas and coal sectors. The plan pays some attention to mitigating non-CO<sub>2</sub> emissions in agriculture, and measures include promoting the installation or the reconversion of effluent management and treatment systems for livestock and improving digestibility of feed (e.g., 6.2.2. Support improvement in digestibility in animal nutrition). Those tackling **nitrous oxide** emissions target the use of fertilisers through the adoption of codes of good agricultural practices and replacing mineral fertilisers with organic ones. The draft updated plan also includes measures for the development of biogas and bio-methane (e.g., 3.6.8. Establishment of the Biomethane Action Plan) and links their production to the use of agricultural waste, organic waste, and landfills (e.g., 3.6.7. Setting up support mechanisms to increase the installed capacity of biodigesters). The plan also provides some information on measures aimed at mitigating methane emissions in waste management (e.g., 1.4.3. Reduce landfilling) and emissions of **F-gases** (e.g., 7.3.3. Minimise the consumption of fluorinated gases with a view to replacing them with natural refrigerants). However, the plan describes all these measures only vaguely and their impact on non-CO<sub>2</sub> emissions remains unclear. This unclarity is problematic, because the largest sources of non-CO<sub>2</sub> emissions are methane emissions in waste management and from enteric fermentation in agriculture, HFCs from refrigeration and air conditioning, and N<sub>2</sub>O from agricultural soils. Moreover, non-CO<sub>2</sub> emissions accounted for 41% of all greenhouse gas emissions within the Effort Sharing sectors in 2021. The limited information undermines the robustness of the analysis underpinning the attainment of the target set by the Effort Sharing Regulation.

In the **building sector**, measures focus on reducing the carbon intensity, including those owned by local, regional, and central public administrations and public companies, by consuming energy more efficiently, promoting further electrification and the use of alternative gases such as biomethane, replacing fossil fuels with renewable energy sources, promoting the use of low carbon impact materials, promoting behavioural change, and increasing the circular and sharing economy. A particular focus lies on the rehabilitation of buildings to increase energy and water efficiency and increase thermal comfort, contributing also to reducing energy poverty. Unfortunately, for most measures the timing,

scope and expected impact are not developed, nor whether they are existing or newly planned measures.

**The analytical basis of the draft updated plan includes an assessment of the impact of policies and measures on the achievement of the GHG mitigation targets** contained in the draft updated plan, even though their individual impact is not always quantified. The policies and measures are generally described in insufficient details in terms of scope, timing, and likely impact.

**The draft updated NECP reflects some progress towards international commitments under the Paris Agreement.** In 2021, Portugal stopped coal-fired electricity production, anticipating its initial commitment (2023) by closing the two plants operating in mainland Portugal – Pêgo and Sines. Another example of this was the closure of the Matosinhos Refinaria in 2021. Portugal is also phasing out coal tax exemptions by 2030. The plan also contains a provision banning the use of fossil natural gas for electricity production from 2040, provided security of supply is ensured. Portugal does not exploit or produce coal, crude oil or natural gas. The phasing out of fossil fuel subsidies is discussed, though not extensively. It includes the intention to phase-out environmentally harmful subsidies, albeit without a clear timing, strengthening the application of the carbon levy and promoting increased taxation on resource use, recycling, and revenues for decarbonisation and just transition. Portugal introduced emergency measures including fossil fuel subsidies to limit the impact of high energy prices, however, it has not stated how and when it intends to phase out such measures in line with the decarbonisation objectives and the 2023 country specific recommendation. There is also a reference included to the Climate Basic Law of December 2021 that mentions the intention to phase out by 2030 fiscal and tax policies set out in national legislation concerning fossil fuels or their use, be they direct or granted through tax advantages.

**On 15 January 2020, Portugal submitted to the Commission its national long-term strategy.** The strategy includes the goal of achieving climate neutrality by 2050. The goal is enshrined into law. In March 2023, Portugal reported on the status of implementation of its initial NECP, where the climate-neutrality objective was confirmed. This climate-neutrality goal is reiterated in the draft updated NECP.

### *3.1.2 Adaptation*

**Portugal has in general terms identified the relevant climate vulnerabilities and risks** that may threaten the achievement of national objectives, targets and contributions in the five dimensions of the Energy Union and has put a national adaptation policy in place. None of the threats are however described in quantitative terms, and adaptation goals are general and are not concretely linked to achieving goals in the energy transition or energy security.

**Emphasis is placed on water management.** Notably, the draft NECP update present a comprehensive approach to enhance water resilience with a strong focus to adapt to structural or and seasonal water scarcity as well as droughts, in particular as regards the agricultural sector. It indicates links to the governance under the water acquis (River Basin Management Plans), but seemingly without precise or quantified measures neither with the development of Drought Management Plans. The draft updated NECP suggests a strong focus on water storage as adaptation measure, as means to store energy ('pumped reversible hydropower') and implicitly also as buffer facility for water provision. There

does not seem to be (a reference to) an assessment on the robustness of these arrangement in severe drought episodes. In addition, the plan indicates the promotion of water recycling and desalination, but without a clear indication of the water volume capacity at stake.

There are no specific plans concerning **nature-based solutions**. However, some of the proposed adaptation measures against wildfires do use nature-based approaches. There is no specification of protection goals, despite sentences against Portugal at the European Court of Justice because of insufficient conservation measures in Natura 2000 sites.

**Innovative approaches** such as insurance policies and fiscal measures addressing the climate protection gap are not described. Investments aimed at minimising environmental impacts, such as combating biodiversity loss, promoting water retention in the soil, and reducing nitrates emissions into water are considered but only described in general terms.

### 3.1.3 Renewable energy

**The renewable-energy contribution proposed by Portugal in the draft updated NECP is for renewables to achieve a share of 49%** of Portugal's national gross final consumption of energy in 2030. This proposal is based on the WEM scenario. However, it seems that the estimated trajectories for the sectoral shares and renewable technologies are based on preliminary results of the WAM scenario<sup>9</sup>. Absolute values in terms of energy in ktoe were included only for the WEM scenario. This contribution is slightly below the minimum share of 51% resulting from the formula in Annex II of the Governance Regulation. The scenarios set out in the draft updated NECP do not provide yearly overall renewable energy contribution trajectories up to 2030 and do not include information beyond this period until 2040. The indicative trajectory to reach the 49% contribution in 2030 is provided, including specific reference points for 2022 (renewables share of 34%), 2025 (a renewable share of 39%) and 2027 (a renewable share of 43%)<sup>10</sup>. The submitted reference point for 2022 reaches the trajectory calculated in line with the 2030 EU renewable-energy target of 32%. However, the reference points for 2025 and 2027 (40% and 44% respectively) are below the trajectory calculated in line with the increased EU 2030 renewable energy target of 42.5%<sup>11</sup>.

**Based on the WAM scenario, the renewable electricity generation is projected to reach 85% of all electricity generated in 2030**, with solar power becoming the main source of renewable electricity (43.4% share and 20.4 GW of installed capacity, with around three quarters coming from centralised sources), ahead of wind (26.4% share and 12.4 GW of installed capacity, of which 2 GW offshore wind) and of the current main source which is hydropower (17.2% share and 8.1 GW of installed capacity). The

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<sup>9</sup> Portugal indicates that the draft updated NECP presents results for an existing policy and measures scenario (WEM) and a preliminary additional policy and measures scenario (WAM) which will be finalised in the final updated Plan.

<sup>10</sup> Reference points of 18% by 2022, 43% by 2025 and 65% by 2027 pursuant to Article 4(a)(2) of Regulation 2018/1999 pursuant to Article 4(a)(2) of Regulation 2018/1999.

<sup>11</sup> Given that the provisionally agreed RED was not yet in force by the deadline of the submission of the draft NECPs, the value for 2022 has been compared to the trajectory values calculated on the basis of the 2030 EU renewable energy target of 32%. The reference points for 2025 and 2027 are compared to the trajectory calculated on the basis of the increased EU target of 42.5% in line with the revised REDII.

development of 2 GW of offshore wind, and allocation of 10 GW in auctions by 2030, indicated in the draft updated NECP, represents Portugal's updated goal in the context of the Atlantic offshore grid's sea basin agreement of January 2023, building on its initial offshore goal of developing 10 GW by 2030. Bioenergy is expected to account for 3% of electricity generated in Portugal in 2030 and 1.4 GW of installed capacity, compared with the current level of 1.2 GW. The draft updated NECP also foresees new installed capacity from concentrated solar power (0.6 GW), ocean energy (0.2 GW) and geothermal (0.1 GW) by 2030. Although Portugal refers in general terms to the promotion of pilot projects including concentrated solar, thermal and wave energy and has ambitious plans for floating offshore wind, the draft updated NECP does not include information on the **innovative target for renewable energy deployment**. To support innovation, Portugal plans to create a Technological Free Zone off Viana do Castelo for the development of demonstration projects. For the assessment of its potential, a multi-disciplinary and inter-ministerial working group at national level was created in 2022. Moreover, Portugal intends to promote floating solar. An auction on floating solar was already carried out in 2021. Portugal intends to encourage the development of hybrid systems based on renewable energy, coupled with storage.

**The use of renewable energy in the heating and cooling sector is projected to reach a share of 43% by 2025 and 47% by 2030.** The corresponding annual average increase is below the binding annual average increase of 0.8 percentage-points for the period 2021-2025 and 1.1 percentage-points for the period 2026-2030 set out in line with the revised RED II. Without providing detailed explanations, Portugal states that it is one of the EU Member States where it may not be possible to increase the share of renewable energy sources by these percentage points. The role of waste heat and cold and the accounting of renewable electricity in the trajectory remain unclear. In light of its climatic conditions, Portugal does not envisage to develop district heating during this decade. The gross final consumption of energy from **heat pumps** is expected to increase only by 5% in 2030 compared to 2025, reaching 854 ktoe by 2030. However, the electricity needed to run these heat pumps and the projected capacity increase were not included. Portugal expects to increase the contribution of solar thermal and renewable gases to renewable heating. The projected renewable energy use in **industry** was not provided as an average over the 2021-2030 period, nor was the renewable energy use in **buildings** in 2030.

**In the transport sector, the share of renewable energy is projected to reach 23% in 2030 energy terms.** Portugal has not provided the equivalence of the target in GHG emissions reduction by 2030. Decarbonisation of the transport sector will be achieved by electrification, the use of advanced biofuels and RFNBOs, and the promotion of public transport. To support alternative modes of transport, Portugal will maintain measures to reduce the cost of public transport and increase its capacity, while improving the quality of the service. Portugal aims to progressively replace consumption of fossil fuels in the transport sector with electricity, advanced biofuels, renewable synthetic fuels, green hydrogen and biomethane, with significant environmental and efficiency gains. However, the draft updated NECP does not include details on the trajectories of different types of renewable fuels, the limitations on the use of conventional biofuels or a quantification of available feedstocks and its impacts on biodiversity. Similarly, while putting a focus on electrification of the transport sector, Portugal does not indicate a specific target for electric vehicles by 2030, nor for recharging infrastructure. On the other hand, the draft updated NECP includes measures to promote the uptake of electro-mobility (both related to

vehicles and to the recharging infrastructure), including promotion of smart and bidirectional charging, and integration of renewable energy sources on islands.

**Portugal's draft updated NECP states that the country is expected to have a capacity of electrolyzers for hydrogen production of 5.5 GW in 2030** and aims to blend renewable hydrogen and other renewable gases such as biomethane in the gas network. However, Portugal intends to revise its National Hydrogen Strategy and it is mentioned that blending shares could also be revised. The draft updated NECP does not provide an updated revision of the figures and the impacts in line with the aforementioned measures, nor a target for **RFNBO** use in transport and industry sectors. Portugal's draft updated NECP does not list or mention **international partnerships** to facilitate imports and exports of renewable hydrogen.

The draft updated NECP includes a general overview of existing and additional **policies and measures** to support the achievement of the proposed objectives and contributions for renewable energy. However, it lacks sufficient details notably as regards the timeframe, budget and expected impacts. In the **electricity sector**, the country's objective is to accelerate the production of electricity from renewable energy through the use of reverse auctions. Portugal states that the frequency and the number of auctions, their target technology and format will be defined on an annual basis. However, Member States are required under Article 6(3) of the REDII to publish a long-term schedule anticipating the expected allocation of support, covering, as a reference, at least the next five years. Portugal indicates in its draft updated NECP that the planning for auctions for offshore wind has been adopted. However, no information is provided notably on the aim to increase the use of Power Purchase Agreements. Portugal recognises the essential role of Guarantees of Origin for consumers' information. The draft updated NECP sets out new measures focusing on Guarantees of Origin for renewable gases, including hydrogen. When it comes to **joint projects** with neighbouring Member States Portugal has established a framework for regional cooperation with France and Spain. However, the draft updated NECP does not explain whether regional cooperation initiatives will lead to the establishment of joint projects with another Member State.

The draft updated NECP refers to the need to ensure an accelerated deployment of solar energy and to the importance that solar power will have in the Portuguese electricity system in line with the EU Solar Energy Strategy. **Individual and collective self-consumption of solar energy as well as renewable energy communities** are considered means to achieve the objectives of the EU Solar Strategy. It will be promoted through measures aimed at removing barriers to self-consumption, disseminating information, and facilitating access to finance, supporting the establishment of energy communities at municipal level, implementing an electronic information portal, and creating guides and training.

Portugal has not indicated in the draft updated NECP whether it has put in place a strategy on **energy system integration**. Nevertheless, the country has provided information on measures taken to facilitate it. Such measures include setting national objectives to increase energy system flexibility, in particular by means of deploying domestic renewable energy sources, demand response and energy storage. Portugal expects an increase in storage capacity through pumped reversible hydropower (3.9 GW in 2030) and production of renewable hydrogen for injection into gas grids by 2030, and at a later stage of the decade a contribution from battery technologies (1 GW in 2030). Portugal has indicated that incentives for behind-the-meter storage in buildings and industry will be relevant to reduce



variations in the daily load profile in the electricity grid, as well as the use of smart charging for electric vehicles and their participation in local or system flexibility services, although without indicating quantified outputs.

**Measures for renewable heating and cooling** set out in the draft updated NECP (including measures to be implemented under Article 23(4) of the revised REDII) include the replacement of outdated heat and cold production systems with more efficient renewable energy systems, and the electrification of heating and cooling via heat pumps. Portugal aims to put in place a dedicated national action plan for the uptake of heat pumps in buildings and industry. The draft updated NECP also includes a measure aimed at promoting efficient use of heating and cooling through increased awareness and consumer participation in demand aggregation. However, the draft updated NECP does not allow for a comprehensive assessment of the contribution of technologies and additional policies and measures that could overcome barriers to the penetration of renewable energy sources in the heating and cooling sector.

**On the industry sector**, the draft updated NECP contains measures to promote the use of renewables (particularly solar energy, renewable hydrogen and biomethane) and the renewables-based electrification of industrial processes aiming to replace fossil fuels used for industrial heating. However, no specific targets are provided for the replacement of fossil fuels and some of the measures included in the plan are formulated only in general terms. Moreover, the plan does not indicate whether the envisaged water desalination plants will be largely fuelled by renewable energy sources.

Portugal projects an increase in the use of biomass for **bioenergy**, mostly related to biomethane production, but does not provide supporting numbers. Biomethane is mentioned as a main tool to decarbonise sectors of the economy that currently have few alternative technological options and where electrification in the short to medium term could lead to significant costs. The support system is well rounded to accelerate biomethane production and use in hard to electrify sectors. Neither the available amounts of sustainable biomass nor the impacts of this increased demand on carbon sinks and biodiversity are quantified. Portugal includes projections on the renewable energy share by sector and technology, as well as estimates on the projected bioenergy demand per sector in 2030. However, the draft updated NECP does not include data on biomass supply by feedstock and on the origin of the feedstock, differentiating between domestic production and import, the source of forest biomass used for energy, nor an evaluation of the impact on the LULUCF sink and biodiversity. The latter should include the assessment of the domestic supply of forest biomass for energy purposes 2021-2030 under the revised sustainability criteria based on the revised RED II, and of the compatibility of the projected use of forest biomass for energy production with Portugal's new obligations under the revised LULUCF Regulation, particularly for 2026-2030, together with national measures and policies ensuring such compatibility.

The draft updated NECP includes a **mapping of the areas** necessary to achieve Portugal's national contribution to the Energy Union's renewable energy target. Portugal does this by developing a "Renewables Go-To Areas" Sectoral Programme and designating areas for renewable energy exploitation in the Atlantic Ocean. However, the plan includes only limited considerations for how these "go-to-areas" should take into account risks to the marine environment. To streamline administrative procedures and time limits for **permit granting**, the draft updated NECP refers to a contact point for project promoters. Portugal plans to establish a one-stop-shop to speed up permitting procedures for renewable energy

production projects, reduce permit times and make simple information available to developers and citizens. The one-stop-shop, which still needs to be operationalised, will be supported by an electronic platform that will facilitate the processing of licensing procedures and the provision of information on them. A Mission Unit for Licensing of Renewable Energy Projects (UMER 2030) was created to ensure a fast deployment of renewable energy, including by developing a programme for renewables acceleration areas and empowering staff of central, regional, and local authorities involved in permitting. The draft updated NECP has not elaborated on the additional human resources dedicated to permitting. However, funding for training for civil service officials is envisaged in the amended RRP.

### 3.2 Energy efficiency (including buildings) dimension

Portugal proposes a corrected **national contribution** of 20.8 Mtoe for primary energy consumption in 2030, corresponding to a primary energy consumption reduction of 0.18 Mtoe/year until 2030 compared to the 2017-2019 average<sup>12</sup>. Portugal's reported 2030 contribution for primary energy consumption deviates from the result of the formula in the EED recast Annex I by 37.2%.<sup>13</sup> Portugal specifies its contribution compared to the one submitted in the 2020 NECP, previously provided as a range from 21.5-15.6 Mtoe for primary energy consumption, by setting it at the upper end of the range at 20.8 Mtoe for primary energy consumption in 2030. The target for 2030 primary energy consumption is set at a lower level (-7.6%)<sup>14</sup> as compared to the Portuguese 2020 energy efficiency target. Regarding final energy consumption in 2030, Portugal did not revise the target provided in the 2020 NECP, which was set as a range between 14.4-14.9 Mtoe.

**The target on reducing total final energy consumption of all public bodies is not well described.** The draft updated NECP does not explain whether Portugal intends to include or exclude public transport and armed forces.<sup>15</sup> The draft updated NECP provides information on what measures will be used to deliver on the savings required post-2020 under Article 7 EED (Article 8 EED recast) on the **energy savings obligation**, though with limited details. Portugal adopts a mixed approach, including both an **energy efficiency obligation scheme (“EEOS”)** and alternative measures. The total 2021-2030 cumulative savings requirement is 6,739 ktoe. The planned measures to reach the target include the promotion of more efficient equipment, improved management of energy consumption in various sectors of the economy, adoption of more efficient agricultural and forestry practices in energy and water, and promotion of energy and resource efficiency. The draft updated NECP also includes some actions for energy efficiency in industry, but the information regarding the promotion of energy audits is limited.

The draft updated NECP presents some **policies and measures**, including new and updated measures in comparison with the initial NECP. However, overall, the policies and

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<sup>12</sup> The 2017-2019 average has been calculated based on the EED recast FEC definition, and the savings per year have been calculated for the period 2021-2030.

<sup>13</sup> According to Article 4(4) EED recast, a Member State shall ensure that its contribution in Mtoe is not more than 2.5% above what it would have been had it resulted from the EED recast Annex I formula.

<sup>14</sup> The comparison has been done with the 2020 target as included in the final NECPs 2020 JRC assessment (22.5Mtoe PEC)

<sup>15</sup> To be noted that measure 1.5 on the decarbonisation of the public administration clearly considers the electrification of the car fleet of the Public Administration but does not refer to public transport.

measures included under the energy efficiency dimension are not described in sufficient detail and do not include an estimation of expected energy savings. The plan is missing relevant information on how each of the identified policies and measures will contribute to the achievement of the 2030 energy efficiency contributions, which makes it difficult to assess Portugal's trajectory in this regard.

The draft updated NECP does not raise the ambition of Portugal's 2021 **long-term renovation strategy** (LTRS) but reports information on its key elements, targets, and milestones. The LTRS has the target of saving 11% of primary energy in 2030, 27% in 2040, and 34% in 2050 compared to 2018 levels. The expected total renovated area is 364 million square meters in 2030 and 748 million in 2050. The draft updated NECP refers to all targets by type of building (residential, non-residential, total), mentioning several result indicators by 2030, 2040, and 2050 (including renewables, primary energy saving, number and floor area of renovated buildings, etc.).

Based on the LTRS, Portugal reports eight measures on building renovations, including planning, regulatory and economic measures. However, no information is provided on the expected impact of these measures in terms of energy savings. Therefore, it is not possible to assess the cumulative contribution of these measures to the achievement of the final targets. Furthermore, investment needs and barriers to the implementation of the LTRS are not described in the draft updated NECP. The plan lacks tools to strengthen Portugal's framework for financial schemes to leverage private investment for energy efficiency renovations.

### 3.3 Energy security dimension

Fossil fuels still play an important role in Portugal's energy mix. In 2021, fossil fuels still accounted for 68% of the country's gross available energy, which is very close to the EU average<sup>16</sup>. According to the draft updated NECP, this share should decrease to around 50% by 2030 and 40% by 2040, which is an ambitious trajectory. Portugal has substantially reduced its energy import dependency from 73% in 2013 to 67% in 2021, with the share of third countries in energy imports decreasing in parallel from 70% in 2013 to 59% in 2021<sup>17</sup>. According to the draft updated NECP, the energy import dependency should continue to slightly decrease to 65% by 2030 (the forecast has not changed compared to 2019 NECP, while energy import dependency decreased by more than 10 percentage points since then). The draft updated NECP shows a good level of ambition in strengthening energy security. However, it only addresses security of supply issues for continental Portugal and not the Autonomous Regions (Azores and Madeira). The draft updated NECP does not assess how these islands could increase energy self-sufficiency through deployment of renewable and storage technologies.

**Natural gas** is the third main source in Portugal's primary energy mix, with a share of 23% in 2021 (close to the EU27 average of 24%) and 31% in the electricity mix, well above the EU27 average of 20%<sup>18</sup>. Despite its variety of suppliers, Portugal is fully dependent on imports as it does not produce any fossil fuels domestically. In 2021, Portugal

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<sup>16</sup> Eurostat data.

<sup>17</sup> Eurostat data.

<sup>18</sup> [https://energy.ec.europa.eu/data-and-analysis/eu-energy-statistical-pocketbook-and-country-datasheets\\_en](https://energy.ec.europa.eu/data-and-analysis/eu-energy-statistical-pocketbook-and-country-datasheets_en).

was relying on imports from third countries for 100% of its gas needs, of those only 14% of gas imports were from Russia<sup>19</sup>. Nevertheless, Portugal has a solid security of gas supply, with the increase in underground storage capacity of Carriço (to 322.6 mcm) bringing its overall gas storage capacity to 3.6 TWh, and the commissioning of the Sines LNG terminal infrastructure contributing substantially to the diversification of Portuguese gas imports and to the overall resilience of the energy system.

The draft updated NECP outlines convincing **policies and measures** to maintain security of gas supply, in particular with ambitious targets for the uptake of renewable gases both in the electricity, heating and cooling and transport sectors as well as in the gas grid. The draft updated NECP also aims to promote diversification of energy supply sources and routes, notably through the strengthening of external cooperation, the creation of a sustainable market for maritime LNG and the creation of a market for alternative fuels. The plan envisages the development of a timetable for the replacement of gas for electricity production with an increasing share of renewable gases, leading to the full decarbonisation of gas power plants by 2040, provided this does not compromise security of supply. This is a welcome ambition, with most of Portugal's current gas consumption being used for power generation, which may represent a risk to security of electricity supply.

Portugal reduced its **gas demand** by 20% between August 2022 and August 2023 in comparison with the average of the previous five years, well above the 15% target and the EU27 average of 18%<sup>20</sup>. This is partly thanks to the Energy Savings Plan 2022-2023 adopted in response to Regulation 2022/1369 on coordinated demand-reduction measures for gas. The Energy Savings Plan focuses on demand-side management with the following drivers: energy efficiency in industry, energy and water efficiency in the residential sector and trade and services, and the promotion of renewable electricity generation for self-consumption. The draft updated NECP does not, however, show how the emergency measures adopted in response to the invasion of Ukraine, in particular with regard to gas demand reduction, are integrated into the medium-term planning towards 2030.

Portugal relies on its high renewable energy potential to decarbonise its **electricity sector** with domestic resources such as water, wind, and sun as well as biomass and geothermal, which also supports a diversification of energy sources. Portugal aims to achieve a share of renewable electricity generation of 80% in 2026 and 90% in 2030. The draft updated NECP considers the power system reliable and adequate despite ambitious goals, such as the early closure of Portugal's two remaining coal-fired power plants in 2021 instead of 2023. However, Portugal's security of electricity supply assessment does not address the impact of more frequent droughts on hydropower output in detail. The assessment of security of supply conditions is performed with probabilistic indicators resulting from modelling, and Portugal refers to the Risk Preparedness Plan submitted to the Commission in 2023 for its risk analysis of the power system.

To support security of electricity supply, Portugal relies on **storage and flexibility services**. The plan sets out a line of action to promote storage systems and mentions the development of a national strategy on storage. Portugal envisages to mainly resort to pumped storage and renewable hydrogen up to 2030, and batteries only at a later stage. In

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<sup>19</sup> European Commission,

<sup>20</sup> DG ENER Chief Economist Team based on ESTAT NRG\_CB\_GASM (sub-series IC\_CAL\_MG subtracted by TOS) in TJ (as of 29 September 2023, 11:00)

2022 the hydroelectric power plants of Gouvães (880 MW, pumped storage) and Daivões (114 MW) entered into operation. The completion of the Hydroelectric Complex of Alto Tâmega (in particular Gouvães) by 2026 will further increase installed pumped storage capacity. A strategic water reserve in reservoirs with hydroelectric power plants was introduced in 2022. Portugal expects to reach 3.6 GW of pumped storage capacity in 2025 and 3.9 GW in 2030 and 1 GW of batteries in 2030. However, the plan does not set a clear timeline for the implementation of this strategy and remains very general in its description of the measures and programmes to support the development of storage.

According to a study on storage commissioned by the European Commission, Portugal's current operational power storage capacity is around 4,867 MW<sup>21</sup>. Portugal also plans to develop a National Strategy for Storage by 2025 and to promote, among others, storage on its islands - examples exist in the Autonomous Regions of Azores and Madeira.

**Oil** was the first energy source in the energy mix in 2021, accounting for 42%<sup>22</sup>. Oil products are mostly used for domestic transport (51%), international bunker fuels (20%) and industry (16%)<sup>23</sup>. Portugal imports all its crude oil from diversified sources (top suppliers were Brazil, Nigeria, Azerbaijan in 2021<sup>24</sup>). The country has direct access to the sea, one refinery and is consistently well-above the EU requirements on emergency oil stocks. According to the draft updated NECP, oil consumption is set to decrease due to decarbonisation measures, notably through electrification and broader use of biofuels. Nonetheless, oil will continue to comprise 20-30% of the energy mix until 2030. The draft updated NECP does not assess the adequacy of the oil infrastructure (refinery, oil stocks) with the expected oil demand decline and the move toward biofuels.

The draft updated NECP mentions that **cyber-attacks, physical threats to infrastructure and climate related events**, such as heat waves and extreme droughts, were considered in Portugal's Risk Preparedness Plan. Prolonged interruption of critical supply chains is also one of the electricity crisis scenarios identified in the Risk Preparedness Plan, although it is not clear if **this also includes critical raw materials**.

The draft updated NECP describes in a precise manner the relevant **risks for energy supply in Portugal**, as identified in the latest National Risk Assessment and in the Risk Preparedness Plan for the electricity sector. However, the draft updated plan does not describe measures in the event of a security of supply crisis for the gas sector, except in relation to the Preventive Action Plan and the Emergency Plan. Portugal submitted its National Risk Assessment, its Preventive Action Plan, and its Emergency Plan to the

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<sup>21</sup> This figure is derived from the database which accompanied the ENTEC study on Storage funded by the European Commission and published in November 2022, by taking into account only the "operational" facilities: [https://op.europa.eu/en/publication-detail/-/publication/dfcaa78b-c217-11ed-8912-01aa75ed71a1/language-en?WT\\_mc\\_id=Searchresult&WT\\_ria\\_c=37085&WT\\_ria\\_f=3608&WT\\_ria\\_ev=search&WT\\_URL=https%3A//energy.ec.europa.eu/](https://op.europa.eu/en/publication-detail/-/publication/dfcaa78b-c217-11ed-8912-01aa75ed71a1/language-en?WT_mc_id=Searchresult&WT_ria_c=37085&WT_ria_f=3608&WT_ria_ev=search&WT_URL=https%3A//energy.ec.europa.eu/)

<sup>22</sup> [https://energy.ec.europa.eu/data-and-analysis/eu-energy-statistical-pocketbook-and-country-datasheets\\_en](https://energy.ec.europa.eu/data-and-analysis/eu-energy-statistical-pocketbook-and-country-datasheets_en)

<sup>23</sup> 2019 figures. <https://iea.blob.core.windows.net/assets/a58d6151-f75f-4cd7-891e-6b06540ce01f/Portugal2021EnergyPolicyReview.pdf>

<sup>24</sup> Eurostat: [https://ec.europa.eu/eurostat/databrowser/view/NRG\\_TI\\_OIL\\_custom\\_7357781/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/NRG_TI_OIL_custom_7357781/default/table?lang=en)

European Commission, as well as all its Common Risk Assessments at regional risk group levels (both Algeria and Norway risk groups).

### **3.4 Internal energy market dimension**

On **infrastructure developments**, the draft updated NECP includes an objective to reach the 15% interconnectivity targets by 2030 and reference to the role of H2Med (Celza) and Projects of Common Interest (PCIs) as part of the principal infrastructure. Furthermore, the draft updated NECP includes several measures to accompany the development plan of transmission system operators and distribution system operators.

Regarding planned policies and measures in the **electricity infrastructure**, the draft updated NECP notably introduces internal reinforcements to achieve the desired interconnection levels with Spain. The plan also directly refers to the High-Level Group of Southwest Europe as the regional cooperation forum to address the issues. However, plan does not refer to the ongoing PCI: interconnection between Fontefria (ES) — Ponte de Lima (PT) and Ponte de Lima — Vila Nova de Famalicão (PT). Moreover, the plan also mentions projects on maritime exports of hydrogen for Portugal, even if not directly related to the infrastructure objectives.

**On the integration of the internal energy market**, the plan does not refer to targets or measure for the improvement of competitiveness of the retail energy sector.

With regards to the increased renewable energy target, and the need to enable the consumers to rapidly reap the benefits of renewables, the plan outlines the policies and measures needed to incentivise demand response. However, the plan does not provide a clear overview of the flexibility needs and, in many cases, fails to set out concrete measures and clear milestones to reach the stated objectives.

In addition, the plan does not seem to contain measures to engage the system operators in facilitating the penetration of flexibility services including through aggregation, in all energy markets, and no targets are set thereunder either. Reference is duly made to legal framework DL 15/2022 which leads to a more decentralized energy system, referring for instance to the installation of smart meters, the legal establishment of citizen energy communities and the provision of dynamic supply contracts. The plan mainly refers to four indicators for consumer participation in the energy system: installed capacity in own consumption (individual and collective), energy communities, citizens energy communities and access to consumption management information. A single figure is provided for 2021 for the first indicator.

**On energy poverty**, the plan does not set a specific target although it reports that the alleviation of energy poverty is part of the broader strategic objective to guarantee the just energy transition. Portugal's plan does not provide an assessment of the number of households in energy poverty pursuant to Article 3 of the Governance Regulation and in relation to the new definition of energy poverty in the EED Recast and the Social Climate Fund. The plan does not investigate the situation of energy poor households vis-a-vis the larger category of vulnerable households. While the plan mentions the existence of a social tariff as a mechanism to support vulnerable households, it lacks detail as to how the social tariff will evolve in the coming years. The latter is particularly important in view of the expansion of the measure's scope in response to the energy crisis and the fact that such measures, by law (Electricity Directive 2019/044) should be limited in time.

The draft updated NECP refers to some planned policies and measures addressing energy poverty, such as the planned adoption of a Long-Term National Energy Poverty strategy (2022-2050), the creation of a National Energy Poverty Observatory and the Valle programme. However, the plan does not provide objectives and concrete timetables to develop the measures, in particular in relation to the milestones included under the RRP. In addition, the draft updated NECP includes complementary measures to promote local strategies addressing energy poverty as well as measures for better dissemination of information to consumers, such as the development of one stop shops promoting energy efficiency and self-consumption of renewable energy. However, the plan is **missing an assessment of structural policies and measures to address energy poverty** through energy efficiency, building renovation, consumer empowerment and access to renewables.

Portugal's plan does not specify national objectives to **protect vulnerable consumers**, but several measures are vaguely detailed including the creation of tools to protect vulnerable citizens and to promote their involvement as active consumers that contribute and benefit from the energy transition. The plan envisages measures to promote information for consumers and businesses by improving energy literacy and facilitating simplified interaction with the market. Some initiatives have already been implemented by the Distribution System Operator (DSO) and the National Regulatory Authority (ERSE).

### **3.5 Research, innovation, competitiveness and skills dimension**

#### *3.5.1 Research and innovation*

The draft updated NECP reports on Portugal's recent commitment to channel **3% of GDP towards research and innovation (R&I) in 2030**. This national funding target will include 0.2% investments in R&I in energy and 0.2% investments in water and climate.

Portugal intends to initially focus **R&I programmes** on: intelligent energy management systems and new infrastructure; energy storage; low carbon technologies; energy efficiency; and hydrogen as an energy carrier. Portugal has developed Thematic Research and Innovation Agendas focusing on several areas such as climate change, circular economy, industry and manufacturing and sustainable energy systems. Through the agendas Portugal aims to mobilise experts from R&I institutions and businesses in identifying challenges and opportunities within the national scientific and technological system. The draft updated NECP provides an overview of both existing and new policy measures related to R&I grouped under different lines of actions: supporting R&I in the transition to carbon-neutral economy; energy efficiency; renewable energy, storage, hydrogen, advanced biofuels and other 100% renewable fuels; and innovative and competitive low-carbon industry. An indicative timeline is provided for each outlined measure. However, while the plan refers to several funding sources for the listed measures, it does not describe dedicated amounts and sources of funding for each. Moreover, it does not provide any R&I pathways to 2030 and 2050 for specific clean energy technologies.

The draft updated NECP highlights the importance of Portugal's participation and cooperation within the **SET Plan** and its Implementation Working Groups. The draft updated NECP puts emphasis on the SET Plan's alignment with the Portuguese Multi-Level Strategy, which has promoted inter-institutional cooperation and actions to address societal challenges in relevant areas. However, beyond the SET Plan, Portugal does not provide any additional examples of regional cooperation in energy R&I.

### 3.5.2 Competitiveness

The draft updated NECP provides information on Portugal's **competitiveness objectives**, which are predominantly related to development of the necessary skills for the transition. Portugal does not, however, set out clear objectives and investments for the manufacturing scale-up of specific clean energy technologies, components, and equipment. Moreover, the plan lacks information on how Portugal will reduce sectoral dependencies and ensure the resilience of its supply chains in case there is not enough domestic production of these components and equipment to reach its climate and energy targets. Nevertheless, the draft updated NECP sets out a measure focusing on suppliers of goods and equipment needed to ensure the climate and energy transition, though with limited details.

The draft updated NECP underlines that energy and climate related competitiveness programmes should include the following themes: supporting participation in high-quality international research and development; the establishment of technological pilots; qualification, empowerment, and mobility; the creation of industrial clusters in new areas of technological development; the promotion of business models based on low-carbon products and services; the implementation of results. Yet, the plan does not provide information on concrete measures and investments related to these focus areas.

The draft updated NECP puts emphasis on the need to promote the **transition to a circular economy**, which is presented as a key component of the country's decarbonisation strategy. The impact of the circular economy on GHG emissions reduction is modelled and integrated in the quantitative analysis. The circular economy is considered under the overview of investment needs.

The draft updated plan lists very broad actions and measures to promote the **digitalisation of the energy system**. These include the expansion of smart meters and the development of smart grids, a long-term plan for the digitalisation of the energy sector and network information, sensation, and automation systems. However, the plan does not describe these actions in sufficient detail.

### 3.5.3 Skills

Portugal's draft updated NECP puts a central **focus on training and reskilling programmes in the field of energy** to advance the country's competitiveness. It reports that Portugal's 2030 Strategy which identifies skills, together with digitalisation and innovation as one of the drivers for the country's economy. The plan reports on several existing and planned measures to address identified skills gaps, but without setting clear and quantifiable objectives. For instance, the plan mentions the "Green Skills and Jobs Programme" put forward in January 2023 by the Institute for Employment and Vocational Training, which aims to foster reskilling of workers in the fields of renewable energy and energy efficiency. Moreover, the draft updated NECP announces a new measure to promote the training and re-skilling of the professional sector for the energy and climate transition; the development of a programme for capacity-building focusing on individual and collective self-consumption of renewables and renewable energy communities; and a series of measures to promote vocational training for the energy efficiency sector. In addition, the circular economy is discussed from the skills perspective. The plan does not, however, make a connection to, for instance, the SET Plan revision, relevant European



Year of Skills initiatives, Pact for Skills large scale partnerships, and the New Innovation Agenda in this regard.

## 4 JUST TRANSITION

**Just transition is partially addressed in the Portuguese draft updated NECP.** An analysis of employment, skills, and social impacts of the energy and climate transition is lacking, including of the distributional impact of the climate and energy transition on low-income earners and vulnerable households. In addition, the draft updated plan does not provide sufficient information for the preparation of the Social Climate Plan, as assessed in chapter 7.

The draft updated NECP lists several measures under the national competitiveness objectives that promote the just energy transition. There is a focus on **education, training, and reskilling** of workers, particularly in sectors most impacted by the transition (e.g., training on renewable technologies for workers in the coal power sector and creation of an innovation centre near the closed Matosinhos refinery – both financed by the Just Transition Fund (JTF)). Another programme aims to qualify unemployed people for jobs in the renewable and energy efficiency sectors. On the other hand, the plan does not include information on supporting **employment** more broadly in the context of the transition, including measures adopted to promote job creation and entrepreneurship in green activities beyond these specific areas.

Furthermore, the draft updated plan mentions some policies and measures to address **energy poverty**, but concrete targets and timing are not fully clear. It relies on social energy tariffs and other measures to ensure fair tax-benefit systems and social protection to support the most affected people and households. In addition, the draft updated NECP also includes measures targeting vulnerable households to combat **transport poverty**. Finally, the plan does not explain how the various available funds will be used to support the just transition.

## 5 REGIONAL COOPERATION

The draft updated NECP provides an adequate contextualisation of **high-level regional cooperation** but does not refer to concrete measures established under cooperation mechanisms. An example of such measures includes conclusions and agreements reached in the margins of the regional fora such as the political High-Level Group on Interconnections in South-West Europe. The draft updated NECP does not refer to the main outcomes or concrete agreements established under such cooperation mechanisms or at the margins of these fora. Moreover, the plan does not describe in detail how established measures can mitigate risks for the neighbouring Spanish energy system, nor does it address the benefits of regional cooperation coming from projects such as the H2Med. In the field of transport, the draft updated NECP does not provide detailed information on Portugal's plans to address the lack of international passenger connections between Portugal and Spain and how it could contribute to the reduction of emissions and reduction of fossil fuels.

It is noted that Portugal has still not signed a solidarity agreement for the security of gas supply with Spain, and that the draft updated NECP does not mention any initiative in this regard. There are also no details about how Portugal is working in the regional Risk groups.

## **6 INTERNAL COHERENCE AND POLICY INTERACTIONS WITHIN THE DRAFT UPDATED NECP**

The draft updated NECP reflects key synergies within and between the 5 dimensions of the Energy Union, the impact of increasing flexibility and demand response on the penetration of renewable energy, as well as on the integration of the internal energy market. Similarly, the interaction of key objectives of diversification of energy sources is directly related to the deployment of renewable sources. However, the draft updated plan does not provide a sufficiently detailed analysis of consistency of policies and measures in each dimension and a quantitative analysis of interactions between objectives. In addition, the draft updated NECP contains very little information on the application of the energy efficiency first principle in each dimension, and particularly in relation to infrastructure deployment and diversification strategies.

## **7 STRATEGIC ALIGNMENT WITH OTHER PLANNING INSTRUMENTS**

**Portugal formally submitted a modified RRP and REPowerEU chapter on 26 May 2023.** The European Commission provided a positive assessment on 22 September 2023<sup>25</sup> and Council approved it on 17 October 2023. Portugal's REPowerEU chapter consists of six new reforms, eleven new investments and five upscaled investments, focusing on energy efficiency in buildings, decarbonisation of industry, deployment of renewables and support the production of renewable hydrogen, and sustainable transport.

The draft updated NECP incorporates only partially the **relevant reforms and investments included in the RRP**. It includes 55 out of the 83 climate and energy relevant measures in the RRP<sup>26</sup>, leaving scope for more consistency. These measures cover a total of 46 investments in 13 components of the RRP. In some cases, the consistency between the draft updated NECP and RRP is only vague and not specific. The draft updated plan does not always clearly indicate whether the measure is fully or partially part of the RRP and REPowerEU. That can be observed, in particular, for policies and measures that are financed through different funding sources, such as for the financing of gas storage (not part of the RRP but the RRP is mentioned as a funding source in the draft updated NECP) or renewable hydrogen. Overall, 10 measures among those 100% climate tagged are not well reflected in the NECP<sup>27</sup>.

**The draft updated NECP spells out clearly the potential for synergies and trade-offs between clean air and climate policies.** For several policy measures, the draft updated NECP mentions air quality impacts. It mentions that projections (still to be reported) will include air pollutant projections. While outlining an administrative structure that is

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<sup>25</sup> COM(2023) 555 final

<sup>26</sup> i.e., 41 measures with a 40% climate tracking and 42 with 100% climate tracking.

<sup>27</sup> This concerns Component 1 (Investment 3.2); Component 2 (Investments 4.RAA.2, 6.1); Component 6 (Investments 1.2, 5.RAA.4); Component 7 (Investment 1.1); Component 8 (Investment 2); Component 12 (Investments 1.1, 1.2, 1.4)).

conducive to coordinated policy making, the draft updated NECP is not transparent on how clean air (notably the National Air Pollution Control Programme and energy and climate programmes are aligned.

The links between climate and energy policies, on the one hand, and **biodiversity objectives**, on the other hand, could be better explained. However, nature restoration actions are explained with detail, even if mainly focused on forests.

**The draft updated plan is consistent with the Territorial Just Transition Plans (TJTPs).** It refers to the EUR 223.8 million available from the Just Transition Fund (JTF) to ensure that the transition to a climate-neutral economy takes place in a fair, equitable and cohesive manner. Also, it refers to the closure of the largest emitters of GHG in Portugal, i.e., the coal-fired power plants in Alentejo Litoral and Médio Tejo (2021), and the refinery in Matosinhos (2020), which are also included in the TJTPs. However, the link between measures proposed for funding and the Just Transition Fund (JTF) is not clear.

The draft updated NECP provides inadequate analytical basis for the preparation of the **Social Climate Plan (SCPs)** that will address the impacts of the new emissions trading system for fuel combustion in buildings, road transport and additional sectors (ETS2) on vulnerable households, transport users and micro enterprises. Portugal has not yet assessed the number of households in transport poverty and has not provided the methodology and indicators to identify the future recipients of the Social Climate Fund (SCF) considering the distributional effects arising from the future ETS2. The plan outlines a consistent set of decarbonisation policies and measures in the buildings and road transport sectors, including some targeted at the vulnerable groups. However, inadequate information is provided on the concrete reforms and policy framework for the future SCP. Thus, the current draft does not explain how the SCP will build on the updated NECP and how the consistency between the two plans will be ensured.

**Portugal does not consistently refer to the specific funds under the Multiannual Financial Framework (MFF)**, including cohesion fund, used as a source of funding. Doing so would avoid inconsistencies with eligibility requirements under some funds<sup>28</sup>. For cohesion policy, there is a reference to the EUR 23 billion made available under the Partnership Agreement between the Commission and Portugal. The plan mentions that around EUR 5.5 million will be invested to implement the European Green Deal, without detailing what goes to the specific policy objectives<sup>29</sup> and across the different operational programmes.

In the draft updated plan, Portugal does not provide the quantification of the climate impacts of measures currently included in the **CAP Strategic Plan (CSP)**, thus the plan does not explain whether the CSP is in line with the new LULUCF and ESR targets and whether additional measures are necessary.

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<sup>28</sup> For example, support for investments in ETS installations to reduce GHG emissions are currently excluded from support under the approved version of the 2021-2027 Cohesion Policy Programmes (ERDF, ESF+, JTF, CF).

<sup>29</sup> The Partnership Agreement says that EUR 3.49 billion will go to Policy Objective 2 (A greener and low carbon Europe), SO2.1 on “Energy efficiency”, with a total ERDF allocation of EUR 910 million, SO2.2 on “Renewable energy” (EUR 268 million) and SO2.4 on “Climate change adaptation” (EUR 404 million).

Compared to the **National Adaptation Strategy (NAS)**, the plan has the same level of ambition or precision. It also refers to relevant sectorial plans and policies, such as those under the water acquis and more generally under the Zero Pollution header, without mention this as such. References to marine policies are very limited.

**The draft updated NECP is broadly aligned with the energy-related European Semester Country Specific Recommendations.** In the draft updated NECP Portugal addresses a substantial subset of the challenges identified in the 2022 and 2023 country-specific recommendations related to energy policy and the green transition. Nevertheless, the draft updated NECP does not consider the EED recast and fails to show how it will decrease the investment gap in energy efficiency, and which incentive framework will be put in place to reach its future targets. Moreover, the draft update NECP is very vague on how it intends to address grid challenges to allow further penetration of renewables.

## **8 FINANCING THE ENERGY AND CLIMATE TRANSITIONS**

### **8.1 Investment needs**

The draft updated NECP includes estimates of expected investment needs only for a few of Portugal's' updated planned policies and measures. Portugal expects to see high investment needs for retrofitting the residential and service building sector, electrifying, and using alternative fuels in industry, electrifying the transport sector, and adding renewable capacity in the power generation sector. The draft updated NECP also recognises the distinct needs of the public sector (e.g., for retrofitting public buildings, electrifying public transport, etc.) and for the private sector (e.g., investing in more efficient household appliances, electric cars, insulation in homes and renewable energy, green hydrogen and electric furnaces and boilers for businesses).

Portugal intends to improve estimates of investment needs in the final updated plan by strengthening the tools for climate policy planning, such as preparing climate budgets and budgets for climate action, including identifying consolidated budgetary allocations and consolidating the legislative impact assessments on climate action. Portugal also intends to introduce green budgeting for the state budget.

### **8.2 Funding sources**

The draft updated NECP outlines the main sources of financing that Portugal will use to implement its planned key policies and measures by line of action. This includes public (national or regional (state-aid)) sources such as the Environmental fund mainly financed from auctioning of allowances under the EU ETS, and EU financing, including from the RRF, InvestEU, CEF, LIFE, Horizon Europe, ERDF Cohesion Fund, JTF, EARDF, EAGF as well as the Innovation Fund. For some measures, the description of the funding sources remains very general, for example simply referring to the MFF 2021-2027 programmes without any assessment of whether these are sufficiently available. The plan does not provide information on the sources of financing, nor type of support schemes, for each policy and measures. For instance, for some energy efficiency and research, innovation, and competitiveness measures indication of the actual budget for the measures is missing. In addition, the plan does not distinguish public and private sources, nor does it specify the lifetime of the measure or the share coming from the EU budget. An overview table

gathering all the budgetary information of the different policies and measures should also be provided.

The mobilisation of private capital is not outlined in Portugal's draft updated NECP, but the plan refers to several initiatives aimed at stimulating private sector financial flows. Still, the description lacks details on the level of funding to be mobilised and a more granular analysis at policy or sector level. The draft updated NECP includes a reference to the Guidelines for accelerating sustainable finance and the Commitment Charter on sustainable finance in Portugal prepared by the Portuguese Sustainable Finance Reflection Group<sup>30</sup>. The draft updated plan also includes specific guidelines on public finance to implement the objectives set out in the plan.

Concerning the Green Agendas included in the RRP, the draft updated NECP mentions a total investment of EUR 7,675.19 million (investment in R&D: EUR 2,939.72 million). However, the link between the RRP and NECP is not always clear, as with the RRF instead, should be financing 2,870 million. In addition, the NECP mentions that Portugal has developed a set of 15 Thematic Research and Innovation Agendas, coordinated by the Foundation for Science and Technology, I.P. (FCT), while it should in theory finance 53 Agendas.

## **9 ROBUSTNESS OF THE ANALYTICAL BASIS OF THE DRAFT UPDATED NECP**

The draft updated plan includes a description of both an economy wide WEM and WAM scenarios with a clear cut-off date for both, but without distinguishing between ETS and non-ETS sectors. The plan does not clearly explain the methodologies nor models used for both projections. Consistency is ensured by, on the one hand, preparing the draft updated NECP in parallel with the Carbon Neutrality Roadmap 2050, and, on the other hand, using the same set of socio-economic parameters to model the different economic sectors.

The plan includes projections of greenhouse gas emissions for the energy system including power generation and refining, as well as transport, industry, buildings, and agriculture sectors (for the energy component), and covers the period until 2040. The modelling was updated for all sectors except for waste, agriculture and LULUCF for which the modelling is still ongoing and will only be available for the final updated NECP. Projections are therefore not fully consistent with the content of the draft updated NECP.

The methodology used to estimate greenhouse gas emissions is the same as in the National Inventory Report. The cost assumptions of power generation technologies, transport and mobility used for the quantitative analysis are clearly documented. The transparency of those cost assumptions constitutes a best practice. From 2025 onwards, the harmonised values recommended by the Commission have been considered. For carbon prices the Commission recommended values up to 2025 have been followed, while afterwards a shadow price generated by models was used by imposing a -55% GHG reduction in 2030 relative to 2005. The new ETS for buildings, road transport and additional sectors (ETS 2) has not been considered in projection scenarios.

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<sup>30</sup> An initiative coordinated by several Ministries, and which included the main public and private actors in the financial sector in Portugal, with the support of the Bank of Portugal.

As the plan does not provide for a full comparison between the WEM and WAM projections, it is difficult to assess the precise impacts of the additional measures. The main challenges, such as the need to ensure a just transition and appropriate skills, are well identified, but the plan would benefit from a quantitative analysis to measure the scale of the challenges and facilitate the design of the appropriate policies and measures to address them.

The draft updated NECP includes developments on possible impacts of targets and policies on health and air pollution and ecosystems, but Portugal will provide the quantitative analysis only with the final updated NECP. Portugal has integrated the circular economy in its models, as was already the case in the final 2020 NECP.

The draft updated NECP contains a macro-economic assessment. However, the assessment is only qualitative and relies on the previous impact assessment submitted with the final 2020 NECP. Some transmission channels are identified, but overall, the methodology is not detailed. While some elements of the impact assessment are included and the results presented in a transparent way, the draft updated NECP still lacks a consolidated quantitative macroeconomic assessment of planned policies and measures, including the impacts on GDP and the main demand components over time. Furthermore, there is no overall impact assessment on public finances or any quantitative assessment on public spending.