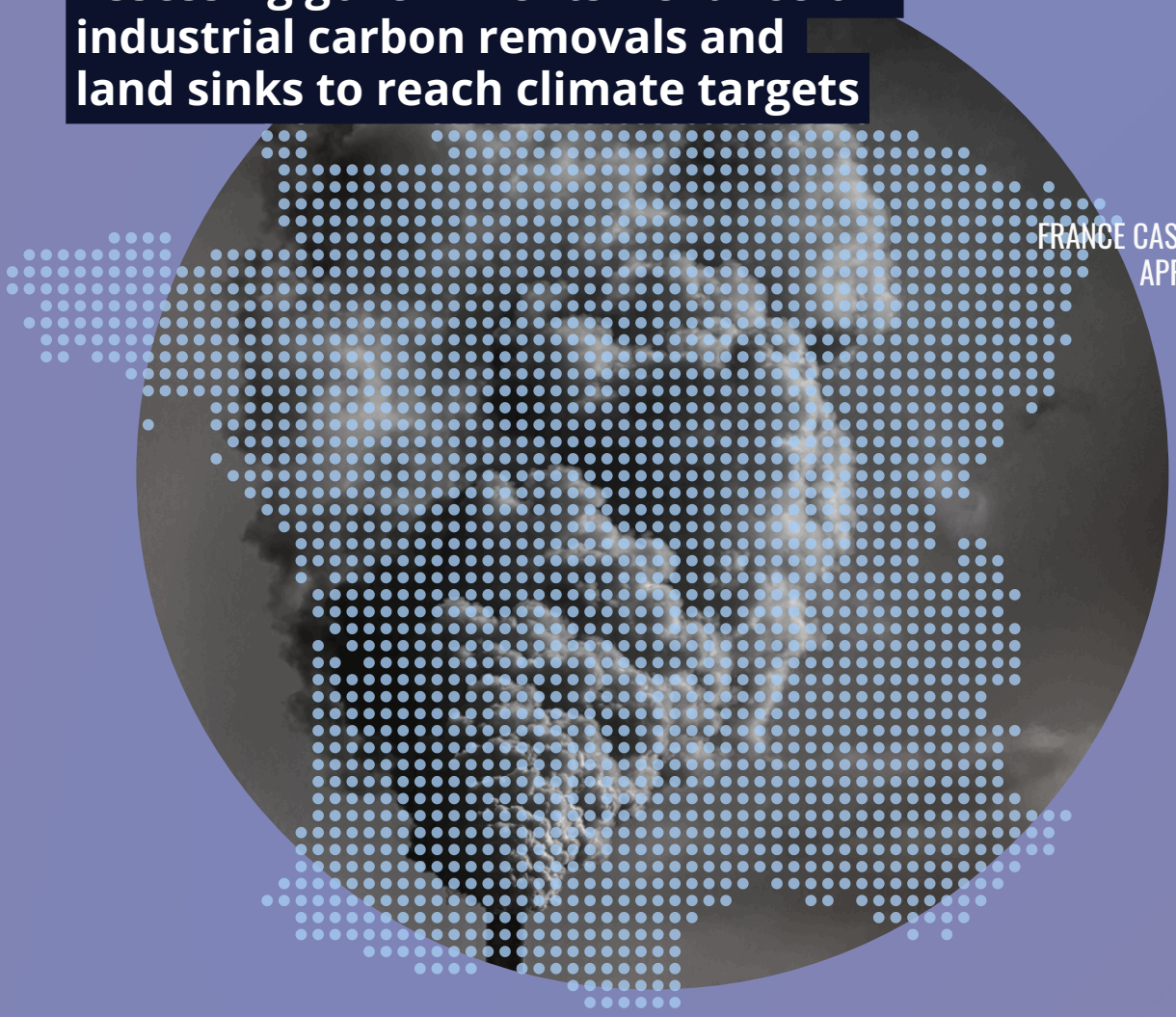
Leaning on Uncertainty

Assessing governments' reliance on industrial carbon removals and land sinks to reach climate targets



FRANCE CASE STUDY
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CARBON MARKET WATCH

FRANCE CASE STUDY

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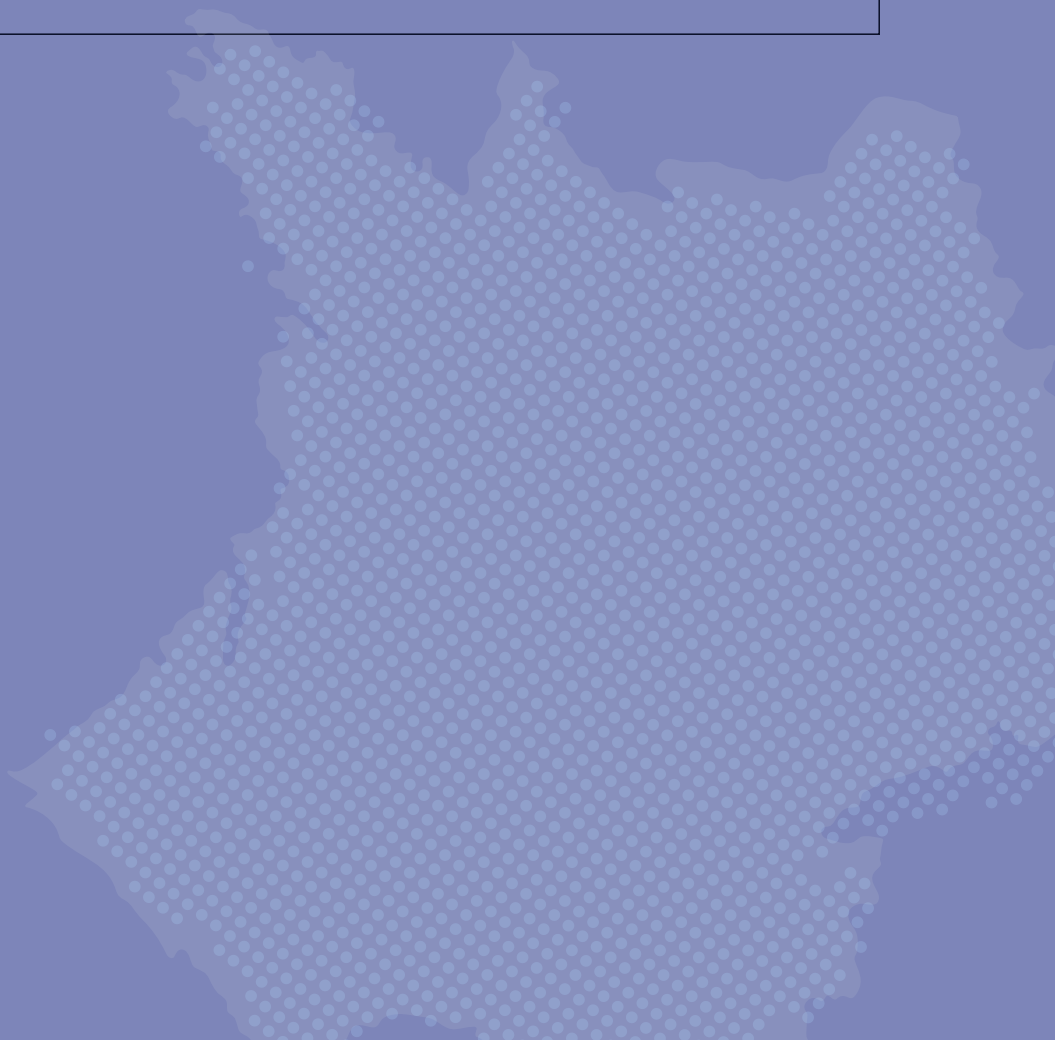

At a glance...

For more information on carbon dioxide removals and a glossary, click here.

The French government has strong national laws focused on reducing gross emissions, but relies heavily on vulnerable soil carbon sinks and carbon storage in wood products to reach net-zero emissions. Additionally, it plans to rely on industrial carbon removal technologies, even though foundational assessments of resource and infrastructure constraints are missing.

France has a national climate neutrality target in its Energy Code. The law sets a binding gross-emission-reduction target requiring emissions to be cut to at least a sixth of 1990 levels by 2050. The 2025 Draft of the Third French National Low Carbon Strategy (SNBC3) proposes a more ambitious reduction to at least an eighth of 1990 levels (p51). The reviewed climate planning documents demonstrate high transparency by clearly separating gross emission reduction from removals and providing detailed breakdowns. However, projections of industrial Carbon Dioxide Removal (CDR) volumes and modelling assumptions lack clarity and transparency, particularly regarding resource demands from industrial removals.

The French government acknowledges that its path to climate neutrality faces serious challenges. The latest strategy in the Draft SNBC3 from December 2025 projects 61-64 Mt CO_2eq of residual emissions by 2050, which it loosely defines as those that "cannot be reduced in any other way at an acceptable cost" (p147). To reach climate neutrality, the Draft SNBC3 relies heavily on industrial carbon removal, including up to 21 Mt from Direct Air Capture and Carbon Storage (DACCS) and Bioenergy with Carbon Capture (BECCS). This is part of France's reaction to its land sink collapsing by more than 20 Mt over the last decade, driven by a forestry crisis.

Industrial removal projections are inconsistent. The Draft SNBC3 projects 15 Mt CO_2eq of removals from BECCS in 2050 but conflates this with Carbon Capture and Storage (CCS) and Carbon Capture and Utilisation (CCU). Even for 2030, the central scenario[1] projections for industrial removals differ in the same document, noted as both 0.4 Mt and 3.4 Mt, leaving the expected BECCS contribution unclear.

France's forest carbon sink is deteriorating rapidly. According to the SNBC3 Draft, forest mortality emissions have surged from 14 Mt CO_2eq in 2010 to 41 Mt CO_2eq in 2023 (p201). The same document stipulates that the forest sink will break down before the end of the century (p53), posing a significant risk to achieving climate neutrality. Despite this, the government plans to increase harvesting from 53 to 60 million m^3 by 2030 for construction and bioenergy purposes (p216).

[1] a midpoint between the most optimistic and the most pessimistic scenario

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The French government's strategy to reach climate neutrality depends heavily on vulnerable carbon sinks. The Draft SNBC3 relies on soil carbon sequestration (-18 Mt) and harvested wood products (-7 Mt) to reach 2050 targets (pp208-210). Afforestation is projected to provide 4 Mt of additional removals, but according to the Draft SNBC3 itself, these gains will be offset by lower forest growth, increased tree mortality, and dead wood (p210). The lack of a feasibility assessment of afforestation and its land use raises doubts about this measure. Nor has any evaluation been conducted of the land use effects that BECCS deployment could result in.

The national biomass supply will likely create a critical bottleneck, yet no BECCS biomass requirements assessments have been conducted. The 2024 French National Energy and Climate Plan (NECP) projects biomass demand to exceed domestic supply by 2030 (p272). A sensitivity analysis in the Draft SNBC3 shows that increased harvesting for biomass energy could reduce the projected forest sink in 2050 by up to 6 Mt CO_2eq (p223). France acknowledges these limits but lacks concrete policies to reduce biomass demand.

For DACCS, assessments of potential energy demand are missing, a key concern for the technology's feasibility. Further doubts about the feasibility of industrial CDR in France stem from the highly uncertain domestic CO_2 storage capacity and underdeveloped transport infrastructure plans.

TARGET SETTING	REMOVALS POLICY	TRANSPARENCY	FEASIBILITY
residual emissions definition	industrial removals	land use & sequestration rates	land use & sequestration rates
residual emissions quantification	land sink	technology & energy	technology & energy
general transparency	financing	transport & storage	transport & storage
reliance on international offsets	depth of assessments	biomass	biomass

Table 1: Traffic light graph; cell colours represent the level of transparency, depth, and plausibility of made assessments and plans; green = overall relatively transparent and plausible, yellow = partly lacking transparency or depth, red = severe transparency gaps or identified delivery risks. The classification is meant to provide an overview of key issues and best practices and is relative to the other reviewed countries.

Methodology Note

The case study was developed by reviewing publicly available policy and assessment documents, supplemented by transparency requests to national ministries and agencies. Data on 17 themes, including residual emissions, technology assumptions, and biomass sources, were analysed to identify gaps and best practices in countries' industrial CDR and land sink strategies. From the identified themes, 12 indicators were selected, as visible in Table 1. The collected information was clustered into themes, and key issues were broken down and underscored by references to authoritative documents in the detailed analysis section.

The scope of the analysis was limited to documents created by or on behalf of government ministries and agencies, with supplementary documents included where necessary. Detailed information on the methodology is available in the accompanying report. All reviewed documents and supplementary sources are either directly linked in the text or can be found in the list of sources at the bottom of this document.

Detailed Analysis

Target setting

● Residual emissions and removal targets

France has a national climate neutrality and a gross emissions reduction target for 2050, and its latest plans show progressive ambition.

Article L100-4(1) of the French Energy Code sets the binding target to reduce greenhouse gas emissions "[...] by a factor of more than six between 1990 and 2050" (i.e., at least a 83,33 % reduction) to achieve climate neutrality. The French Energy Code further defines climate neutrality as "a balance, on national territory, between anthropogenic emissions by sources and anthropogenic removals by sinks of greenhouse gases" without international offsets. With 1990 emissions at 537.84[2] Mt CO_2eq excluding Land Use, Land Use Change and Forestry (LULUCF), this translates to maximum gross emissions of approximately 90 Mt CO_2eq in 2050. A central document for climate planning in France is its National Low-Carbon Strategy (SNBC). It is the French government's planning tool for achieving climate neutrality by 2050. The official document establishes binding five-year carbon budgets starting in 2019 and sector-specific targets intended to guide all levels of government and industry.

The SNBC2 from 2020 estimated total carbon dioxide removals for 2050 at 82 Mt CO_2eq, with 67 Mt coming from natural sinks and 15 Mt from technological sources (p21). This is based on the mandated reduction factor of six. However, according to the new Draft SNBC3, the French land sink has shrunk by more than 20 Mt in the last ten years due to a forestry crisis.

The December 2025 draft version of the new SNBC3 includes higher ambitions for the 2050 gross emission reduction target, envisioning "more than eight" as a reduction factor (i.e., at least a reduction of 87.5 % compared to 1990 levels) (p51). The central scenario, representing a mid-point between the most optimistic and most pessimistic scenarios, in the Draft SNBC3 projects 61-64 Mt[3] of residual gross emissions and 59 Mt of total removals in 2050 (p52). The higher gross emission reduction target is seen as necessary, since cutting gross emissions by 6 would not be sufficiently ambitious to achieve climate neutrality in 2050 based on the estimated capacity from natural sequestration, permanent removals,

[2] See 2024 French National Energy and Climate Plan, p21
[3] depending on the inclusion of international aviation and shipping

and carbon capture technology in the SNCB3 reference scenario (p51). This rise in ambition constitutes good practice in responding to curbing expectations for available removal volumes based on updated assessments.

Additionally, the Draft SNBC3 proposes targets for the country's overall carbon footprint, which includes the whole French economy and imports (pp227-228). This disincentivises reliance on imports to reduce domestic emissions. The Draft SNBC3 proposes reduction targets of 38-43% by 2030 and 71-79% by 2050 compared to 2010 levels. This would mean emissions reducing from 749 Mt CO_2eq to between 426 and 464 Mt in 2030, and to between 160 and 215 Mt in 2050 (p227). Based on the most ambitious scenario, the French carbon footprint in 2050 would be about three times the size of its domestic residual emissions (64 Mt).

A further good practice example of climate planning in France can be found in the modelling assumptions of its 2024 NECP. They include significant societal shifts, such as a move toward more plant-based diets (p234), reflecting France's recognition that achieving climate targets requires behavioural change.

The French government provides general definitions of residual emissions, but sectoral contributions remain unclear.

The Draft SNBC3 defines residual emissions as "those that cannot be reduced in any other way at an acceptable cost" and it specifically highlights process emissions, such as those from lime or cement production (p147). At the same time, it notes that "[...] a certain level of emissions appears to be unavoidable, particularly in non-energy sectors (especially agriculture)" (p49). However, the earlier report on the long-term challenges of the SNBC3 of 2024 instead indicated that residual emissions may remain mainly from the energy recovery of fossil waste in the energy sector (p19). The vague and inconsistent descriptions of residual emissions indicate that clear, robust definitions have not yet been developed or adopted by the French government.

Estimates from 2025 project fewer residual emissions than the earlier valuations, while intensifying reliance on technological sinks to achieve climate neutrality.

The prior SNBC2 from 2020 estimated total carbon dioxide removals for 2050 at 82 Mt CO_2eq, with 67 Mt coming from natural sinks and 15 Mt from technological sources (p21). Nonetheless, according to the new Draft SNBC3 (2025), within the last decade, the land sink

has declined sharply due to a forestry crisis, resulting in a loss of more than 20 Mt CO_2eq of net sequestration capacity. The central scenario in the Draft SNBC3 projects 61-64 Mt[4] of residual gross emissions and 59 Mt of total removals in 2050 (p52). This is in line with the newly included ambition to reduce gross emissions by a factor of more than eight compared to 1990 levels. The composition of projected removals at the point of net-zero reveals a strategic pivot towards industrial CDR. The Draft SNBC3 projects -21 Mt CO_2eq total from technological sources in 2050 (p52). This is broken down into -6 Mt from DACCS and -15 Mt from BECCS, alongside -37 Mt CO_2eq from the land sink (p52)[5].

When comparing the residual emissions projections (61-64 Mt) with the central scenario for removals (-59 Mt), a gap of 2-5 Mt remains. This means France relies on additional developments beyond those assumed in the central scenario to achieve climate neutrality. Furthermore, the Draft SNBC3's projections for the French land-sink to achieve climate neutrality differ significantly from the estimates in the French 2024 Biennial Transparency Report (BTR). The BTR shows a decline in the country's land sink from -11,8 Mt net sequestration in 2025 to -3.6 Mt in 2050, based on existing measures (p217). The central scenario in the Draft SNBC3 is more optimistic, projecting land-sink removals of 37 Mt CO_2eq in 2050. This gap between the existing measures modelled in the BTR and in the SNBC3's envisioned trajectory towards climate neutrality reveals that much more action will be needed to restore the French land sink.

A pessimistic scenario is included in recent modelling of the land sink, which would see net removals disappear in the long run, shifting the burden to achieve net-zero even more strongly onto technological removals.

The 2024 report on the long-term challenges of the SNBC3 notes "[...] high volatility in land sink modelling with most optimistic and most pessimistic scenarios differing by up to 35 Mt in 2050", and all scenarios predict continued decline (p5). This uncertainty expanded in the 2025 Draft SNBC3 to a difference of 50 Mt between the most optimistic and pessimistic 2050 scenarios (p49).

The long-term challenges of the SNBC3 report acknowledged that "forest sink projections remain pessimistic beyond 2050 due to a decline in growth and a continuous increase in forest mortality", with post-2050 trends depending on actions taken in the next 10 years (p8). The pessimistic scenario shows that forests could become a net carbon source

[4] depending on the inclusion of international aviation and shipping
[5] The fact that the separate numbers for removals does not add up may be explained by rounded numbers used in the report. However, no detailed breakdown of the numbers could be found in reviewed documents.

(pp20-21). The Draft SNBC3 mirrors the picture drawn by these projections (p53). Most significantly, it notes that given the anticipated effects of climate change, France's LULUCF sink will likely be nonexistent by mid-century (p53). It further notes that "Maintaining climate neutrality would therefore rely primarily on the mobilisation of technological sinks [...]" (p53).

France struggles to meet its land-sink targets.

According to the Draft SNBC3, net removals in the French land sink have declined from the 2004 peak of -56 Mt to an annual average of -35 Mt CO_2eq for the years 2017-2024. Estimates for 2024 stand at -37 Mt CO_2eq (p32). The Draft SNBC3 notes that France did not achieve its nationally set LULUCF contribution to the national carbon budget for the period 2019-2023 with a yearly average of -36 Mt against a goal of -45 Mt. Therefore, France accumulated a cumulative gap of 43 Mt CO_2eq "[...] attributed to droughts, fires and health crises (bark beetles), which had not been anticipated in SNBC2" (p32).

Frances 2024 NECP showed that France was off track to meet its obligation under the LULUCF Regulation. The With Additional Measures (WAM) scenario in the 2024 NECP projects a land carbon sink of -18 Mt in 2030 (p. 89). However, to achieve the targets set in the LULUCF Regulation, of an additional -6,693 Mt CO_2 by 2030, a total sink of -31.4 would have to be reached (p. 89). After revisions to land-sink accounting methodologies, these numbers may now be outdated, as described in the section below.

● General transparency

Transparency on broad projections and policies is high, but it is lacking in the breakdown of measures and communication of assessments.

On a general level, the reviewed French climate planning documents exhibit high transparency, including information on residual emissions, separate gross emissions and removals projections, and planned policies. However, the underlying assessments contain crucial transparency gaps. They include poorly explained changes to the LULUCF accounting methodology and missing information on whether land-use, biomass, and energy constraints were factored into the modelling. Additionally, the conflation of BECCS with CCU and CCS, which are incorrectly labelled as BECCS in the Draft SNBC3, as discussed

later in the removals policy section, represents a major shortcoming in the transparency of France's climate plans.

The scenario modelling in the French NECP is a best-practice example of transparency as it employs a methodical sector-by-sector approach and checks for overall coherence.

The With Additional Measures (WAM) scenario, included in the 2024 NECP, models and presents each sector separately before summing the results. Then, aggregate resource demand and supply are analysed to ensure overall consistency across sectors (p233). The assumptions for the modelling are described transparently and in great detail (p234). This transparent, detailed, and ambitious modelling approach is based on thorough assessments of trade-offs and aligns with economy-wide emission reductions that require action across all sectors.

Poorly justified changes to the methodologies used for land sink accounting illustrate low transparency and make comparisons with prior data difficult.

In 2025, France revised its inventory methodology for estimating its land sink. This revision resulted in a higher reported net sink and makes comparisons with earlier data and projections difficult. According to the Draft SNBC3, the main reason for the change in net-sink figures is the inclusion of deadwood in LULUCF accounting (p200). In recent years, forest mortality in France has increased sharply, leading to more deadwood, which stores large amounts of carbon. Under the previous methodology, emissions from deadwood were assumed to be released instantly. The revised methodology instead assumes a gradual release over multiple years. As a result, emissions attributed to deadwood are spread over time, leading to lower reported emissions and a higher net sink in the updated data.

The effect of this methodological revision is visible in the projections from CITEPA, 'Centre Interprofessionnel Technique d'Etudes de la Pollution Atmospherique', a technical centre responsible for producing France's greenhouse gas (GHG) inventory reports. Their 2024 Secten Report calculates net-removals in the French land-sink to be -18.5 Mt CO_2eq in 2022 (p509), while their 2025 report estimates the 2023 land sink to be about -37 Mt CO_2eq (p503). Regardless, the provided graph of annual LULUCF emissions and removals does not indicate a structural improvement in forest carbon uptake between 2022 and 2023 (p508).

The apparent increase in the reported sink, therefore, reflects the methodological revision rather than a sudden biophysical change. Consequently, the data communicated in France's 2024 NECP are outdated and no longer directly comparable to the revised inventory figures. The French government acknowledges the high level of uncertainty in land-sink accounting in its 2025 Draft SNBC3. It indicates that forest soil carbon may be included in future accounting (p58), potentially further affecting the reported sink levels.

The French High Council on Climate (HCC), an independent body that advises the French government on climate planning, notes in its 2025 Annual Report that France is on track to meet its 2019-2023 carbon budget contribution for the LULUCF sector (p6). But, because emissions from deadwood are now accounted for over multiple years, part of the associated CO_2 release will be recorded during the 2024-2028 budget period. This effectively increases reported emissions within that timeframe and may create additional pressure for France to meet its next LULUCF contribution to the 2024-2028 carbon budget.

● Reliance on international offsets

France banned the use of international carbon credits to achieve its nationally set climate targets, but some of its recent EU-level propositions suggest this may change.

France's current national legislation, specifically the Energy Code (L100-4, 1), explicitly excludes the use of international carbon credits to reach domestic climate objectives, reflecting a commitment to genuine domestic emissions reductions rather than offsetting. Notwithstanding, France's actions at the EU level seem to diverge from this strict stance. The French government actively supported incorporating Article 6 credits into the flexibilities allowed to achieve the EU's 2040 climate target. During negotiations on the EU Climate Law amendment to include a 2040 target, France has repeatedly advocated greater reliance on international credits than the Commission originally suggested. The reviewed national climate planning documents do not yet mention potential reliance on international credits, but the final deal on the 2040 target leaves the door open to this possibility.

Removals policy

● Specific plans and foreseen measures

France's industrial removal strategy for 2050 appears to rely primarily on BECCS, but it conflates industrial removals with CCS and CCU, creating ambiguity.

The Draft SNBC3 central scenario forecasts approximately 21 Mt CO_2eq of industrial removals by 2050 (p50). These are broken down into 15 Mt from BECCS and 6 Mt from DACCS (p50). Nevertheless, a more detailed breakdown on page 147 presents different removal figures: only 6 Mt from BECCS, 10 Mt from CCS, and 5 Mt from bioenergy with carbon capture and utilisation (BECCU) for synthetic fuels. The conflation of industrial removals with fossil carbon capture and storage (CCS) and the utilisation of captured biogenic carbon (BECCU), along with inconsistencies within the document, makes the French government's actual plans ambiguous.

Projections for 2030 and 2050 show more inconsistencies, potentially undermining long-term planning processes.

The Draft SNBC3 projects 15 Mt of BECCS removals by 2050, distributed between the energy (9 Mt) and industry (6 Mt) sectors (p138 & p179). For the energy sector, 2 Mt are attributed to refineries, 1 Mt to energy-from-waste installations, and 6 Mt to the heat sector (p179). For the industry sector, no comparable breakdown is provided. Yet, projections for 2030 in the 2025 Draft SNBC3 are inconsistent: one section reports 3.4 Mt of BECCS removals in 2030 (p137), while another mentions 0.4 Mt for the same year (p147). Given that CCS figures are presented alongside BECCS on the same pages, this discrepancy may result from a transposition error. Regardless of its origin, the inconsistency complicates the interpretation of the projected contribution of BECCS in 2030 and undermines the transparency of projected removals in the SNBC 3.

In its 2024 report 'Current Status and Prospects for CCUS Deployment in France', the French Ministry of Economy and Finance estimates that biogenic CO_2 capture could reach 20-34 Mt by 2050 and foresees a DACCS potential of 0-12 Mt (p15). However, it is not clear whether these figures refer to the total CO_2 captured or to the net removal after accounting for additional emissions from the deployment and use of the removal technology. (p51). This distinction is relevant for assessing the actual contribution of these technologies to mitigating climate change. Notably, the 2024 NECP projects 1.2 Mt of biogenic CO_2 capture

by 2030, with part of it allocated to e-fuel production rather than permanent geological storage (p64).

Overall, projections of industrial CDR are inconsistent across and within documents. This creates confusion about the level of reliance on removals. This lack of clarity on targeted BECCS and DACCS volumes makes it difficult for enabling industries to plan ahead. Relevant sectors that procure biomass and produce renewable energy would need to be in line with the anticipated demand for industrial CDR. But, given the inconsistencies in the projections, these sectors may not be able to accommodate possible higher demand, threatening the feasibility of the projected industrial removals.

Some of the mitigation measures in the land sector rely heavily on soil carbon sequestration and carbon storage in wood products, both of which are subject to significant uncertainties and reversal risks.

As discussed above, the baseline scenario in the Draft SNBC3 projects a decline in the French land sink from -37 Mt CO_2eq in 2023 to -25 Mt in 2030, followed by a stabilisation after 2030, resulting in a -24 Mt land sink in 2050 (p206). The same document outlines projected mitigation levers in the land use sector between 2023 and 2030, and between 2030 and 2050 (pp207-208).

Despite the identified measures, the French land sink is projected to diminish until 2030, from -37 Mt CO_2eq to -25 Mt CO_2eq (p207). This is due to additional yearly net emissions in French forests, estimated at an increase of 18 Mt CO_2eq by 2030. Partially offsetting this trend, agricultural soils, grasslands, and harvested wood products are expected to deliver -6 Mt of net removals by 2030.

From 2030 onwards, the land sink is projected to increase, reaching -38 Mt CO_2eq by 2050. This is largely attributed to a projected increase in carbon sequestration in forest and agricultural soils of -18 Mt CO_2eq (p208). Nonetheless, soil carbon sequestration is highly vulnerable and difficult to measure. Therefore, a strategy that relies substantially on soils to provide stable net sequestration carries risks regarding permanence and non-delivery.

The Draft SNBC3 projects an additional annual capacity of -4 Mt CO_2eq from temporary storage in harvested wood products between 2030 and 2050, which would contribute to the net land sink. In total, including -3 Mt of removals by 2030, an additional annual removal capacity of -7 Mt CO_2eq is expected to come from harvested wood products from 2023 to 2050 (p208). The French climate strategy's increased reliance on wood harvesting

to pursue carbon storage creates multiple risks. Peer-reviewed scientific literature shows that the negative long-term effects of pursuing harvested wood product storage as a removals strategy (i.e., additional pressure on the forest sink through increased harvests and competition with other sectors requiring biomass for decarbonisation) likely exceed positive effects. Additionally, major practical challenges exist, including questions of how long-term monitoring of carbon stored in products would work, and who would be held liable if storage times are shorter than expected. If carbon is not stored for the whole foreseen lifetime, this may shift emissions and, therefore, additional emission-reduction efforts to a later point in time.

The Draft SNBC3 further envisages afforestation on 200,000 hectares between 2030-2039, followed by a continued annual afforestation rate of 15,000 hectares until 2050 (p211). These new forests are projected to provide -4 Mt CO_2eq of additional annual removals from 2030 to 2050. However, these projected gains are offset by lower forest growth, higher mortality, and increased dead wood (p210), limiting the strengthening of the land sink.

The decline of French forests is set to continue, due to increased harvesting to meet the demand from the energy and construction sectors.

According to the Draft SNBC3, forest mortality has led to a surge in emissions from 14 Mt CO_2eq per year in 2010 to 41 Mt CO_2eq in 2023. Over the same period, the annual carbon sequestration from forest growth declined by an estimated 5 Mt CO_2eq (p201). Despite this deterioration of the forest sink, France plans to increase harvesting from 53 to 60 million cubic meters by 2030 to meet demand for wood in the construction industry and for biomass energy (p216). A sensitivity analysis reveals the trade-offs: limiting harvest levels to 56 million cubic meters would improve the forest carbon sink by 5 Mt CO_2eq annually by 2050, but this would also increase reliance on imports of wood products and reduce domestic biomass energy supply by 6 TWh per year, potentially shifting emissions abroad (pp222-223). The land-based strategies outlined in the 2025 Draft SNBC3 resemble those presented in France's 2020 SNBC2, aiming to achieve 2030 targets. In both cases, significant reliance is placed on harvested wood products and afforestation. Given that the measures outlined in the SNBC2 (p169) did not deliver the anticipated land-sink outcomes, this raises questions about the credibility of the current strategies to achieve the aimed at emission trajectory towards 2050.

Additional effects of BECCS deployment for biomass demand pressures are discussed in the following section titled ‘Biomass supply’.

● Associated financial cost and source of financing

The French government's current financing tools only target fossil carbon capture.

Current French financing instruments appear to focus on CCS and CCU projects aimed at mitigating fossil-based industrial emissions. The Draft SNBC3 notes that "[...] [d]espite rising carbon quota costs, CO_2 capture technologies, which are still emerging, are not profitable without public subsidies in the short term. Thus, the call for tenders for major industrial decarbonisation projects was launched at the end of 2024 to support, among other things, the installation of CO_2 capture units at sites with no alternative for decarbonisation." (p143) However, the document does not indicate that the scheme is intended to support processes that permanently remove CO_2 from the atmosphere. While technological or infrastructure synergies between the development of CCS technologies and BECCS may exist, the French government does not mention this as one of the new initiative's goals.

France allocates €100-150 million annually for 'forestry renewal' and has already established a voluntary initiative, but provides limited detail on concrete measures and results.

In the land sector, financial support is primarily directed towards 'forestry renewal'. The 2024 NECP allocates a yearly budget of EUR 100-150 million for this purpose, but does not specify which concrete measures it covers (p145). A comparison with a foregone project provides information about the potential effects the measure could have. The EUR 150 million 'FranceRelance' investment plan resulted in the creation of 36,000 ha of forest. (p154). Even so, the expected outcomes of the current allocation are not quantified in the reviewed documents.

To support measures in the land sink, the 2024 NECP also refers to the voluntary initiative 'Label Bas-Carbone'. France created the scheme in 2018 to support projects that reduce emissions or increase carbon sequestration beyond regulatory requirements. Public and private actors may finance certified projects and claim the associated emissions reductions. The scheme defines criteria for eligibility, additionality, and methodologies for quantifying GHG reductions or removals. All sectors can participate except those already covered by the EU Emissions Trading System (p155).

The reviewed policy documents do not specify the amount of private investment the scheme mobilised. The Label Bas-Carbone has been the subject of discussions in policy and academia. It has been particularly criticised for its weak additionality and permanence

criteria, which may lead to projects being certified that actually have a negative impact on the environment or increase emissions.

Constraints and risks

● Land use and sequestration rates

Assessments of potential land use effects from BECCS are missing.

The reviewed documents do not include a dedicated assessment of potential land-use impacts associated with the projected BECCS volumes. It remains unclear whether additional biomass demand and land requirements resulting from BECCS deployment were incorporated into modelling assumptions, and if so, under which parameters. The absence of explicit documentation of these assumptions limits transparency into the land-use implications of large-scale BECCS deployment and indicates a significant gap in the assessments.

France provides criteria for afforestation site selection to avoid competition with agricultural land, but no feasibility study was conducted.

The Draft SNBC3 outlines the criteria for the selection of land intended for planned afforestation measures. The document states: “Afforestation outside existing forests will not compete with agricultural land but will take place on brownfield sites and land no longer used for agriculture. Efforts will be made to identify vacant lots, industrial wasteland and disused quarries in the region and to implement, on a case-by-case basis, restoration measures prior to afforestation.” (p216). While these safeguards are explicitly acknowledged, the Draft SNBC3 does not reference a feasibility study or a quantitative land-availability assessment to support the projected scale of afforestation. A request for additional information to the relevant French ministries did not yield further documentation. As a result, the feasibility of achieving the planned afforestation targets cannot be assessed based on the reviewed materials.

This stands in contrast with other modelling components of the Draft SNBC3. For example, the document proposes measures supporting dietary changes to address land competition. The 2025 Draft SNBC3 incorporates dietary assumptions into its land-use modelling following recommendations made in the National Program for Nutrition and Health (p108).

Despite conducting this complex assessment of changes in consumption patterns, France has not provided comparable detail on land-use pressures from afforestation or BECCS deployment.

● Technology and energy assumptions

The French 2024 NECP acknowledges general uncertainty about technological developments, but no explicit assumptions are outlined for BECCS and DACCS.

The 2024 NECP notes uncertainties regarding technological developments in its WEM modelling and emphasises the importance of taking them into account to develop a robust scenario (p234). However, the underlying assumptions about technological development are not disclosed.

In addition, despite the Draft SNBC3's central scenario projections of -6 Mt CO_2eq from DACCS by 2050, the potential energy demand associated with this level of DACCS deployment is not explicitly quantified in the reviewed planning documents. Without an assessment of energy demand implications, it is difficult to evaluate the compatibility of projected DACCS deployment with broader energy system constraints in France's climate strategy. Therefore, this denotes a crucial gap in France's assessment of DACCS feasibility and potential impacts.

● Transport and geological storage of CO_2

Domestic storage capacity remains uncertain, and transport infrastructure planning is underdeveloped.

The French NECP notes that France has not identified domestic geological storage capacity. Studies launched in 2024 aim to assess this potential, with a potential investment of €25-30 million allocated for additional studies and preparatory work (p64).

The 2024 report 'Current Status and Prospects for CCUS Deployment in France' includes an initial review of theoretical storage capacity, estimating potential CO_2 storage volumes of 760 Mt onshore and 384 Mt offshore (pp25-30). But, these estimates are described as "theoretical" to "highly theoretical" and exclude key factors such as cost considerations and potential conflicts over their use (p28). As such, France's domestic geological storage

potential is still in a very early stage of assessment, and estimates of available volumes are highly uncertain.

In addition, the same report provides an initial review of potential CO_2 transport networks (pp21-24) and lists planned actions to improve data availability and support deployment (p29). However, more detailed long-term infrastructure planning for domestic CO_2 transport has not yet been fully articulated in the reviewed climate planning documents.

France has taken the first steps towards enabling international CO_2 storage.

The Draft SNBC3 notes that in June 2025, the French Parliament approved legislation that allows cross-border transport of captured CO_2 for geological storage (p143). Two bilateral agreements have been signed with Denmark and Norway to facilitate CO_2 exports from French industrial sites (p143). The government also plans to establish a regulatory framework for transport and storage infrastructure, but it has not indicated a timeframe for this. Simultaneously, France aims to develop its own storage capacity, citing sovereignty concerns, energy cost optimisation, and ensuring access for emitters located far from export hubs (p143).

● Biomass supply

National biomass demand is projected to increase significantly, outgrowing domestic supply by 2030.

The Draft SNBC3 outlines France's climate strategy for the Industry sector, which relies on a significant increase in solid biomass use and BECCS (p139). The report on the long-term challenges of the SNBC3 notes that biomass-based energy consumption is expected to increase until 2050 (p9). Meanwhile, the 2024 report on the SNBC3's first broad orientations further notes that while imports could supplement domestic supply, their availability cannot be assumed due to other countries' demand (p9). Therefore, the French government wants to promote demand moderation by introducing a prioritisation for the different uses of biomass. No foreseen measures to translate such a prioritisation into practice are described.

The NECP similarly acknowledges concerns that biomass demand may exceed available domestic supply in 2030 and notes that "[...] uncertainties about the projected figures

suggest caution as early as 2025 [...]" (p272). Altogether, these documents indicate that France recognises potential supply constraints in its biomass strategy.

The forests' capacity to act as carbon sinks is threatened by the increased biomass harvesting for energy, which might be exacerbated by BECCS.

As discussed in the 'Removals Policy' section, harvesting levels are already putting the land sink under pressure. According to the Annex of the Draft SNBC3, forest harvesting in France is expected to increase from 53 Mm^3 in 2021 to 60 Mm^3 in 2030 and 62 Mm^3 in 2050 (p31). These projected harvesting levels are significantly lower than those assumed in SNBC2s. A sensitivity analysis in the Draft SNBC3 reveals connected trade-offs: if wood energy demand were to remain constant between 2030 and 2050 instead of decreasing as assumed in the reference scenario, the forest sink would decline by an additional 3 Mt CO_2eq in 2050, reaching 22 Mt total instead of the projected 25 Mt CO_2 eq (p223). In addition, net removals from harvested wood products would be around 3 Mt/year lower than otherwise expected in 2050 (p223). Therefore, failing to reduce biomass demand alongside harvesting levels may lead to the French LULUCF sink decreasing by 6 Mt more than expected.

These results indicate that sustained biomass demand can materially affect projected LULUCF outcomes. Given that BECCS deployment would require additional biomass feedstock and that the sink in the harvested wood products is vulnerable to forest conditions, the heavy reliance on both measures to achieve climate neutrality bears significant delivery risks. The French High Council on Climate, in its 2023 Statement on the Strategy for Carbon Capture, Usage and Storage, already highlighted the necessity of removing uncertainties around biomass availability for BECCS in its key recommendations (p6). To date, however, an assessment of the potential effects of BECCS on biomass demand is still missing.

France recognises limited biomass in its climate planning and commits to adapting biomass demand, but lacks clear policies to operationalise this commitment.

The NECP recognises that biomass resources are limited and their use must be compatible with a healthy land sink, soil fertility, and biodiversity (p264). It further states that biomass demand should be adjusted to resource availability (p89). The Draft SNBC3 calls for improved governance to apply the cascading use principle to prioritise higher-value

applications of biomass and strengthen its public governance (p218). While these principles are clearly stated, the reviewed documents do not provide concrete measures designed specifically to enable these developments. The operationalisation of biomass demand moderation remains to be further specified.

Key Issues

France's climate-neutrality strategy depends on vulnerable carbon storage in soils and forests, but logging is expected to increase. The strategy also relies on temporary storage in harvested wood products, the climate benefits of which are highly contested, and on permanent industrial removals, which rest on ambiguous, inconsistent projections. Biomass constraints are a key issue in the French climate plans, with rising demand eroding the land sink. The French government responds to the declining land sink by shifting to greater reliance on industrial removals, for which crucial assessments are missing.

1. France relies on its land sink to achieve climate neutrality, and plans to stabilise it from 2030. Past failures, as outlined in France's SNBC2 from 2020, including relying on afforestation while increasing logging, have already led to a significant decline in land sink capacity. Reacting to this decline, the French government now shifts part of the envisaged removal volumes to achieve climate neutrality onto uncertain industrial removal technologies. Meanwhile, forestry plans continue to include logging increases, repeating similar problem-shifting patterns to those that previously hampered the country's goal of preserving a healthy land sink.

2. The French climate strategy's heavy reliance on harvested wood products as a carbon sink carries significant risks. While cascading use and circular-economy approaches are necessary strategies, carbon storage in wood products is temporary and reversible. Relying on it to counterbalance residual emissions calls the reliability of the French strategy into question.

3. France's projections of industrial removals are unclear and conflicting. The Draft SNBC3 conflates BECCS with CCS and CCU and presents inconsistent projections. The problem has carried over from the previous SNBC2 strategy and complicates the assessment of the scale, feasibility and credibility of the government's industrial removal plans.

4. Projections mentioned in the French NECP show that biomass demand may exceed domestic supply by 2030, creating critical trade-offs for its climate strategy. The planned increase in harvesting to meet construction and bioenergy demand would

reduce the forest sink by up to 6 Mt CO_2eq by 2050. This directly threatens the overall land sink and risks increasing reliance on industrial removals. If this includes more BECCS, it may even exacerbate the issue. Although the strategy recognises sustainability limits and calls for demand moderation, concrete policies to reduce biomass demand remain absent.

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