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Assessment of the draft updated National Energy and Climate Plan of Hungary

Accompanying the document

COMMISSION RECOMMENDATION

on the draft updated integrated national energy and climate plan of Hungary covering the period 2021-2030 and on the consistency of Hungary'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, including as regards diversifying energy supplies. These developments are reflected in the legislative framework adopted under both the ‘Fit for 55’ package and the REPowerEU plan.

Hungary’s draft updated national energy and climate plan (‘the draft updated NECP’ or ‘the plan’), submitted on 31 August 2023, partially takes into account this new geopolitical and legislative framework.

Table 1: Summary of key objectives, targets and contributions of Hungary’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 (GHG) compared with 2005 under the Effort Sharing Regulation (ESR) (%)		2021: -2.6% 2022: -7.5% ¹	-18.7%	NECP: -23.8%
	Binding target for net GHG removals under the Regulation on Land Use, Land Use Change and Forestry (LULUCF)	-7,110 (kt CO ₂ eq.)	Reported net removals of -7.20 Mt CO ₂ eq. in 2021 and reported approximated net removals of -6.65 Mt CO ₂ eq. in 2022	-934 kt CO ₂ eq. (additional removal target) -5,724kt CO ₂ eq. (total net removals)	Insufficient ambition based on missing projections
	National target/contribution for renewable energy: Share of energy from renewable sources in gross final consumption of energy (%)	13% (SHARE S) 13% (target)	14.1%	29%	Hungary’s contribution of 29% is significantly below the 34% according to the formula set out in Annex II of the Governance Regulation
	National contribution for energy efficiency:				
	Primary energy consumption (Mtoe)	26.6 Mtoe	24.93 Mtoe	Target for PEC is not provided	HU primary energy consumption was not provided. Results of

¹ The ESR emissions for 2021 are based on final inventory data and for 2022 on approximated inventory data. However, the final ESR emissions for 2021 and 2022 will only be established in 2027 after a comprehensive review.

					the EED recast Annex I formula: 23.31 Mtoe
	Final energy consumption (Mtoe)	18.2 Mtoe	19.15 Mtoe	17.91 Mtoe	HU final energy consumption contribution is 17.91 Mtoe. Results of the EED recast Annex I formula: 16.19 Mtoe
	Level of electricity interconnectivity (%)	35.3%	48%	15% ²	

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

1.2 Summary of the main observations³

Hungary'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 is not entirely convincing on how these targets will be reached. This applies especially to energy targets. The draft updated NECP partially incorporates adaptation policies in the relevant dimensions of the Energy Union. Overall, the policies and measures are described with some degree of credibility, but there is a lack of details on their scope, timing, financing sources, and expected impacts are not included.

Regarding the **reduction of greenhouse gas emissions under the Effort Sharing Regulation**, the plan provides emission projections to demonstrate that with the additional policies and measures put forward in the draft updated NECP, Hungary is on track to meet its national greenhouse gas target of -18.7% in 2030 compared to 2005 levels. According to Hungary's projections, they would overachieve the target by 5.1 percentage points. At the same time, it is unlikely that the existing policies and measures as described will be enough to ensure that Hungary reaches its targets under **the Regulation on Land Use, Land Use Change and Forestry (LULUCF)** targets⁴. On LULUCF, the draft updated plan indicates that Hungary lacks any projections to be able to fully assess the 2030 ambition. It does not clearly set out a pathway to increase the land sector's contribution to the EU's overall enhanced climate target. The draft 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 higher tier levels and geographically explicit datasets needed to ensure the robustness of net removal estimates.

² 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. The 2020 figure covers also interconnectors with the neighbouring countries outside the EU.

³ 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.

⁴ Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU (OJ L 156, 19.6.2018, p. 1).

Furthermore, the plan does not consider adaptation policies in all the relevant Energy Union dimensions in sufficient depth. The **impact of policies and measures** on the achievement of the GHG mitigation targets lack details in terms of emissions reductions quantification, scope and timing. Actions or measures are also lacking for some of the dimensions of the Energy Union.

On **Carbon Capture Utilisation and Storage (CCUS)**, the plan does not identify any annual CO₂ emissions that can be captured, nor any geological CO₂ storage capacity. No details on CO₂ transport are provided. One reference to the capture potential from biogenic sources is made, with estimated volumes for 2050. The plan mentions that there are limited possibilities for storing CO₂ within Hungarian borders.

The draft updated plan does **not reflect progress towards international commitments** under the Paris Agreement. Hungary is postponing its commitment to phase out of lignite and assumes to continue its use in Mátra power plant by 2030, conditional on the finalisation of a new combined cycle gas turbine (CCGT). Moreover, it does not include any action to phase out the existing fossil fuels subsidies.

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, although it recognises the risk of damage to forests, soil erosion and the safety of ground water resources. The link to the specific Energy Union objectives and policies, which adaptation policies and measures should support, is not specified and quantified. Adaptation policies and measures, to support Hungary's achievement of national objectives, targets and contributions under the Energy Union, are not properly described in terms of their scope, timing and expected impacts.

On **renewable energy**, Hungary's draft updated NECP presents a contribution to the overall EU target of 29% of renewables in the country's gross final energy consumption by 2030. This is significantly below the share of 34% resulting from the formula in Annex II to Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action (the 'Governance Regulation'). The draft updated NECP includes trajectories for renewables in the electricity, transport and heating and cooling sectors. However, some other elements such as the targets for renewable energy and renewable fuels of non-biological origin (RFNBO) in industry and the share of renewable energy in buildings are not included. While the plan provides a list of measures to support the deployment of renewable energy, many of those correspond to existing measures and most of the descriptions lack details, particularly in terms of budget and expected impacts.

On **energy efficiency**, the Hungarian draft updated NECP includes many significant information and definitions. The increase in the ambition of the final energy reduction target is welcome, and it is a notable development from the 2019 NECP. However, the reported level of final energy consumption is significantly higher compared to the theoretical results stemming from the use of the formula in the Directive (EU) 2023/1791 on energy efficiency and amending Regulation (EU) 2023/955³ ('EED recast') Annex I. A target for primary energy consumption (PEC) is not reported. The set of measures has been renewed with a few central elements continuing, compared to previous reporting, but details on the measures and their expected energy savings are missing.

On **buildings**, the draft updated NECP does not set out more ambitious targets than those included in Hungary's 2020 long-term renovation strategy (LTRS). However, the draft

update NECP briefly recalls the key elements of the LTRS such as its milestones and targets. The projections included in the draft updated NECP indicate that the LTRS objectives cannot be achieved without consistent additional measures. The plan details some existing and some new measures, but the quantitative estimations of their impact in terms of energy and emission savings are not sufficiently described.

On **energy security**, the draft updated NECP convincingly sets targets to increase the security of Hungary's energy system. Still, additional details are needed about the specific measures to reach these objectives. Efforts to reduce Hungary's dependency from Russian fossil fuels are insufficient. As regards the **gas sector**, the draft updated NECP notably points to several fields of action: (i) the increase of domestic extraction, (ii) ambitious objectives for low-carbon hydrogen, (iii) the adaptation of storage facilities and the transmission grid for hydrogen, (iv) the diversification of energy supply through increased imports from Azerbaijan and the Black Sea region as well as from liquified natural gas (LNG) sources. However, the draft updated NECP does not demonstrate how the emergency measures adopted in the aftermath of the unprovoked Russian invasion of Ukraine, particularly those on gas demand reduction are integrated in the mid-term planning towards 2030. Furthermore, it is not clear from the draft updated NECP how Hungary's energy security objectives are in line with the overall aim of the REPowerEU plan of phasing out the use of Russian gas by 2027. As regards the **electricity sector**, it is positive that the Hungarian draft updated NECP sets a measurable target for power storage. On the **oil sector**, the draft updated NECP does not contain detailed information on plans for alternatives to Russian supply. Neither does it include an assessment of the adequacy of the oil infrastructure (oil stocks, refineries, ports and pipelines) with a view to future oil demand.

On the **internal energy market**, the Hungarian draft updated NECP emphasises the importance of interconnection. Hungary already has a high level of electricity interconnection and plans to increase the share to 60% by 2023. The plan also mentions the importance to increase the capacity for gas interconnection, but without sufficiently clear policies and measures and identification of benefits in this regard. While the draft updated NECP indicates the intention to foster non-fossil flexibility, demand response and storage, it does not elaborate on how it intends to achieve this.

On **energy poverty**, the plan includes incomplete definitions and does not include any measurable targets or indicators. While some interesting measures to enhance consumer empowerment are mentioned, no clear and detailed policies are formulated to specifically support vulnerable consumers, nor are any synergies with energy efficiency measures explored.

On **research, innovation, competitiveness and skills**, Hungary's draft updated NECP provides very limited information on measures for research, innovation, and competitiveness in the field of clean and low carbon energy technologies. Furthermore, it does not include national-level quantified targets, notably for public research and innovation (R&I) investment in clean energy by 2030. The draft updated NECP also lacks targets for the increase of capacity for manufacturing clean energy technologies, key components and equipment to ensure the resilience of its supply chains and does not reflect the need for and investment into re- or upskilling in various clean energy sectors.

Just transition is addressed in a limited manner in the draft updated NECP. While there is some information on the employment impacts, information on the social and skills

consequences, including distributional impacts of the climate and energy transition is lacking. Furthermore, the plan does not include concrete policies and measures to tackle these issues more widely but focuses mainly on the actions linked to the Mátra power plant. With regards to the latter, the envisaged timeline in the draft updated NECP for phasing out coal-based electricity production by 2030 is in contradiction with the commitments taken in the adopted Territorial Just Transition Plans (TJTTPs). It is also not clear what impact this, including the phase out of lignite and the closing down of the lignite mines, will have on the planned measures. In addition, the plan does not elaborate on the resources specifically devoted to supporting a just transition. Finally, it does not provide sufficient information for the preparation of the Social Climate Plan and on how the consistency of the two plans would be ensured.

On its **strategic alignment with other planning** tools, the Hungarian draft updated NECP references various measures from Hungary's RRP, particularly those in the submitted REPowerEU chapter. The plan seems to be partially consistent with the RRP and its chapter on REPowerEU. However, Hungary did not elaborate on how the RRP investments and reforms under the REPowerEU help meet the quantitative targets in the NECP.

Hungary's draft updated NECP does not adequately address the energy-related 2023 **European Semester Country Specific Recommendations** and only partially reflects the challenges to be addressed by Hungary, as outlined in these recommendations.

Finally, the draft updated NECP includes only limited information on the expected **investments needs** to implement the planned policies and measures for each of the five dimensions. It only sporadically outlines the main sources of financing used to implement the planned key policies and measures. Overall, the **analytical base** of the draft updated NECP relies on robust quantitative analyses. However, the analytical approach used for the social-economic impact assessment is missing. Projections and impact assessment are referred to both the with-existing-measures ('WEM') scenario and the with-additional-measures scenario ('WAM') until 2050, however, not with full sectoral coverage. However, the plan does not provide enough transparency on the analytical tools used and the underlying assumptions.

2 PREPARATION AND SUBMISSION OF THE DRAFT UPDATED NECP

2.1 Process and structure

Hungary's draft updated NECP was submitted to the Commission on 31 August 2023. The plan contains all required sections and follows the structure provided in Annex I of the Governance Regulation, covering all five dimensions. However, objectives, targets and contributions for the different dimensions are not always spelled out clearly, nor are they always backed by policies and measures and underpinned analytically. The draft explains that a Strategic Environmental Assessment is ongoing, and some preliminary conclusions are presented. It is unclear to what extent they have been already integrated in the plan.

The draft updated NECP was discussed by the Sustainable Development Committee of the Hungarian Parliament. In May 2023, it was also discussed by the Hungarian National Environment Council, which is composed of three equal groups: representatives of environmental organisations, trade and economic interest representatives, and academic representatives appointed by the President of the Hungarian Academy of Sciences.

However, the plan does not provide clear evidence that it was prepared in line with the '*whole-of-government approach*', by involving all the ministries across portfolios for example.

Hungary has scheduled consultations with cities and local authorities for the end of 2023 and early 2024. Therefore, the involvement of regional and local authorities in the preparation of the draft updated NECP and its planned implementation is not sufficient. The draft NECP does not mention the large Hungarian community of local and regional authorities involved in the Covenant of Mayors for Climate and Energy (covering more than 56% of the country's population in 2022).

Overall, the draft updated NECP describes only partially the national context in which the update was developed. Most of the focus is on increased energy prices resulting from the Russian war of aggression against Ukraine.

2.2 Public consultation

The public consultation procedure outlined in Hungary's draft updated NECP generally planned for early public participation in the decision-making process. The draft updated NECP was open for public consultation between 23 June and 7 July 2023 through an online platform. Environmental NGOs, business associations and industry stakeholders were invited to participate in six debates. The draft updated NECP also indicates that the participants were able to submit their comments and suggestions in writing. However, it is not clear how much of the complete draft updated NECP was included in the version that the public was consulted on. The plan does not explain either what type and quality of information was submitted to the public and what communication channels were used to promote broad participation.

Moreover, Hungary does not provide any information about the public views expressed during the public consultation procedure and no indication is provided of how the public's views were considered and addressed, or why they were not.

The plan is unclear on how Social Partners were consulted during the drafting process, which hinders the assessment on the fulfilment of a '*whole-of-society*' approach, as stated in the Council Recommendation on ensuring a fair transition towards climate neutrality.

2.3 Regional consultations for the preparation of the draft updated NECP

Hungary reports in its draft updated NECP that a regional consultation on energy and climate plans was held in Bratislava on 23 April 2023 with the participation of Czechia, Hungary, Poland and Slovakia ('V4', the Visegrád countries). The consultation aimed at discussing progress in preparing the national plans. Furthermore, Hungary also refers to the High-Level group of the Central and South-Eastern Europe (CESEC), which discusses issues relevant to the NECPs.

However, the main outcome has not been summarised in the draft updated NECP, so there is no explanation of its scope and the procedural aspects.

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

Hungary's draft updated NECP partially embeds the increased climate targets in the ESR and LULUCF Regulations, as part of the 'Fit for 55' legislative package. The draft updated NECP confirms Hungary's legally binding commitment to achieve climate neutrality by 2050. Although the draft updated NECP includes WEM and WAM projections up to 2050, the WEM projections do not cover the LULUCF sector, and the WAM projections are only provided for energy and agriculture. Projections submitted in March 2023 under Art. 18 of the Governance Regulation show net GHG emissions (i.e., including LULUCF and excluding international aviation) of 40 million tonnes of CO₂ equivalent (CO₂ eq.) by 2050 considering existing measures.⁵ This is equivalent to a projected reductions in 2050 of 56%, compared to 1990. In the most recent years, net GHG emissions in Hungary have declined at a pace below the EU average, mainly due to an increase in transport emissions. Despite the commitment to achieve climate neutrality by 2050, the information provided in the draft updated plan does not allow for a full assessment as to whether progress by Hungary is consistent with the achievement of the EU climate-neutrality objective. However, based on all the available information, progress by Hungary is likely to be consistent with the achievement of the EU climate-neutrality objective. Hungary plans to identify new policies and measures and to include WEM and WAM projections for each sector in the final updated NECP.

The draft updated NECP reflects the required ambition under the **ESR**, as the planned additional policies and measures would lead to an overachievement of the effort sharing sector obligations. The ESR sets Hungary's 2030 ESR emissions reduction target at -18.7% compared to 2005 levels. The draft updated NECP projects ESR emissions to be above this target with existing measures, highlighting the need for implementation of the planned more ambitious climate action in the sectors involved. In the WEM scenario, Hungary falls short of the target by 3.6 percentage points, while in the WAM scenario they overachieve by 5.1 percentage points. In 2021, Hungary's ESR emissions were within the Annual Emission Allocation (AEA) by 3.3 Mt CO₂ eq.

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

⁵ In March 2023, Hungary did not submit GHG emission projections under the additional measure scenario.

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

ESR target and projections⁶					
	2030 target*	2021 performance (inventory data) *	2022 performance (approximated data) *	2030 WEM projection *	2030 WAM projection *
Hungary	-18.7%	-2.6%	-7.5%	-15.1%	-23.8%
EU	-40%	-14.5%	-16.9%	-27%	-32%

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

The draft updated NECP does not fully reflect the increased ambition of the **LULUCF Regulation** and in particular the 2030 national target requiring Hungary to deliver an additional –934 kt CO₂eq. of net removals to reach the total value of -5,724 kt CO₂eq. in 2030 compared to 2005 levels.

The draft updated NECP does not clearly set out the pathway to increase the contribution of the land sector to the EU’s overall enhanced climate target, nor does it quantify the mitigation impact of planned measures in terms of emissions removals from the LULUCF sector, since the relevant projections are not included.

The draft updated NECP does not provide information on the status and progress to be made in making improvements to higher tier levels and geographically explicit datasets for monitoring, reporting and verification (MRV), in line with the provisions under the Governance Regulation.

Overall, hardly describes policies and measures to ensure that the LULUCF sector reach the targets and will contribute to the long-term transition to climate neutrality by 2050. Biodiversity and nature restoration, and their connection with LULUCF, are not addressed. The plan does not clarify with sufficient detail what sort of afforestation and reforestation will be carried-out, e.g., focused on monocultures or through more biodiverse and close-to-nature approaches.

The draft updated NECP includes policies and measures for improved access to zero- and low-emission **mobility, transport and vehicles**.

The WEM and WAM scenarios make assumptions on the different reductions in **transport emissions** and their sources. However, it is not clear from the draft updated NECP how these reductions are envisaged to be achieved in practice. The plan refers to different transport-related strategies, in particular increasing the incorporation rate for biofuels and the uptake of vehicles with alternative propulsion; shifting traffic towards low-emission modes of transport in particular by increasing the competitiveness of rail transport, including single wagon load; promoting active mobility and developing public transport. However, Hungary generally does not sufficiently elaborate on and commit to concrete resulting measures, which are necessary to implement the different scenarios.

⁶ 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).

Transport measures described in more detail include:

- Promoting the uptake of electric vehicles and the necessary infrastructure through regulatory, fiscal and financial support instruments. In particular, all-electric or partially electric cars and zero-emission cars will be exempt from vehicle tax, company car tax and registration tax. In addition, the level of vehicle tax on buses and lorries will also depend on the vehicle's environmental classification. Additional tax relief will be granted to trucks when combined transport is used.
- A 'green bus programme' which includes the objective of some 300 green, electric and hydrogen-powered local buses to be operational by 2025.
- A cycling strategy that aims to increase the cycling network to 15 000 km and reduce the number of cycling-related road fatalities.

Other transport related policies and measures are not described in sufficient detail in terms of their scope, timing and likely impact.

Hungary sets a **renewable energy share in transport** of 29% by 2030. To achieve this target, Hungary intends to increase the share of 'first-generation biofuels' produced from food and feed crops to almost 4% by 2030. According to the draft updated NECP, the share of waste and second-generation (or advanced) biofuels and biogas is to be increased to at least 4.5% and renewable transport fuel of non-biological origin to a minimum of 1% in final energy consumption in transport. The remaining part needed to reach the 29% target is planned to be achieved through a significant increase in the use of electricity and hydrogen for transport.

The draft updated NECP includes measures to promote active mobility (walking and cycling). Moreover, it is aligned with the new Alternative Fuels Infrastructure Regulation as regards national policy frameworks for alternative fuel infrastructure for low- and zero-emission vehicles and mobile assets across transport modes, including on measures for recharging points and hydrogen refuelling stations. Hungary mentions roadmaps and measures for the production and deployment of **sustainable aviation fuels** (SAF), to contribute to the ReFuelEU Aviation Regulation but without further specific details.

The draft updated NECP also includes measures for electrification and the introduction of zero-emission technologies and related infrastructures in rail and ports, and a shift towards low-carbon modes (e.g., fiscal measures or environmentally harmful subsidy reforms, deployment of infrastructure for zero-emission aircrafts, shore-power infrastructure at ports). No measures are proposed for airports.

The support for car electrification and charging infrastructure planning are consistent with the CO₂ emission standards for cars⁷.

Hungary reports that electricity and heat production are expected to achieve significant reductions in GHG emissions thanks to the simultaneous operation of existing and new nuclear power plants (under construction) and the generation of electricity from renewable (mainly solar) sources.

⁷ An EU-level reduction per OEM of 55% for cars and 50% for vans of CO₂ emission per km by 2030; 100% reduction (only Zero-Emission Vehicles - ZEV) at 2035. Measures such as corporate cars incentives and any fiscal incentive for ZEV shall be reported.

The draft updated NECP does not identify overall annual **CO₂ emissions that can be captured** from Emission Trading System (ETS) and non-ETS sources. However, carbon capture and storage (CCS) is considered to be a tool for GHG reduction for biomass-based electricity generation. In this sense, the following potential capture volume is identified: in 2030, the share of biomass capacities equipped with CCS is projected to be 6%. At the same time, for 2050, an annual capture capacity of 6 Mt is foreseen to be achieved through CCS technology for biomass-based electricity generation. The draft updated NECP does not include an estimated CO₂ storage capacity, but it mentions that there are limited possibilities for storing CO₂ within Hungary's borders.

The draft updated NECP foresees an increased role of CCS in Hungary's decarbonisation plans through dedicated regulatory and financial instruments, and power plants with CCS installations are planned from 2030 onwards.

The draft updated NECP does not pay attention to mitigating **non-CO₂ emissions** in different sectors. It refers only vaguely to the production of biogas and bio-methane and merely mentions agricultural waste, landfills, and sludge from wastewater treatment plants as sources for that production. Similarly, the plan indicates lower N₂O emissions due to tertiary treatment in wastewater, but without further elaboration. Thus, there are no measures to mitigate methane emissions in energy, agriculture and waste management, nor N₂O from agricultural soils, manure management, fuel combustion, nor even emissions of F-gases.

Hungary provides some quantified projections of non-CO₂ emissions. However, the projections show a problematic trend in several sectors. In agriculture, methane emissions from enteric fermentation will increase between 2005 and 2030 (+10.5 in WEM and +9% in WAM) and between 2005 and 2050 (+6.8% in WEM and +5.1% in WAM).

Methane emissions from manure management will decrease between 2005 and 2030 due to a decreasing pig and bovine population. Here, further reductions could be possible due to the use of manure to produce biogas and bio-methane. N₂O emissions from all sectors, including agricultural soils that are the largest source of non-CO₂ emissions, will increase between 2005 and 2030 (+26.2% in WEM and +10.4% in WAM) and between 2005 and 2050 (+27.6% in WEM and +8.9% in WAM). In waste management, the draft updated NECP fails to provide a WAM scenario. These shortcomings are problematic, because non-CO₂ emissions accounted for 31% of all greenhouse gas emissions within the Effort Sharing sectors in 2021.

The updated draft NECP does not include a national target for **agriculture** but does provide projections for agricultural emissions. It does not appear to prioritise action to reduce emissions from the agricultural sector. This is reflected in the projections for agricultural emissions where Hungary shows an increase of 7.8 % between 2005 and 2030. It is unclear how existing measures contribute to the projected emissions in the WEM scenario and which measures contribute to emissions reduction in the WAM scenario.

The draft updated plan does not reflect progress towards **international commitments** under the Paris Agreement. The draft updated plan does not mention the commitment to phase out coal by 2025 and assumes to continue the use of lignite in Mátra power plant by 2030, conditional on the finalisation of a new combined cycle gas turbine (CCGT). The draft updated NECP states that there are no direct subsidies for fossil fuels and justifies the support for sectors and certain social groups which is not in line with available information. Furthermore, it states that the level of indirect fossil fuel consumption subsidies is broadly

in line with the OECD average. The draft updated NECP does not include any action to phase out the existing fossil fuels subsidies.

On 21 September 2021, Hungary 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, Hungary reported on the status of implementation of its initial NECP, where the target year to achieve the climate-neutrality objective was confirmed.

3.1.2 Adaptation

The draft updated NECP reports that Hungary's Second National Climate Change Strategy 2018-2030 (NES2), including a national adaptation strategy, provides an adaptation vision, comprehensive and specific targets for domestic climate adaptation and lines of action by sector. Hungary identified some adaptation goals in its initial 2019 NECP, as reported in its national adaptation plan, but has not provided such information in its draft updated NECP. Compared to the 2019 NECP, the formulation of adaptation goals has not progressed.

Generally, Hungary has not identified in sufficient depth the relevant climate change vulnerabilities that may threaten the achievement of national objectives, targets and contributions in the five dimensions of the Energy Union. Hungary identified two climate risks that may threaten the achievement of the decarbonisation target: damage of forests due to climate change could reduce the forest CO₂ sink capacity and soil erosion of agricultural land might impact the agriculture sector.

Therefore, Hungary has put into place a National Forest Strategy for 2016-2030 to increase the resilience of forests to climate change and to monitor the impact of climate change on them. Hungary has also reported on a measure to reduce the erosion of agricultural soils.

As a third risk Hungary mentioned safety of ground water resources.

The planned and implemented nature-based solutions are only vaguely described, together with their expected impacts in terms of reducing the risks by increasing the resilience of forests, preventing soil erosion of agricultural land and increasing the safety of ground water resources.

Adaptation in dimensions of the Energy Union other than decarbonisation is not addressed in the draft updated NECP. In particular, its discussions on the water aspects and water-related topics appears incomplete, notably on the resilience of energy systems to floods and structural or seasonal water scarcity (such as the need for cooling water in nuclear plants), but also on the resilience to flood events and drought periods more widely in the economy. There is no clear link either to the governance mechanisms foreseen in the water acquis, the River Basin Management Plans (under the Water Framework Directive), including natural and non-natural water storage facilities, the development of Drought Management Plans, and the Flood Risks Management Plan(s). The National Forest Strategy 2016-2030 (as mentioned above) might have indirect impacts on water bodies, but this angle seems to be neglected.

Innovative approaches (e.g., smart urban water management) such as insurance policies and fiscal measures addressing the climate protection gap are not considered, neither is investment aimed at minimising environmental impacts, such as biodiversity loss.

3.1.3 Renewable energy

The renewable energy contribution proposed in the updated draft NECP is 29 % of the national gross final energy consumption in 2030, based on the WAM scenario and in absolute values. This contribution is significantly below the share of 34% resulting from the formula in Annex II to the Governance Regulation. The scenarios are not detailed with the yearly overall renewable energy contribution to gross final energy consumption. The draft updated NECP does not include a trajectory to reach the reference points for 2022, 2025 and 2027 towards achieving the contribution of 29% in 2030⁸. The draft updated NECP contains only shares of renewable energy trajectories for electricity, transport and heating and cooling sectors.

Renewable electricity generation is projected to reach 31% in 2030, with solar power capacity roughly doubling and reaching 12 GW by 2030 under WAM, thus covering 25% of all electricity generation, and wind power capacity tripling to 1GW. Bioenergy is expected to shrink significantly, with the use of solid biomass in power generation reaching zero by 2030. The updated draft plan does not include any target for **innovative renewable energy deployment** and provides limited information in terms of promoting this.

The use of renewable energy in the heating and cooling sector is projected to reach a share of 31.5% by 2030. The draft updated NECP refers to a target to increase the use of renewables in heating and cooling by at least 1.0 and 1.3 percentage points as an annual average calculated for 2021-2025 and 2026-2030 respectively in order to meet the binding target in line with Directive (EU) 2018/2001⁸ on the promotion of the use of energy from renewable sources as amended by Directive (EU) 2023/2413 (“revised REDII”). However, the estimated national trajectories show an average increase of close to two percentage points for the first period and of 1.1 point for the second period. This is below the indicative top up under the revised REDII that results in a 1.7 percentage point average increase over 2021-2030.

The role of waste heat and cold and of renewable electricity in the trajectory towards the target, and its impacts on the target setting and achievement remain unclear. Bioenergy will remain dominant with 2.27 Mtoe in 2030, although it is projected to grow by only 34 % compared to the level in 2021. Heat pumps will see their gross final consumption more than tripled (with respect to 2021), reaching 0.25 Mtoe by 2030. However, the electricity needed to run these heat pumps and the projected capacity were not included. The ambition is to double geothermal energy, an increase from 0.12 Mtoe in 2021 to 0.29 Mtoe in 2030, but there is no mention of possible impacts on groundwater bodies and measures to prevent them.

The share of renewable energy and waste heat and cold in district heating is projected to increase by 2.2 percentage points per year, in line with the targets of the revised REDII, reaching 37.8% by 2030 under the WAM scenario. However, no information was provided on the role of waste heat and renewable electricity in the calculation, nor on their impacts on the target setting and achievement. Renewable shares on use of renewable energy in **industry** and in **buildings** were not provided.

In the transport sector, the share of renewable energy sources is projected to reach 29 % in 2030 in energy terms (RES-T). Hungary set a target of 14.5% for GHG emissions

⁸ Pursuant to Article 4(a)(2) of Regulation 2018/1999.

reduction. For the transport sub-targets, 4.5% and 1% are set as targets for advanced biofuels and RFNBO, respectively. The contribution of conventional biofuels will be about 4%. In the draft plan, Hungary pledges to continue to promote the uptake of electric vehicles and the necessary infrastructure through regulatory, fiscal and financial support instruments. However, the plan does not report on a specific target for electric cars by 2030.

The draft updated NECP refers to the objective in the 2021 National Hydrogen Strategy of 240 MW electrolyser capacity and 36 kt of carbon free and 16 kt of low carbon hydrogen by 2030. The draft updated plan does not include a target for renewable fuels of non-biological origin (RFNBO) in industry. While the draft plan includes a **RFNBO target** for transport, it indicates that complying with the RFNBO targets of the revised REDII would require higher volumes of renewable hydrogen, to be partly delivered via imports. Although this requirement is outlined in the draft updated NECP it does not substantiate the sources of this renewable hydrogen, nor the import routes, nor the domestic transport or storage of renewable hydrogen.

There are no specific references to **international partnerships** agreements, Memoranda of Understanding or bilateral talks to facilitate imports of renewable hydrogen. Hungary does provide some limited information regarding the pathway for oil-based transport fuel substitution through electrification and renewable hydrogen in land transport.

While some existing measures, in particular those supporting renewable electricity, are described in sufficient detail, and the draft plan includes some information on the deployment of decentralised renewables and heating and cooling, most of the **policies and measures** to support the achievement of the proposed objectives and contributions for renewable energy lack details, in particular in terms of budget and expected impacts.

Hungary aims to focus on decentralised generation of electricity and heat. While the Renewable Energy Support Scheme METÁR (renewable and alternative sources of heat and electricity) will remain the main instrument to deliver renewable electricity projects, the draft updated NECP does not provide details on its upgrading. Specific programmes targeting small scale solar panels are expected to drive the acceleration of photovoltaics, mainly for households and for small and medium-sized enterprises. Hungary also plans to provide financial and legal support and information campaigns to promote **local consumption and renewable energy communities**, including renewable heat communities, but the draft plan lacks sufficient details on those measures including quantitative targets. Hungary recognises the need to make better use of the possibilities offered by long-term renewable energy supply contracts (power purchasing agreements) by assessing its regulatory options. In addition, the draft updated NECP states that Hungary has an objective to simplify the permit-granting process for renewable energy investments. However, no further details are provided on those measures. For Guarantees of Origin, Hungary proposes an extension of the system to include biogas but does not indicate other measures using that instrument to improve consumer empowerment or information. Hungary has not indicated whether it has put in place a strategy on energy system integration. However, it aims to introduce strengthened measures to make better use of demand response and enhance the role of aggregators and uptake of energy storage along with the projected capacities to be installed (500-600 MW by 2026, which could increase to 1 GW by 2030) and promote the use of **innovative technologies**. Hungary is looking into the possibility of joint projects under the CEF53 programme and is open to cooperation with neighbouring countries.

The draft updated NECP outlines general objectives for **renewable heating and cooling** but measures still need to be further specified. Hungary aims to promote the uptake of heat pumps as part of the renovation of buildings, which is mentioned as the main action in decentralised heating. Hungary plans to establish a legal framework for renewable heat communities. For district heating and cooling, Hungary expects that the share of renewable energy would reach 37.8% under the WAM scenario, with strong growth in renewable and municipal solid waste-based technologies and waste heat, aiming to reduce the share of natural gas to 50% by 2030. Geothermal energy will be promoted by a combination of regulatory and financial measures. Measures to promote renewable-based electrification of **industrial processes** used for industrial heating with the aim of reducing the use of fossil fuels were generally not mentioned.

On **bioenergy** in the draft updated NECP, Hungary included estimated trajectories for renewable energy consumption per sector and per technology (including specific estimates for solid biomass and biogas up to 2030), as well as projections on generation capacities by technology. Hungary also includes data on projections for bioenergy consumption in 2030 and reports that the use of bioenergy could increase sharply in 2030, mainly in the heating sector. At the same time, it reports that residential biomass use will be significantly reduced by 30 % by 2030. Based on the reported data, an increase in bioenergy consumption can be seen in both the RES-T (transport) and RES-HC (heating) sectors, while a decrease can be observed for the electricity sector. Data are reported for the years 2021, 2025 and 2030. Hungary reports that the use of bioenergy peaks in 2030, after which it is projected to mildly start decreasing. An action programme for the utilisation of biogas and biomethane will be prepared with the aim of reducing natural gas imports. Yet, the reported investment is related to the production of electricity from biogas in combined heat and power (CHP) power plants. In the transport sector, the share of compressed natural gas vehicles is projected to increase, but without related biomethane production. Hungary has modelled the supply limit for forest firewood for 2030, 2040 and 2050, taking into account the new LULUCF EU carbon sink target. This capacity limit has been significantly increased by the supply rates from non-forestry primary solid biomass sources. The overall limit (forest firewood capacity limit and other primary solid biomass capacity limit) is set to 104 petajoules (PJ) in 2030 and decreases to 85 PJ in 2050. The Hungarian draft updated NECP does not provide information on the projections of sustainable biomass supply compared with demand projections and data, nor does it differentiate between imports and domestic production and the impacts of bioenergy use in biodiversity.

The draft updated NECP also does not include a **mapping of the areas** necessary to achieve the national contribution to the EU's 2030 renewable energy target or on the designation of renewables acceleration areas and dedicated infrastructure areas. It includes a reference to the regulatory objective to simplify the permit-granting process for renewable energy investments, but without giving specific details on the related measures. It has not elaborated on the additional human resources dedicated to permitting. The part of hydropower is minimum as well, with no consideration on either the environmental pressures on aquatic environment or the potential production disruptions related to water stress and droughts.

3.2 Energy efficiency (including buildings) dimension

Energy savings are presented as a pillar of the draft updated NECP, with Hungary aiming to reduce final energy consumption by 0.17 Mtoe per year until 2030, compared to the

2017-2019 average⁹. This corresponds to a corrected national contribution of 17.91 Mtoe final energy consumption (compared to 16.19 Mtoe according to the results from the formula in the EED recast Annex I). Hungary reported its final energy consumption target deviates from the theoretical result stemming from the formula in the EED recast Annex I by 10.6 %¹⁰. Compared to the 2020 final energy consumption target, Hungary sets the target for 2030 at a lower level (- 1.6%). No target for primary energy is provided.

The target for reducing the total final energy consumption of all public bodies is described in the plan and includes information on the measures planned, without including information on the exclusion/inclusion of public transport or armed forces. The draft updated NECP states that it is possible to reach around 80 PJ (cumulative) additional savings by 2030 resulting from the strengthening of the target from cost-optimal to nearly zero energy buildings. However, the commitment is not fully clear due to the lack of detail.

The target of 336 PJ of cumulative final energy savings by 2030 is set by the Hungarian updated draft NECP in accordance with the EED, but does not consider the new level of ambition in the EED recast. The measures used to deliver the **energy savings** required post-2020 under Article 7 of the EED or Article of the 8 EED recast are described, but more information is needed to assess their quantitative impact.

The draft updated NECP presents the newly introduced energy efficiency obligation scheme (EEOS) in 2021 as the central energy efficiency measure, delivering 26% of the energy efficiency target by 2030. The "alternative measures" delivering the bulk of the energy savings required to achieve the energy savings obligation are mentioned, but not described in detail and it is not clear how these measures contribute to the achievement of the 2030 energy efficiency contribution.

The draft updated NECP presents the planned measures to achieve the 2030 energy efficiency goals but information on the expected impacts and energy savings is largely missing. Only the central energy efficiency measure, namely the EEOS with an overall impact of around 88 PJ in cumulative final energy savings is presented in detail. The draft plan does not include measures reflecting the 'energy efficiency first principle'.

Based on the presented scenarios, the largest part of the transformation is based on the combination of new policy measures in the residential sector. Policy measures such as stronger standards, grants and the impact of the EEOS will lead to about 14% lower final energy consumption under the WAM scenario compared to the WEM scenario in 2030. For the transport sector, the introduction of the ETS2 and the additional excise duty on fossil fuels are expected to lead to a substantial drop in energy consumption.

There are dedicated measures to provide energy audit services both to individuals and public institutions, however, the information about the enterprises subject to the obligation of Article 11 EED recast on **energy management systems and energy audits** is missing.

⁹ 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.

¹⁰ 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.

The Hungarian draft updated NECP assesses the additional investment need to finance the set of measures at about HUF 500 billion per year. However, the investment need for each measure is unclear. There are no leverage factors discussed and the source of the investment is not identified clearly.

The updated draft NECP includes subsidy measures that will fund energy efficiency measures through public sources, including the **Climate Policy Modernisation Fund** (previously the Green Economy Financing Scheme) to support the promotion of electric mobility, energy efficiency, renewable energy and the development of integrated green transport¹¹. In addition, the Integrated Transport Development Operational Programme aims to shorten travel times and reduce emissions by developing the TEN-T infrastructure in Hungary. The Competitive Central Hungary Operational Programme aims to improve the energy system in central Hungary. Families are supported by the Family Home Establishment Programme, partially for energy efficient investment.

The draft NECP does not increase the ambition of the **2020 long-term renovation strategy ('LTRS')** but refers briefly to its key elements such as milestones and targets. For residential building stock, the 2020 LTRS target goal of reaching 20% energy and emission savings by 2050 with the aim of reducing GHG emission by 90% by 2050 are confirmed. However, according to the WEM scenario, the final energy consumption of residential stock will decrease by only 13% and the final energy consumption for heating, cooling and hot water of residential stock by only 8.5%. The final energy consumption of residential building stock decreases by about 25% in the WAM scenario. This indicates that the LTRS objectives cannot be reached without consistent additional measures. Renovation of public buildings and related savings are also in line with the 2020 LTRS. Hungary envisages financing **public sector renovations** using ESCO-type financing and an obligation scheme for which Hungary intends to provide additional investment aid to the public bodies involved in the renovation. The draft plan indicates that the energy savings resulting from the renovation obligation on the central government are estimated to be comparable to those of the energy efficiency obligation scheme, but it does not give any indication of how these are estimated.

The updated draft NECP also incorporates 16 of the 35 measures already included in the 2020 LTRS, 7 new measures and 3 other measures that appear to be a continuation of existing ones. However, most of the measures do not have a quantitative estimation of their impacts in terms of energy and emission savings. The circular economy/resource efficiency in buildings and their renovation is largely missing.

3.3 Energy security dimension

Fossil fuels still play quite an important role in the Hungarian energy mix, as in 2021 they accounted for 69 % of the gross available energy, very close to the EU average.¹² According to the draft updated NECP, this share is expected to decrease and be between 55% (WEM scenario) and 51 % (WAM scenario) by 2030, and between 48 % (WEM

¹¹ It is a Recovery and Resilience Instrument aimed to develop clean urban transportation.

¹² Eurostat data.

scenario) and 39 % (WAM scenario) in 2040. Still, Hungary continues to depend heavily on Russian fossil fuels and efforts to reduce this dependency are insufficient. Hungary's **energy import dependency** on third countries has slightly decreased from 50% in 2013 to 42% in 2021¹³. The draft updated NECP pinpoints increasing energy independence as a high priority of the government. In this perspective, Hungary intends to mainly use the following levers: increase energy efficiency; sustainable use of domestic hydrocarbons and renewables; maintain national nuclear capacities; increase market integration.

Natural gas is the largest energy source in Hungary, accounting for 34% of its energy mix and 27% of its electricity mix, well above the EU27 average¹⁴. In 2021, Hungary was dependent on Russian imports for 95 % of its gas needs¹⁵. To increase its security of gas supply, Hungarian authorities aim in particular to increase domestic production, which is planned to increase to 1.8-2 bcm/y by 2030, depending on exploration.

In terms of **renewable gases**, the draft plan envisages a small increase in the use of biogas for electricity generation, as well as a more substantial increase in its use for heating and cooling (from 10 ktoe in 2022 to 87 ktoe in 2030). In addition, under the 2021 National Hydrogen Strategy, the installation of 240 MW of electrolysis capacity is expected to enable the production of 36 thousand tonnes of carbon-free hydrogen and 16 thousand tonnes of low-carbon hydrogen by 2030, together with a pilot project on hydrogen storage infrastructure. More generally, Hungary is exploring adapting its gas storage facilities to the shift from east-west transport routes to a more south-north-west direction and making them hydrogen-compatible, but without describing specific measures in this regard.

In terms of diversification, the draft plan explicitly mentions the goal of increasing imports from Azerbaijan, the Black Sea and LNG sources. The draft plan also mentions the objective of continuously meeting the N-1 criteria and maintaining the value of the indicator above 120%. Overall, while the objectives generally go in the right direction, there is a lack of detail on the specific measures and policies to achieve them. The draft updated NECP also fails to clarify how the envisaged measures fit with the REPowerEU objective of phasing out Russian gas dependence in the EU by 2027, nor does it explain clearly enough how Hungary intends to reduce its Russian gas consumption.

Hungary managed to reduce its gas demand between August 2022 and August 2023 by 18% compared to the average of the previous five years, slightly above the -15 % indicative target and in line with the EU27 average (-18 %)¹⁶. However, the updated draft plan does not show how the emergency measures adopted in response to the Russian war of aggression against Ukraine, in particular regarding gas demand reduction, are integrated into the medium-term planning towards 2030.

Hungary's primary objective in the **electricity sector** is to secure supply with affordable wholesale market prices, incorporate innovative technologies and ensure its decarbonisation objectives, principally by increasing the share of low carbon technologies. The draft updated NECP provides a detailed description of how these objectives will be achieved, such as information on generation assets, interconnections, policies aiming at

¹³ Eurostat data.

¹⁴ Data from EU energy statistical pocketbook and country datasheets (europa.eu)

¹⁵ Joint Research Centre, https://economy-finance.ec.europa.eu/system/files/2023-06/ip241_en.pdf

¹⁶ 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)

enhancing integration of renewables, and other flexibility instruments, such as storage. All this, amid the expected increasing electrification (and thus growing power consumption) of its economy.

More than 40% of domestically generated electricity comes from the Paks nuclear power plant. The new Paks 2 project is not expected to be operational until the next decade. In 2022, 20% of electricity was generated from solar power. Over the last few years Hungary imported around 30% of its electricity consumption. Import dependency is expected to decrease by 2030, with new capacities coming online. Hungary also considers the potential for deploying Small Modular Reactors (SMRs) depending on their technological maturity and market availability.

The lignite fired Mátra power plant, which alone is responsible for 50% of the CO₂ emissions of the whole Hungarian electricity sector, is expected to be phased out by 2030 at the latest, which is inconsistent with the coal phase-out date that was agreed in the cohesion policy programme and in the corresponding Territorial Just Transition Plans adopted by the Commission in 2022. Gas-fired power plants operate with high marginal costs following the surge in gas prices since 2022. Combined with the expected increase in electricity demand, additional production capacity will be necessary to ensure adequate power generation. Resource adequacy analysis from ENTSO-E in 2022 showed that loss of load expectations (LOLE) might reach more than 6 unserved hours in 2025, which is high in an EU comparison.

According to the current Hungarian legislation, the nuclear fuel stocks at Paks nuclear power plant should reach a minimum level corresponding to at least two years of combined heat and electricity generation. Nuclear fuel is currently supplied through an intergovernmental agreement with Russia. Diversification efforts have, however, accelerated after the Russian war of aggression against Ukraine. No alternative fuel supply contracts have been negotiated so far. Also, in the perspective of the construction of the new nuclear units, the draft updated NECP does not report further details on measures taken to diversify and address long-term supply of nuclear materials, fuel, as well as spare parts, and services.

Interconnection capacities are available with all neighbouring countries (Austria, Slovakia, Romania, Croatia, Slovenia, Serbia and Ukraine) and in total their capacity reaches 50% of the total domestic generation capacities, well above the EU target of 15%, showing that cross border interconnections make up an important part of system flexibility in Hungary. Further capacity increases are planned on the Hungarian-Serbian border, as well as improvements to the links with Austria and Slovakia, where capacity scarcities hamper cheap renewable imports from the north-west.

Increasing variable renewable penetration requires a significant upgrade of the transmission and distribution electricity grids, and a better regulatory and market environment. To address increasing electricity needs, 1.5 GW Combined Cycle Gas Turbines (CCGT) plants are planned to be commissioned by 2027. The compatibility of such measure with 2050 decarbonisation objectives should be explained in details. The draft updated NECP also foresees to increase storage capacities (from the current low of 25 MW batteries) to 500-600 MW by 2026 and up to 1 GW by 2030, pending the overhaul of the currently unfavourable network tariffs for storage installations. Yet there seems to be no dedicated strategy for the deployment of power storage in the country. According to a study on storage commissioned by the European Commission, the current operational

Hungarian power storage capacity is around 6.5 MW and double charging and the limited participation of storage in the ancillary services markets were among the identified barriers¹⁷. Broader deployment of innovative demand response solutions is also considered an important tool for flexibility. Energy communities and aggregators are also expected to play a role in harnessing flexibility.

Oil represents about 30% of Hungary's primary energy mix and is mostly used in the transport sector. As a landlocked country, the country is still very much dependent on Russian crude oil imported via the Druzhba pipeline (78% of crude oil import in July 2023), with the rest transported from Kazakhstan and Croatia. The draft updated NECP aims to limit the current oil import dependency below 85 %. To reduce dependency on Russian oil, the draft plan states that the priority should be to increase the capacity of the Adria pipeline on the Croatian territory. The draft plan however lacks details on the cooperation between Hungary and Croatia on this project.

There is one major refinery in Hungary which works in close coordination with another refinery in Slovakia. One planned measure to improve diversification is to increase the flexibility of the Danube Refinery to be able to process crude oil of non-Russian origin. The plan does not address the adequacy of the oil infrastructure (oil stocks, refinery, ports, pipeline) for future expected oil demand. Hungary is not projecting a significant decrease in oil or oil products consumption by 2030. But the plan does not cover the impact of the roll-out of renewable energy sources and energy efficiency measures on oil consumption beyond 2030. There is also a lack of detail on future alternative solutions to Russian energy deliveries.

Digitalisation is recognised as an important aspect of the electricity sector, along with promoting data-based solutions and publicly available data on the sector for all market participants. **Cybersecurity** is also part of the draft plan as a major risk factor for the electricity sector, putting emphasis on addressing challenges, threats and risks by information sharing among the relevant actors and calling an incident management unit to be set up.

The draft updated NECP does not address the resilience of critical raw materials supply chains, nor the impact of climate change on the energy system (on nuclear output for instance).

The draft updated NECP does not describe the measures in the event of **security of supply crisis** neither in the gas nor in the electricity sectors. In this regard, Hungary has still not submitted its updated Preventive Action Plan yet, while it was due by 1 March 2023. However, it has recently submitted its National Risk Assessment and its Emergency Plan, as well as the Common Risk Assessments for the Caspian (which it coordinated), Ukraine and Trans-Balkan regional risk groups, which are all currently being assessed by the European Commission.

¹⁷ 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/.

3.4 Internal energy market dimension

The draft updated NECP emphasizes the high level of interconnection for Hungary and put forward an electricity interconnection level of 60% for 2030, which can help integrate renewables into the electricity system and therefore support the ambition to increase renewable energy sources in 2030. While the plan concretely includes a planned capacity increase of the Hungary-Serbia electricity interconnection, it does not describe the expected benefits of the project in detail.

The draft updated NECP refers to further expansion of cross-border natural gas capacities in a general manner, makes reference to the Hungarian gas TSO's network development plan and makes concrete reference to a new natural gas interconnection with Slovenia, which the NECP describes as envisaged to be fully hydrogen compatible. The need for this interconnector however is not substantiated.

To prevent the loss of flexible capacities and improve flexibility capabilities, Hungary intends to integrate energy storages and new gas-fired power plants (CCGT) into the system with clear targets for both. Hungary intends to install at least 1 million smart meters by 2030 and envisages putting in place the necessary legislative amendments to ensure the proper functioning of aggregators and energy communities by 2024. Whilst it mentions actions to promote renewables, as well as the importance of storage and demand response, the draft updated NECP does not propose very concrete plans going forward.

The draft updated plan sets the objective of increasing self-generation by consumers and local energy use within communities while accelerating the digitalisation of the electricity system through creation of databases and deployment of smart meters for the purpose of activating consumers in demand-response (1 million in the electricity sector by 2030). Corresponding measures and policies are limited and often insufficiently detailed (e.g., a declaration of intention to revise the legal environment for energy communities and enable them in the heating sector by 2024), and there is no cross-reference to investment or reform commitments made as part of the RRP (e.g., regarding smart meter investments).

While not explicitly employing the term 'energy poverty', the draft updated NECP sets out a rather basic definition of vulnerable customers. It does not provide an indication of the number of households in energy poverty nor a corresponding measurable target to reduce this number. The draft plan does not formulate any measures or policies to protect and to empower this category of consumers.

Overall, the description of the current situation concerning energy poverty is not sufficiently detailed. It does not provide synergies with the above-mentioned measures to develop demand response, accelerate building renovation and make energy savings in a targeted manner. Hence, no direct effect on households in energy poverty and on the empowerment of vulnerable consumers can be discerned.

Furthermore, there is no reference to national objectives and to a concrete timetable to develop the specific measures announced, or to the link between energy efficiency and social policies and measures.

3.5 Research, innovation, competitiveness and skills dimension

3.5.1 Research and innovation

The draft updated NECP reports that Hungary aims to increase its **national spending** on research and development (R&D) to 3% of the GDP (reported in the RDI strategy), and to improve its position in the ranking of the world's leading innovators by 2030. However, Hungary did not report on its specific national spending target for clean energy research and innovation (R&I).

Hungary reports that, on average, annual public R&I spending amounted to HUF 7.5 billion between 2018 and 2022. Priority areas included energy efficiency, renewables, energy production and storage, as well as nuclear development (in particular as of 2022).

The draft updated NECP highlights three main programmes/strategies that provide direction for energy-related R&I: Hungary's 2023 innovation strategy (the Neumann János programme), the National Energy Strategy and the National Smart Specialisation Strategy (2021-2027). These programmes are meant to concentrate resources on strategic sectors and increase competitiveness. The draft NECP outlines eight priority areas for energy innovation policy, i.e., grid balancing; storage for heat and intermittent power; energy services; smart regulation; nuclear innovation; greening of mobility; CCS and CCU; and hydrogen. The plan also refers to increasing national clean energy manufacturing capacity. The circular economy is referenced as having been included in one of the four areas addressed by the new János Neumann Innovation Strategy (i.e., green transition and circular economy), however, without further details in the NECP.

However, the draft updated NECP does not provide investment figures, at national or programme/strategy level. It only mentions the operational programmes for Economic Development and Innovation and for Environment and Energy Efficiency, and the REPowerEU programme as possible sources of funding. Consequently, information is missing on what the declared national R&I objective (3%) implies for the clean energy sector.

The draft updated NECP extensively explains the country's participation in various regional research and innovation cooperation programmes. Hungary engages actively with the 'Visegrád 4' countries (Poland, Czechia, Slovakia and Hungary), including through a dedicated energy working group, which deals in particular with energy efficiency and renewable energy. Hungary is involved in five SET-Plan Implementation Working Groups (IWGs) (HVDC, Batteries, Wind, CCUS and Nuclear safety), as well as eight Horizon partnerships, and several European and international nuclear energy initiatives.

The draft updated NECP reports that support for **nuclear innovation** can improve the competitiveness of nuclear power generation and contribute to the maintenance and expansion of nuclear energy in Hungary (e.g., R&D projects on the safe long-term use of nuclear energy and the proper storage of radioactive waste). Hungary participates in several EU and international scientific R&D projects in the nuclear sector: for instance, Thermonuclear plasma physics research and development, work by the European Safeguards Research and Development Association (ESARDA) under EURATOM; and various projects by the European Organisation for Nuclear Research (CERN), the OECD's Nuclear Energy Agency (NEA) and the International Atomic Energy Agency (IAEA).

3.5.2 Competitiveness

Hungary's draft updated NECP recognises the link between competitiveness and investment into innovation, manufacturing capacity and training. Some relevant measures in the Neumann János programme have been vaguely referred to, such as linking universities to relevant sectors of the economy. However, their translation into concrete clean energy-related competitiveness objectives is missing.

The draft NECP provides very limited information, and no figures, when it comes to national net-zero industry policy (manufacturing of key energy technologies, components and equipment and deployment in various industrial ecosystems) and related notions such as recyclability and circularity or diversifying the sourcing of imported raw materials, components and final products, required for manufacturing and deploying clean energy systems.

Hungary did provide relatively detailed information on the digitalisation of energy (power) systems. The country included measures that enable the digitalisation of the energy system through solutions such as deploying smart meters or increasing cybersecurity.

3.5.3 Skills

The draft updated NECP identifies a need to increase the efficiency of knowledge production, and the availability of human resources required for the energy transition, especially by training and reskilling. Energy efficiency of buildings, hydrogen economy and biogas are the areas highlighted by way of example, although without specific policy measures or investment figures. The circular economy and its education and training programmes are missing. REPowerEU and the Environment and Energy Efficiency operational programme are vaguely referred to as possible funding sources.

The draft updated NECP does not include measures and investments to address the identified gaps in order to boost European competitiveness in clean energy technologies, equipment and components, connecting, for instance, with the SET Plan revision, relevant European Year of Skills initiatives, the Pact for Skills large scale partnerships, and the new innovation agenda.

4 JUST TRANSITION

The draft updated NECP addresses just transition aspects in a limited manner. An assessment of overall employment effects of the transition towards climate neutrality is presented, showing a small but positive impact (for a non-specified time-horizon) but sector-specific impacts are not detailed. The draft updated plan does not provide information on the number of jobs-at-risk due to decarbonisation or the number and quality of jobs in the green sectors. In particular, the employment and skills impacts of the transformation of vehicle manufacturing and of the sizeable investments into the battery manufacturing in Hungary are missing. Also, the plan neither assesses nor quantifies social impacts of the climate and energy transition and does not provide sufficient information for the preparation of the Social Climate Plan, as assessed in Chapter 7.

Concrete measures to address **access and preservation of employment** are only mentioned from the perspective of territorial just transition, in the context of upskilling and employment of workers in the Mátra power plant. Regarding impacts on workers in

declining industries, the draft updated NECP states that the Mátra lignite power plant, the last coal fired power plant in Hungary, will be decommissioned by 2030 at the latest which is a significant postponement compared to the commitment to phase-out coal by 2025 indicated in the adopted Territorial Just Transition Plans (TJTPs). In fact, closing of the lignite power plant and the two associated open cast lignite mines (Visonta and Bükkábrány) by 2025 was a necessary condition for approval of the JTF financing in Hungary and of the TJTPs. The consequences of this on employment in the Mátra power plant and related sectors as well as on the planned measures to mitigate socio-economic impacts foreseen in the Territorial Just Transition Plans (TJTPs) are thus not clear. In the context of the transition, measures related to **access to affordable and inclusive education, training and life-long learning** are partly considered by stating that Hungary wants to increase training (both vocational and higher education) and develop teaching materials, but concrete measures are missing.

With regards to access to **essential services and the fairness of the tax-benefit system**, in the context of the transition, an analysis is missing. Furthermore, consumer empowerment measures and policies as well as energy poverty measures are insufficiently described (for more details on these aspects, see Section 3.4). Finally, the plan lacks detailed information on the resources specifically devoted to supporting the just transition.

5 REGIONAL COOPERATION

The draft updated NECP foresees a moderately strategic role for regional cooperation.

Hungary is member of ‘V4’ (the Visegrad countries) together with Czechia, Poland and Slovakia. Within this framework, Hungary participates in exchange of experience on the development of the energy sector, including on cooperation with individual technology suppliers, in particular suppliers of nuclear technologies (e.g., “Research and innovation” scientific projects).

The draft updated NECP does not contain details on cooperation with neighbouring countries and regulatory authorities, for instance within the confines of the Central and South Eastern Europe energy connectivity (CESEC) high-level group. The plan does, however, point out the continued communication and effective cooperation among electricity TSOs developed during their collaboration on interconnectivity.

Hungary has still not signed any solidarity agreement for security of gas supply out of the five required (with Austria, Slovenia, Croatia, Slovakia and Romania), and the draft updated NECP does not envisage any change in the situation.

6 INTERNAL COHERENCE AND POLICY INTERACTIONS WITHIN THE DRAFT UPDATED NECP

The draft updated NECP reflects synergies within and between the five dimensions of the Energy Union, including increasing energy efficiency and deploying renewables and nuclear power to decarbonise the economy, increase energy security and reduce dependency on fossil fuel imports. This requires the need for better market integration of renewables, by improving the electricity and gas infrastructure including storage capacities, increasing interconnectivity, increasing system flexibility and considering demand response measures. The energy independence of households can be promoted by

supporting indigenous renewables production and by promoting the uptake of smart meters, thereby also increasing energy efficiency. Apart from renewables deployment, Hungary strongly focuses on the development of hydrogen infrastructure. This new energy source strongly interlinks with the five dimensions. However, the draft updated NECP does not provide detailed analysis of the consistency of policies and measures in each dimension and a quantitative analysis of interactions between certain objectives. Hungary plans to reduce its high dependency on energy imports, by decreasing final energy consumption, developing a diversified energy supply portfolio and strengthening the electricity system through grid development and power digitalisation.

7 STRATEGIC ALIGNMENT WITH OTHER PLANNING INSTRUMENTS

Hungary submitted its REPowerEU Chapter on 31 August, together with the updated draft NECP. The draft NECP mentions that the Chapter will further contribute to the NECP renewable energy and energy efficiency objectives. The draft updated NECP for Hungary covers to a limited extent the main reforms and investments of the **Recovery and Resilience Plan (RRP)** that contribute to implementing the objectives, targets and contributions. The consistency between NECP and some key measures of the RRP is only vague and not specific enough in several instances.

The RRP reform on increasing transparency in the allocation of grid connection capacity and investments aimed at further developing the distribution and transmission networks, the development of energy storage as well as the installation of smart meters. These investments will be instrumental in accelerating the integration of renewables into the grid. Moreover, the Hungarian draft updated NECP also highlights the objective of strengthening the skills base in the energy transition. In this regard, it makes reference to the reforms and investments implementing energy efficiency renovation and digital equipment solutions in buildings in higher and vocational education institutions. On energy efficiency, the NECP mentions that the resources currently allocated under the RRP for energy efficiency renovations and refurbishment of public and private buildings will contribute to the achievement of the country's energy efficiency objectives. The draft NECP indicates that RRP planned investments in residential photovoltaics would contribute to GHG emissions reduction and increase renewable energy production. In the area of renewable energy, a strong link is missing between the NECP and the RRP, especially when it comes to the role of RRP reform to encourage the development of onshore wind energy, which is not mentioned in the NECP. The plan seems partially consistent with the national RRP and REPowerEU chapter. Furthermore, Hungary did not elaborate on how the RRP and REPowerEU investments and reforms will contribute to achieving the quantitative targets included in the NECP.

When the RRP 100% and 40% climate-tagged measures are considered, the draft updated NECP refers explicitly to 7 out of the 27 climate relevant measures and sub-measures in the RRP (i.e., those with 40% - 12 measures / sub-measures - or 100% - 15 measures / sub-measures - climate tracking), covering 8 RRP components, 24 investments and 2 reforms. Overall, 9 measures / sub-measures among those 100%-climate tagged are poorly or not

consistently reflected in the draft NECP¹⁸. Of those measures / sub-measures 40%-climate tagged, the draft NECP poorly covers or does not include 11 measures / sub-measures¹⁹.

One measure covered also seem to show important inconsistencies with that in the RRP: for Component 6, investment 4 (installation of grid energy storage facilities for energy market participants), the draft NECP mentions a 10-year income compensation support to be provided to market participants that is not part of the RRP measure. Hungary does not provide clear information whether this support will come on top of the RRP measure and will be implemented together with national resources. Moreover, for Component 5, investment 3 (development of zero-emission bus transport), while the RRP refers to 300 electric buses, the draft NECP does mention the 300 target but also refers to green, electric and hydrogen-powered buses, which is inconsistent with the RRP measure description.

The draft updated NECP contains very few references to air quality, although it is referred to in the context of the planned transformation of the Mátra power plant. Moreover, it does not include the required information on the impacts of planned policies and measures on projected emissions of the main air pollutants regulated under Directive 2016/2284. Nor does it explain how the **National Air Pollution Control Programme** (NAPCP) and energy and climate programmes are aligned.

The draft updated plan is not consistent with the adopted **Territorial Just Transition Plans** (TJTTPs) for the counties of Baranya, Heves and Borsod-Abaúj-Zemplén, given that it postpones the commitment to close Mátra power plant's lignite-fired units from 2025 to 2030 and makes it conditional on the finalisation of a new CCGT. Furthermore, the draft updated plan does not make any reference to the commitments to stop lignite extraction in the two associated open-cast mines (Visonta and Bükkábrány) by 2025. Moreover, is not making any reference to impact of the transformation of declining industries in Baranya County.

The draft updated NECP does not provide an adequate analytical basis for the preparation of the **Social Climate Plan** (SCP) 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. Hungary 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), taking into account the distributional effects arising from the future ETS2. The draft updated NECP outlines a consistent set of decarbonisation policies and measures in the buildings and road transport sectors, however inadequate information is provided on the concrete reforms and policy framework for the future Social Climate Plans. Thus, the current draft does not explain how the SCP will build on the NECP update and how the consistency between the two plans will be ensured.

In the draft updated plan, Hungary 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

¹⁸ i.e., Component 2, investment 2, 4 and 5; Component 3, investment 2; Component 5, investment 1, 2 and 3; and Component 7, investment 1

¹⁹ i.e., Component 1, investment 4; Component 2, investment 2; Component 4, reform 1 and investments 2 and 3; Component 5, reform 1 and investments 1 and 4; Component 8, investment 1

additional measures are necessary. Compared to the **National Adaptation Strategy (NAS)**, the plan is less detailed and less ambitious on the respective measures.

In the draft updated NECP, Hungary only partially addresses the 2022 and 2023 **European Semester country specific recommendations** to diversify the supply of fossil fuels and reduce their share in the energy mix by taking specific actions such as shortening and simplifying permitting procedures to accelerate the deployment of renewables, and pursuing efforts on energy efficiency, especially in the building sector. The recommendation to accelerate the deployment of renewable is not adequately addressed, as the proposed renewable energy target is still significantly below Hungary's share in application of the formula of Annex II of the Governance Regulation.

8 FINANCING THE ENERGY AND CLIMATE TRANSITIONS

8.1 Investment needs

The draft updated NECP includes only limited information on the expected investment needs to implement the planned policies and measures for each of the five dimensions. It provides information on the aggregate investment needs for the period until 2035 and for the period of 2036-2050 in sectorial breakdown, covering transport, electricity and district heating, households, industry, services and others, but not agriculture. However, the quantitative and qualitative information on the investment needs for the planned policies and measures is missing.

8.2 Funding sources

The draft updated NECP only sporadically outlines the main sources of financing used to implement the planned key policies and measures. The description is often limited to the listing of EU funds used (most often Cohesion Policy Funds and RRF) and it lacks quantification of the investment volumes. No detailed information is provided in some key investment areas, in particular concerning greenhouse gas reduction and removal and energy efficiency.

The draft updated NECP does not provide information and quantification of the sources of financing for each policy and measure, including information on the public and private funding sources, and the share coming from the EU's budget or NextGenerationEU, explicitly specifying the RRF contribution. There is no consolidated overview table gathering all the budget information for the different policies and measures.

Furthermore, the form of support provided through various EU funding sources is not sufficiently clearly outlined. The role of public funding in mobilising private financing (including the use of EU shared management financial instruments where relevant) is not adequately detailed in the document.

9 ROBUSTNESS OF THE ANALYTICAL BASIS OF THE DRAFT UPDATED NECP

The draft updated NECP is based on robust quantitative analyses grounded on the use of Hungary's TIMES model. However, this is not sufficiently documented in the draft plan. The analytical approach used for the socio-economic impact assessment is currently missing. Projections and impact assessment are discussed for both the WEM and WAM

scenarios and differences between the two as regards the main energy and climate indicators are presented in a clear way. However, WEM projections do not cover the LULUCF sector, and WAM projections are only provided for energy and agriculture.

The projections cover the period until 2050 and provide an ETS/ESR split. The new ETS for buildings, road transport and additional sectors (ETS 2) has been considered in the projection scenarios. The analysis is based on the drivers recommended by the Commission (though international fuel price of natural gas in 2050 differs from the recommended trajectory and assumptions for the ETS2 carbon price do not seem correct). Key energy indicators (e.g., final energy consumption, gross inland consumption) show slight differences with official statistics, while renewable energy shares largely differ from official statistics. Data sources (e.g., techno-economic parameters in Section 4.1) are well documented for power and heat generation, while additional transparency is recommended for the transport and building sectors and especially for industry. Overall, the analysis is well suited to assess the expected impact of the draft plan and the most important policies and measures introduced by the plan, but the overall discussion would benefit from additional transparency both in terms of the analytical tools used and in the underlying assumptions.

The draft plan lists and briefly describes the existing/planned policy measures (also in Annex I). However, it does not define clearly which policies are considered in the WEM and WAM scenarios, respectively. While an analysis of the expected impact from each policy is missing, the plan assesses the overall impact of all the policy measures included in the WEM and WAM scenarios on the relevant sectors of the economy. However, the discussion does not cover all variables specified in Annex 1 part 2 of the Governance Regulation. The draft plan does not assess the main policy interactions and it does not include any sensitivity analysis.

The draft plan includes draft quantitative analyses of the expected impacts of policies on macroeconomic and socioeconomic indicators, while environmental and health impacts are not discussed. The tools used for these analyses are not documented, so it is not possible to evaluate the robustness of the analysis.

The draft updated NECP contains a **macro-economic assessment** of the proposed policies and measures. However, as specified in the plan, the modelling has been prepared ‘in the context of energy modelling’ only and says that the ‘impact analysis will be extended to the entire plan’ until the NECP is finalised. The draft plan includes quantitative estimates of its impact on GDP, employment and government revenue. There are brief descriptions provided for each three macroeconomic indicators. It is unclear which methodology was used to prepare the macroeconomic assessment and which transmission channels were taken into account. The analysis does not address the negative welfare costs, such as the impact on consumption during the transition. The draft plan lacks an assessment of the impact on the public budget, and it is not clear how public spending would be financed.