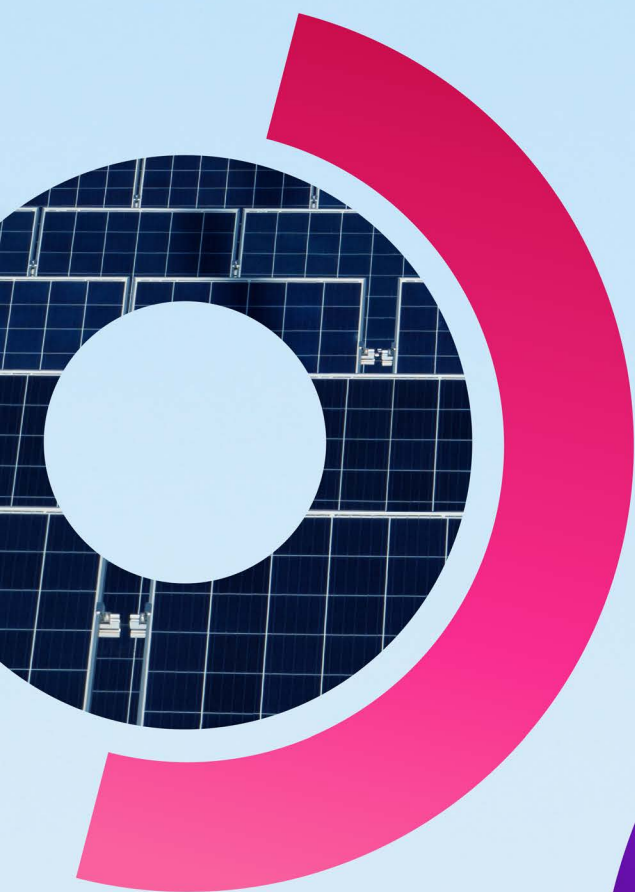


Summary for Policymakers

Net zero risk in European climate planning:

A snapshot of the transparency and internal
consistency of Member States' NECPs



Who is ECNO?

The European Climate Neutrality Observatory (ECNO) aims to help the EU achieve climate neutrality by providing scientifically rigorous analysis of economy-wide progress and an impartial check on EU climate policy processes. As an independent observatory, ECNO seeks to inspire the uptake of better monitoring practices and policy making, as well as greater transparency on the EU's transition to climate neutrality by presenting a unique, comprehensive picture of the whole economy.

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Summary for Policymakers

Why NECPs matter

A climate neutral economy will not come about by chance. The pathways consistent with well-below two degrees require decisive action during this decade. Consistent and transparent planning, with a clear eye to intermediate targets, will be needed. National Energy and Climate Plans (NECPs) represent an opportunity for EU Member States to chart their next steps on the road to a net-zero economy by 2050. Clear and robust NECPs are one of the key tools available: done well, they should provide detailed information on how climate and energy targets will be implemented, with an integrated and considered view of how steps taken in different sectors will interact. They are also a powerful way to reinforce the collaboration and coordinated action across Member States if sufficient focus is set on the coherence across countries. Member States must finalise their NECPs by June 2024. Several good practice examples exist around the EU, at least on particular aspects of the NECPs, and should serve as inspiration. This report aims to share the strengths and weaknesses on the consistency of the draft plans of a few Member States and therewith aid all of them to deliver robust plans in their final versions.

Scope of work: uncovering inconsistencies

This report offers an analysis of five Member State draft NECPs and assesses them according to **transparency and internal consistency**. We interrogate the documents regarding four key cross-sector themes in order to both help directly improve the NECPs assessed, and to inform and strengthen European climate planning at large as regards the use of limited, cross-sector resources: renewable electricity and renewable hydrogen, land uses, bioenergy and long-term geological storage of CO₂. Therewith, it enables national administrations to improve the draft NECPs for their final version, shining a light on the areas where these current drafts typically lack coherence and clarity.

The report does not evaluate the likely effectiveness of the presented policies, nor the quality and inclusiveness of the drafting process. Rather, it highlights ‘planning risk’ areas in the draft plans with the aim of helping to ensure that Europe stays within the available pathways to timely climate neutrality, in this crucial decade of climate action.



Headline findings: the lack of transparency leads to risks of inconsistency

Our assessment finds that the five analysed draft NECPs lack a sufficiently detailed and systemic view of all the proposed measures. This gives rise to a risk of inadequate infrastructure, shortages of key resources and ultimately not delivering the targets. The analysed plans all fall short on policy detail and transparency, and in many cases, this leads to inconsistencies.

EU countries now have an opportunity to improve the plans by June 2024 when final versions are due.

Also, while each country will need to submit a progress report every 2 years, the next round of new NECPs will only be due in 5 years' time (Governance Regulation¹, Art. 3). A clear course for implementation must therefore be laid out in the plans today, or the risk of missing the 2030 targets – and ultimately, the timely and cost-effective delivery of climate neutrality – is very high.

Our analysis gives insights on this lack of transparency at two levels, first with a view on total GHG emission reductions, and then by exploring four key research themes in detail.

Transparency gap towards the 2030 targets

The assessed country plans have a significant transparency gap as regards setting out how the 2030 emission reduction targets will be delivered. Among the five draft NECPs analysed, levers that would account for at least 14% of the stated reductions are not transparently laid out, and in one case more than 100% of the reductions are not transparently laid out (see Table 1). This transparency gap risks leading to what some actors refer to as an implementation gap². It is expressed in the table both in absolute tons of carbon dioxide equivalents (t CO₂e) and as a percentage of the reduction which is not achieved between 2021 and 2030. We find that all analysed sectors contribute to this gap (for a visual representation and sectoral information, see section 1.3.2).

Table 1: Transparency gap of the plans analysed

Transparency gap as:	Italy	Hungary	Netherlands	Spain	Sweden
Absolute amounts in missing tons of CO ₂ e	44 MtCO ₂ e missing	16 MtCO ₂ e missing	17 MtCO ₂ e missing	13 MtCO ₂ e missing	11 MtCO ₂ e missing
Percentage of the reduction which is not explicitly planned for between 2021 and 2030	-17% explicitly planned vs a -28% target leading to a 39% transparency gap	+4% explicitly planned vs a -24% target leading to a 117% transparency gap	-16% explicitly planned vs a -26% target leading to a 38% transparency gap	-31% explicitly planned vs a -36% target leading to a 14% transparency gap	[The emissions in the Swedish NECP become negative, making a percentage calculation impossible]

Our assessment is based primarily on the information set out in the draft NECPs, but we have also looked at specific plans when they were explicitly mentioned in the drafts as being an official policy contributing to a key topic (e.g., a separate national hydrogen or bioenergy strategy). It is, however, not always possible to state to which extent the transparency gaps are due to detailed plans actually not existing, and to which extent it is simply an incomplete representation of existing information. In all cases, given that the NECPs are intended to be both Member States’, and the EU’s most systematic and comprehensive statements of how to reach domestic and international emission reduction obligations, this missing information does suggest achievement of its targets is at risk.

The sections below highlight our conclusions on the key findings across the four research themes.

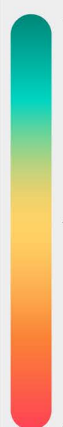
1. Renewable electricity and hydrogen

There is a significant difference between the quality of information in the different NECPs for renewable electricity as compared to renewable hydrogen. **On renewable electricity, the quality of information is high overall;** countries are far more detailed and advanced on their plans for renewable energy build-out than for renewable hydrogen, for example. Renewable electricity reporting especially lacks behind on the implications of the updated RE targets and the electrification of key sectors, especially industry. **In contrast, in all countries assessed, the quality of information in the NECPs for renewable hydrogen is low and should be improved** on all levels. The first indicators in the table are included in the Governance Regulation, i.e. (EC guidelines to Member States). The other indicators in the table are suggestions made by ECNO for more transparent monitoring of NECPs.

Table 2: Quality of information regarding renewable electricity

	Metric	Description	Rating
Gov. Reg.	Targets	Renewable Energy Directive II targets are stated and explained	High
		Renewable Energy Directive III targets are stated and explained	Medium
	Policy Support	Policies and measures to support renewable energy build-out detailed	High
	Electrification	Electrification measures for industry clearly described	Low
Electrification measures for transport clearly described		Medium	
Electrification measures for buildings clearly described		High	
ECNO Indicators	Grid enhancement	Plans for grid infrastructure development detailed	High
		Grid integration efforts & coordination within the EU described	High
	Pipeline of projects	Expected level of imported electricity, including from which country	High
		Planned & ongoing renewable energy projects within MS detailed	Medium
		Capacity & timeline of renewable energy projects match RED targets	Medium

Rating legend



- High transparency:** All countries included information and most or all countries included a good level of detail
- Medium transparency:** Most countries included information and some countries included a good level of detail
- Low transparency:** None of the studied countries included adequate information and only few countries provided any information at all

Table 3: Quality of information regarding renewable hydrogen

	Metric	Description	Rating
Gov. Reg.	Targets	Targets for production, consumption and integration stated	High
	Infrastructure	Plans for infrastructure to support production, storage, transportation etc	High
	Policy Support	Policies and measures to support renewable hydrogen detailed	High
	Sectoral Integration	Strategies on integrating renewable hydrogen into transport described	Medium
Strategies on integrating renewable hydrogen into industry described		Medium	
ECNO Indicators	International Collaboration	Sourcing of imported hydrogen (within EU or from abroad detailed)	Low
		Collaboration between Member States on hydrogen imports	Medium
	Pipeline of projects	Collaboration with partners outside of EU on imported hydrogen	Low
Planned & ongoing import capacities described		Medium	
Pipeline of projects	Planned & ongoing renewable hydrogen projects within MS detailed	High	
	Capacity & timeline of renewable hydrogen projects match targets	Low	

Rating legend

- High coverage:** All countries included information and most or all countries included a good level of detail
- Medium Coverage:** Most countries included information and some countries included a good level of detail
- Low coverage:** None of the studied countries included adequate information and only few countries provided any information at all

As with the quality of information, **the risk of inconsistency is higher on renewable hydrogen than renewable electricity** as targets, policies, plans and implementation are far less advanced. However, even on renewable electricity, some risks were identified, notably on translating the updated RED III targets into national legislation and achieving them, as most NECPs have not provided a clear view on how they have updated their measures. Some risks also remain on whether the countries are sufficiently addressing barriers to RE deployment and to what degree sufficient flexible generation is planned to accommodate the increasing shares of variable renewables (wind and solar).

Table 4: Risk of inconsistency regarding renewable electricity

	Metric	Description	Rating
	Targets	Alignment of national target(s) with Renewable Energy Directive II	High
		Alignment of national target(s) with Renewable Energy Directive III	Low
	Generation & capacity	Consistency between generation and capacity values per technology	High
		Total renewable energy generation consistent with available potential	High
	Grid enhancement	Risk of failing to achieve the 15% interconnection target	High
		Risk of renewable roll-out being hampered by inflexible grid operation	High
	Policy support	Barriers to renewable electricity roll-out addressed	High
		Measures in line with stated targets and projects	High

Rating legend

- The risk of inconsistency is low across all countries
- There is very mixed level of inconsistency risk across the studied countries
- The risk of inconsistency is high across all countries

Table 5: Risk of inconsistency regarding renewable hydrogen

Metric	Description	Rating
Generation & capacity	Consistency between domestic production and capacity	Yellow
	Electricity demand for renewable hydrogen H ₂ production accounted for	Yellow
International collaboration	Geographical detail on expected import sources	Red
	Cooperation with other countries on renewable H ₂ strategies, import, connections	Yellow
	Clarity on which domestic and imported supply will cover renewable H ₂ demand	Red

Rating legend



- The risk of inconsistency is low across all countries
- There is very mixed level of inconsistency risk across the studied countries
- The risk of inconsistency is high across all countries

Key risks identified:

- **NECPs do not yet sufficiently reflect the implications of the updated renewable energy target under the latest renewable energy directive (RED III)³.** While countries only have to implement the provisions on targets until early 2025, the Fit for 55 package referenced in the NECP guidance foresees an increased RE target to at least 40% by 2030. Even though countries provided some initial insights on what they attempt to be doing in their NECPs, these are far from sufficient to ensure the updated targets can be reached in the short timeframe until 2030. For example, Sweden’s NECP mentions the plan to adapt the national policy and plan for RE expansion in line with the increased RE targets under RED III but does not provide detail how this would be achieved. The Dutch NECP acknowledges the need to update in line with REDIII targets but expects not to even be able to meet the RED II targets. Hungary has increased its RE target but does not provide details how it relates to RED III and/or how it will be implemented.
- **Barriers to renewable development** such as permitting and siting are widely acknowledged as a major showstopper to RE development in the EU⁴, but are not yet addressed with sufficient detailed in NECPs: The Swedish NECP mentions a contact point, but provides little detail as to what measures are taken to overcome the barriers. The Dutch NECP on the contrary provides a detailed description of policies and platforms designed to speed up the permitting process, at least one of the major barriers. Similarly detailed measures for barrier removal are described in the Spanish NECP, while the Italian and Hungarian NECPs restrict themselves to mentioning the existence of several barriers and the intention to address them without providing further detail on measures.

- **Flexibility at the grid level**, provided through options other than gas power plants⁵, is only covered in a scattered and incomplete form in the NECPs. The Swedish NECP focuses at the level of demand response services. The Dutch and Spanish NECP mention the need for flexibility in several places but do not quantify it further or specify measures to support it. Italy goes as far as listing several areas of actions to enable flexibility but does not specify them further. Finally, the Hungarian NECP still mentions the construction of new gas plants to provide flexibility, acknowledges the need for more demand response measures but also requires flexibility options to be build first before RES gets deployed.
- Lastly **electrification measures** are described in all NECPs but are especially poorly detailed for the **industry sector**. Sweden discusses the need for electrification in industry but, while detailing a strategy for industry under the FossilFree Sweden initiative, does not clearly single out measures for electrification. The Dutch NECP focuses on other measures for decarbonisation of industry, such as CCS or hydrogen, the Spanish and Hungarian NECP focuses on energy efficiency measure for the sector and the Italian one focuses on the provision of RE for industry. Overall, the NECPs assessed seem to focus more on developing renewable hydrogen for industry decarbonisation while seemingly neglecting strong measures for the electrification of industry.

For renewable hydrogen, the analysis shows that the information provided in the NECPs is lacking detail at all levels.

This is especially problematic as the latest RED III directive foresees the development of a “union strategy... on the basis of data reported by Member States” for hydrogen production⁶. Particularly planning for consumption, production and imports/exports bears a risk of inconsistency due to incomplete, missing or even inconsistent information in all analysed countries. It should further be noted that most of the NECPs use the term “renewable” or “green” hydrogen, but in some instances, countries do not specify and simply state “hydrogen”.

- In Hungary, the estimates of projected domestic hydrogen production are less than half of the anticipated demand in 2030 of more than 4 TWh, leaving a substantial gap potentially to be filled with imports, however the NECP does not provide sufficient information on the sourcing of the imports and limited clarity on the required infrastructure.
- In contrast, in the Netherlands, the plans on renewable hydrogen deployment and production are very ambitious with more than 20 TWh to be produced. Yet the demand is estimated to be even higher, suggesting that the Netherlands will not cover all sectoral demand with domestic production and will need to import 5 TWh in 2030. Around 40 TWh of electricity will be needed in 2030 to cover the domestic renewable hydrogen production. This represents between 30% and

40% of the projected national renewable electricity production, which means a high share of renewable resources would be used with much lower efficiency than by using it directly as electricity.⁷

- In Spain more transparency is required: our estimates based on the figures found in the draft NECP and the hydrogen strategy suggest high production to the extent of potential exports, while the draft NECP itself speaks of the need for imports.
- And in Sweden, the draft NECP makes little effort to quantify renewable hydrogen production or consumption volumes, nor imports or exports, which risks leaving Sweden without viable plans for renewable hydrogen development to meet likely demand.


The more comprehensive information in the draft NECPs on renewable electricity as compared to renewable hydrogen reflects that plans are more developed on electricity. However, it will be important for countries to reach a level of maturity and explicitness as regards to realistic demand, and supply (including imports) projections for renewable hydrogen in order to guarantee that appropriate infrastructure can be built, electricity needs catered for, and demand levels met. Otherwise, the risk is that insufficient renewable electricity will be available to produce hydrogen and fossil-based alternatives will end up being used to make up for supply gaps, jeopardising emission reductions.

2. Land uses

All countries are missing sufficient information on land use and land use changes.

While the basic requirements on land use from the European Commission’s governance regulation are generally included in the plans, most countries remain quite abstract and do not provide additional granularity or details on how these ambitions will be reached. Most Member States provide a LULUCF (Land Use, Land Use Change, and Forestry) target, but fail to integrate concrete and quantitative actions to reach this target. Additionally, measures to limit natural disturbances (drought, forest fires, disease) are often missing, despite their increasing frequency.

Table 6: Quality of information regarding Land use, Agriculture and Forestry


	Theme	Indicator	Score	Rating legend
Gov. Reg.	Land use monitoring	Identification of improvements for data collection and land use monitoring	Yellow	 <p>High coverage: All countries included information and most or all countries included a good level of detail</p> <p>Medium Coverage: Most countries included information and some countries included a good level of detail</p> <p>Low coverage: None of the studied countries included adequate information and only few countries provided any information at all</p>
	Non-CO2 reduction target	Specific reduction targets for non-CO ₂ emissions from agriculture	Light Green	
	Net land use removals	The objective to increase net removals from the land use sector	Dark Green	
	Sustainable biomass use	Measures for the sustainable sourcing and use of biomass	Light Green	
ECNO Indicators	Wetlands area evolution	Restoration of wetlands from previously drained areas	Dark Green	
		Planification of land use changes due to wetland restoration	Red	
	Settlements area evolution	Increase of constructed area	Red	
		Demographic growth	Dark Green	
	Croplands area evolution	Plans to reduce food waste	Yellow	
		Demographic growth	Dark Green	
		Reliance on first generation bioenergy crops	Yellow	
		Implementation of agroecological practices considering influence on yields	Yellow	
		Efficiency improvements leading to increased yields	Red	
	Forest lands area evolution	Feed production for locally fed livestock	Red	
		Wood production	Red	
		Afforestation/reforestation	Light Green	
Grasslands area evolution	Natural carbon sink targets	Yellow		
	Plans to increase protected grassland areas	Red		
	Pasture demand for the livestock population	Light Green		
	Natural carbon sink	Red		

The lack of details on land use change projections, leads to potential internal incoherence of the projections and increases the risk of land competition. Trade-offs between the services that are expected to be provided from different land uses, and how these land uses are expected to be managed or restored in the coming years, are barely integrated in most plans, which can also lead to an overestimate of the sinks they will provide. Most plans also focus on mitigation through increasing carbon sequestration, but few integrate adaptation measures in a changing environment.

Table 7: Risk of inconsistency regarding land use and land use change

Theme	Potential inconsistency	Score
Land overlap	Are the expected increases in land area compensated by decreases of other lands?	Orange
LULUCF target	Are the country's LULUCF ambitions aligned with the EU's removal targets?	Orange
Forests	Are there plans to manage forests sustainably, to maintain productivity while increasing resistance and resiliency, hence maintaining their carbon sink potential?	Light Green
Croplands	Is the projected demand for food, feed, energy or industrial crops compatible with the existing utilised agricultural area (UAA)?	Yellow
Wetlands	Does the NECP consider and integrate the land use changes due to wetland restoration?	Red

Rating legend



- The risk of inconsistency is low across all countries
- There is very mixed level of inconsistency risk across the studied countries
- The risk of inconsistency is high across all countries

Key risks identified:

All NECP's lacked quantified targets or projections on land related issues, which hampered a deeper analysis. Countries need to anticipate potential land use changes linked to the implementation of different policies and measures, since **the risk of increased competition for land is real**, and could jeopardize future decarbonization efforts, or hamper lands from delivering services to society.

- Italy and Sweden have the highest risk of land overlap, with four times more indicators predicting a land increase than indicators predicting a land decrease.
- The Dutch draft NECP was the only one that met the LULUCF target imposed by the revised LULUCF regulation. Unless NECPs are improved, the risk of missing out on the overall 2030 target of 310 MtCO₂ removals across Europe is thus probable.
- A sustainable management of forests is ensured through the countries national forest strategies, which are mentioned in the draft NECPs. However, NECPs would benefit from integrating some key points of these strategies in order to better reflect the impact of these practices on emissions.
- Countries would benefit from having a clear view and estimate of the evolution of cropland area which was found to be quite uncertain across the board.
- All draft NECPs plan to restore wetlands, but none integrates the consequence this would have on the loss of croplands and forest lands. This lack of planning can further conflicts or inconsistencies in land uses.

Additionally, **key information is missing related to land use change and land carbon sink capacity**. No clear targets for these key measures lead to higher risks of

missing out on national targets, such as land CDR and ultimately, the overall GHG reduction targets and the ability to meet net zero.

- Italy provides historical trends for all land uses but fails to integrate future projections. Our modelling however shows that there is a significant risk that Italy will not meet its LULUCF target as the modelled evolution of land use will capture less carbon than is required by the European Commission (-31 vs -36 MtCO₂). The LULUCF targets noted in the draft NECP also fall behind on the European targets.
- In the Netherlands, a lot of key information is missing, including quantified reforestation or wetland restoration targets, or measures to reduce or halt artificialisation. This lack in quantified projections prevents to plan land use change ahead, which raises the risk of competition for land.
- The Hungarian draft NECP lacks a LULUCF target and concrete measures to reach it. The plan assumes “climate policy legislation that ensures that the Hungarian forest sector approaches this [LULUCF regulation] target by 2030”, without providing further details on specific policies or measures to reach it. The NECP would benefit from further details specific to LULUCF.
- The Spanish draft NECP provides the most detailed and thorough information regarding land management and land use change by 2030. Especially forest management, for which measures and actions are described to prevent forest fires and to maximise carbon sequestration. Reforestation and wetland restoration include quantitative targets, which shows the robustness of the strategy, and allows for an integrated analysis of the proposed measures.

3. Bioenergy

Overall, information regarding bioenergy demand was of high quality, while information regarding supply was significantly less so. The draft NECPs detailed specific targets related to bioenergy use; policies and measures to increase bioenergy use were also integrated into the draft NECPs, as were specific fuel switches to increase biofuel use in transportation. Regarding supply, information was of lower quality: few quantified targets for the production of advanced biofuels, no projection for different types of inputs, nor the imports or exports of bioenergy was addressed in the draft NECP. This of course has knock-on implications for the possibility of making correct planning assumptions as regards to land use and anticipating the risk of competition for land. Bioenergy can also have a direct impact on a country’s natural CDR capacity when taking up land that could be dedicated to forests or grassland. This should be accounted for when increasing the reliance on bioenergy domestically.





Table 8: Quality of information regarding bioenergy

	Theme	Indicator	Score	Rating legend
Gov. Reg.	Targets	Renewable Energy Directive II targets are stated and explained	High	<p>High coverage: All countries included information and most or all countries included a good level of detail</p> <p>Medium Coverage: Most countries included information and some countries included a good level of detail</p> <p>Low coverage: None of the studied countries included adequate information and only few countries provided any information at all</p>
		Renewable Energy Directive III targets are stated and explained	Medium	
	Sustainability	Include plans to promote second- or third generation (i.e. advanced) biofuels	High	
		Inclusion of sustainability criteria to the production of biomass	High	
ECNO Indicators	Policy Support	Mention of the cascading principle for the use of biomass	Low	
		Considers the indirect impact of using biomass, especially linked to indirect land use change	Medium	
	Fuel switch	Policies and measures to support renewable energy build-out detailed	High	
		Integration of bioenergy in the heating sector clearly described	Medium	
		Integration of bioenergy in the production of electricity clearly described	Medium	
	Supply	Integration of bioenergy in the transport sector clearly described	High	
		Production of first-generation bioenergy described	Medium	
		Production of second-generation bioenergy described	Medium	
	International collaboration	Production of third-generation bioenergy described	Low	
		Sourcing of imported bioenergy or bio raw materials (within EU or from abroad details)	Low	
Collaboration between Member States on bioenergy imports		Low		
Collaboration with partners outside of EU on imported bioenergy		Low		
		Planned & ongoing import capacities described	Low	


The analysis found that **there was a medium to high risk for the bioenergy strategies to be incoherent.** The biggest risk identified is the lack of consideration of the development of infrastructure that would be needed to support the massive bioenergy roll out foreseen in some draft NECPs. Bioenergy production must




never be the priority use of biomass. To ensure this sustainable use of biomass, draft NECPs need to integrate into more details existing and future European directives (RED II & RED III) that provide sustainability targets and thresholds for bioenergy production. The lack of detail on measures aimed at increasing domestic production and supply compared to the increased demand for bioenergy points to high import scenarios, especially in the Netherlands. For other countries, this lack of information leads to uncertainties related to future import needs. This bears heavy risks, since foreign biomass can potentially be harvested unsustainably, and lead to deforestation. Domestic production and supply should be covered in draft NECPs, to anticipate future import needs, and ensure they can be provided from sustainable sources.

Table 9: Risk of inconsistency regarding bioenergy

Theme	Potential inconsistency	Score
Targets	Alignment of national target(s) with Renewable Energy Directive III	
Infrastructure	Plans for infrastructure to support production, storage, transportation etc.	
Policy Support	Measures in line with stated targets and projects	
Imports	Need for bioenergy imports to meet domestic demand	

Rating legend



-  The risk of inconsistency is low across all countries
-  There is very mixed level of inconsistency risk across the studied countries
-  The risk of inconsistency is high across all countries

Key risks identified:

In most plans the balance between production and demand of bioenergy is not well documented, leading to **risks on their sufficiency and uncertainties related to future imports or exports of bioenergy.**

- Countries should first question whether their projected demand is actually credible and desirable, considering biomass availability both domestically and in Europe, and the risks of importing biomass from outside Europe.
- The Netherlands projects a production of 2 billion cubic meters of biogas, which is not expected to fulfil future demand. Imports are therefore planned, but neither quantified, nor anticipated in terms of infrastructure development or partnerships.
- All countries plan to valorise more residues or waste to produce advanced biofuels, yet all lack clear strategies on how these residues will be collected, or to improve the infrastructure to allow for this collection and treatment of residues.

- The future of energy crops is well described in most NECPs. However, risks pertaining to land competition between food and energy crops are not integrated in the draft NECPs. Spain and Italy plan to reduce the use of energy crops, the Netherlands plans on capping the use of biofuels produced from food and feed crops. On the other hand, Hungary plans on increasing the use of first-generation biofuels which poses a major risk, increasing the reliance on energy crops in potential competition with food production and sovereignty.

Infrastructure developments would be key to supply this increased demand in bioenergy, not only for advanced biofuels. **However, few NECPs mention investments or a budget that would allow for the credible roll out of bioenergy country wide, implying a clear risk of delivery failure.** These needed infrastructure changes would include, but are not limited to, transforming refineries into biorefineries, developing biogas production plants, developing storage facilities for biogas and bioliquids, installing refining systems to remove impurities from biogas, expand refuelling stations for vehicles, modifying or replacing appliances and equipment to be compatible with biogas to ensure safety and efficiency, etc.

The bioenergy strategies should further be thought of carefully, as biomass supply has a direct impact on surrounding ecosystems, but also on ecosystems in exporting countries. A robust strategy should not only include plans to maximise its use, but also plans prioritize their use for specific end-uses, and to ensure a sustainable production and procurement. These are unfortunately often missing in NECPs and **lead to risks of unsustainable exploitation and biodiversity issues in the countries and abroad.** The cascading principle suggests that biomass should be valorised according to its highest economic and environmental added value. Following this principle, biomass should only be used for bioenergy when it cannot be used as wood products, reused or recycled. This is an important concept to prevent an overreliance on wood and ensure a sustainable wood procurement. Unfortunately, only the Netherlands specifically mentions this logic in their draft NECP.

The increased bioenergy ambitions of the different countries therefore bear multiple risks which, collectively, question the feasibility of the current bioenergy ambition.

4. Long-term geological storage (LTGS) of CO₂


In general, **the availability of information regarding the LTGS of CO₂ in the assessed NECPs is low.** The key factors contributing to this assessment was the lack of quantitative data related to this subject in some NECPs, missing metrics in others and lack of clarity with respect to some of the presented indicators. None of the countries managed to include all the metrics recommended by the EC. The lowest level of the information availability concerned the capacity of transport infrastructure and the level of inherent emissions resulting from industrial production processes that will have to be abated through CO₂ capture. The metric related to CCU was included despite CCU providing only short- to medium-term storage of CO₂. This was done to discern CCU and CCS, as in some of the NECPs it is not clear whether the captured gas will be later used or stored.

The quality and availability of data in this area is highly unequal, and in most cases low, which is a sign that plans regarding deployment of CCS/CCU are not well developed in investigated MS overall. This is concerning, given that the technology is crucial for decarbonising some industries, while investment in carbon capture and storage installations and transport infrastructure is associated with high costs. It is thus important to carefully plan further development in this area: on the one hand, to be prepared to capture inherent (non-avoidable) emissions, and on the other hand – not to invest excessively in CCS/CCU deployment in sectors where other alternatives exist.

Table 10: Quality of information regarding long-term geological storage of CO₂

	Theme	Metric	Score
Gov. Reg.	Inherent emissions	Assessment of the inherent process emissions that will have to be abated through CO ₂ capture	Low coverage
	Storage capacity	The total amount of CO ₂ storage available for CO ₂ injection (annually)	Medium coverage
ECNO Indicators	Storage utilisation	The total amount of CO ₂ actually injected (annually)	Medium coverage
	CCU	The total amount of CO ₂ captured and dedicated to further utilisation (annually)	Medium coverage
	Transport infrastructure	The amount of CO ₂ which can be transported to storage space with existing infrastructure	Low coverage
	Captured emissions	The total amount of CO ₂ captured (annually)	Medium coverage

Rating legend




- High coverage:** All countries included information and most or all countries included a good level of detail
- Medium Coverage:** Most countries included information and some countries included a good level of detail
- Low coverage:** None of the studied countries included adequate information and only few countries provided any information at all

The lack of details related to the implementation of CCS/CCU, paired with the fact that countries did not clearly rule out the use of the technology, is in itself a sign of low-quality planning. This may signal potential internal incoherence of the projections included in the plan, depending on the scale of expected CCS/CCU deployment.

Table 11: Risk of inconsistency regarding long-term geological storage

Theme	Potential inconsistency	Score
Sources	Sources of captured CO ₂ not indicated clearly	[Yellow bar]
Destination	Destination of captured CO ₂ not indicated clearly	
Export	Storage space in another country not secured (in case of CO ₂ export)	

Rating legend

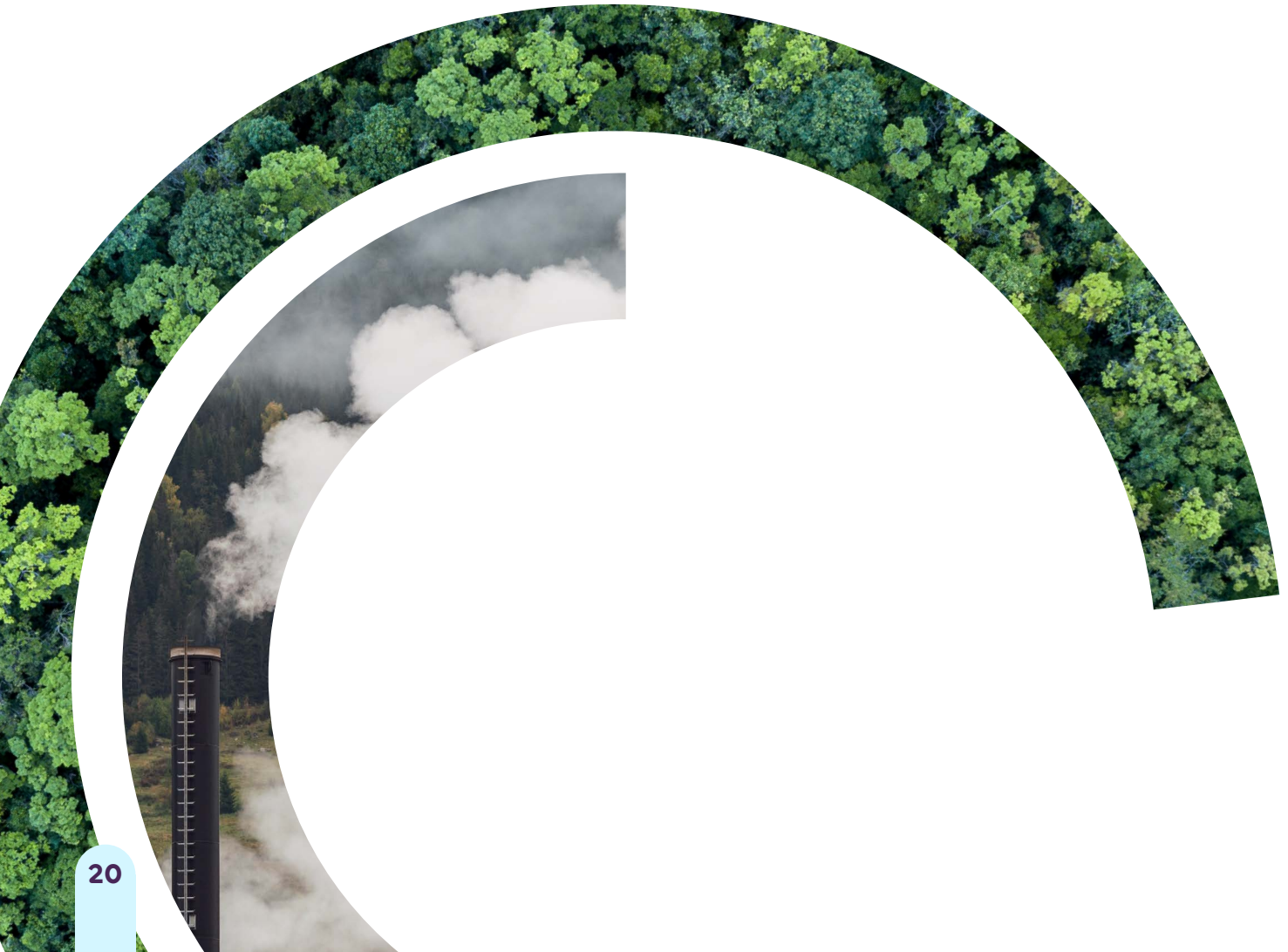


- The risk of inconsistency is low across all countries
- There is very mixed level of inconsistency risk across the studied countries
- The risk of inconsistency is high across all countries

Key risks identified:

- The Italian NECP relies heavily on CCS to stabilise emissions in the industrial sector (CCS abating the 15% to 20% of growth in emissions). Alternative decarbonisation measures (such as enhanced circularity, new industrial processes, electrification or alternative fuels) for the industry are not clearly stated in Italy’s Plan, implying that CCS may be deployed not only to reduce inherent process emissions but also avoidable combustion emissions, which constitutes a risk of locking in fossil fuel dependency.
- In the Netherlands the ambition for deployment of CCS in chemicals and refineries sector is high: around 25% of their emissions are expected to be covered by CCS. For these two sectors, the NECP may be over-reliant on CCS since it does not specify any other ways of reducing emissions (such as electrification, recycling). In addition, the electrical energy needed in 2030 to capture this volume is estimated at 8 TWh for both sectors (without accounting for the energy for storage and transport of the captured CO₂). This figure represents almost 10% of the energy consumption of each respective sector in 2030.
- Spain declares that it will need to deploy LTGS of CO₂ technologies only to a limited extent. In order to achieve that, the country needs to perform deeper reductions in sectors other than industry, which may be difficult to achieve.
- In Hungary, the modeling results disclosed in the NECP show that after 2040, deployment of CCS results in negative emissions in industry and power generation sectors. However, the text of the Hungarian Plan states that due to insufficient domestic storage space, captured CO₂ will be mostly utilized, contradicting the modeling results.

- Swedish NECP hardly mentions any information related to LTGS of CO₂, except that the work on a CCS/bio-CCS strategy was launched in 2023. Thus the plan fails to describe some existing state-level policies and measures in this area (e.g. support-scheme for bio-CCS, National Centre for CCS). As a consequence, these actions may not be taken into account by other European countries in their own planning processes.
- Both, the too high and the too low ambition levels in the area of LTGS of CO₂ can impair the collective EU emission reduction potential. Over-reliance on these technologies on the national level may result in using more storage capacity than necessary, limiting possibilities for the other member states to permanently store their inherent emissions in available sites. On the other hand, too low ambition in the area of LTGS of CO₂ may suggest that the country has an above average mitigation or carbon potential in other areas (e.g. natural sinks), which will be used to achieve climate neutrality at the national level without CCS deployment. This, in turn, may force other European countries to introduce more costly mitigation measures in order to meet the climate neutrality goal for the EU as a whole.



Recommendations for Policymakers

The NECPs are meant to convey the policies and measures to achieving Europe's climate and energy targets, and support putting concrete additional policies in place to reach them. However, this report finds that the draft documents are not sufficiently precise and complete to fulfil that purpose. All the plans analysed have a large transparency gap, which means that the measures included in the plans are not specific and/or comprehensive enough to reach the targets they have set for their country.

National policymakers should therefore consider the following recommendations to improve transparency and information in the NECPs ahead of submitting their final versions:

- **Clearly outline national targets relevant for climate and energy planning and develop a monitoring process:** Too often the plans include a list of policies and measures but do not provide a clear view on their actual impacts, both individually and taken altogether - and even less on interconnected issues such as the underlying need for renewable energy and resources. Member States can strengthen their NECPs by including clear national targets coupled with a clear monitoring mechanism that considers production/demand balances and domestic resources. Based on learnings from the five national plans assessed, countries can improve their drafts for example by outlining their contributions to the EU-wide renewable energy targets under the EU's Renewable Energy Directive (RED II and RED III targets), and indicate in their NECPs if they are on track to meeting those targets. Similarly, countries should communicate on their efforts to reach their LULUCF sequestration targets and specify how different measures contribute to that final target.
- **Be more specific on the measures included in their NECPs:** The national authorities should consider upgrading their plans with sufficient detail, even if this information may already be available in separate documents, as the plans need to be self-standing to stand against the scrutiny of the full range of stakeholders, with everyone ultimately involved in making these targets a reality. We focus in this report on elements that are often missing in the plans based on our detailed review, but there may be other aspects of the NECP that need further specifications as well.
- **Outline potential inconsistencies in the plan and how these have been addressed:** Our research analyses a few of the key areas of potential inconsistencies in NECPs. Policymakers need to be aware of these and make their strategic choices explicit in the document in order to adequately plan infrastructure, land use distribution, import plans and other parameters.

Both in its further interactions with countries, and in its review of the EU Governance Regulation, **the European Commission**, should consider to:

- **Make full use of the assessment of draft plans and country-specific recommendations to safeguard against the risk of inconsistencies:** Our analysis shows that risk of inconsistencies, such as risks of missing targets or undermining decarbonisation objectives, exist throughout the NECPs analysed. The European Commission should highlight these risks to Member States, including but not limited to the following areas:
 - ⦿ Provision of sufficient detail (from planning to implementation) for achievement of updated RE and hydrogen targets
 - ⦿ Clarify the demand for electrification and hydrogen use (sector coupling) in demand sectors, especially industry.
 - ⦿ Properly document the risk of inconsistencies between the LULUCF and bioenergy targets. This could take the form of a specific reporting of bioenergy emissions.
 - ⦿ Provide higher quality and detail regarding the deployment of CCS/CCU and their solutions for LTGS of CO₂.
- **Request that national plans explicitly identify key areas of a risk of inconsistency.** In addition to highlighting potential areas for risk of inconsistency to national policy makers, the European Commission should also ask national policy makers to proactively highlight potential areas with a risk of inconsistencies in their plans, including how they have or are planning to overcome them. Such risks might exist where planning might not be advanced sufficiently (e.g., for hydrogen) or recent legislation has not been implemented in national planning (e.g. the RED III directive).
- **Provide a clear view of how key risk areas will be addressed at EU level (if applicable).** Some issues with consistency might be best addressed at the EU level. These include especially those risks that require cross-border interactions between countries, such as import/ export balances or the use of resources in other countries (e.g., for CO₂ storage). These should be addressed in the work programme of the new Commission, e.g., via EU level agreements with other geographies on importing green hydrogen, an EU level mapping of carbon dioxide storage, or a clear standardised framework to report trans-border CO₂ flows.



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