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Project of National low-carbon Strategy n°3

PART 1

June 2026

ÉLECTRIFIONS LA FRANCE !

STRATÉGIE FRANCAISE ÉNERGIE CLIMAT

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Résumé **exécutif**

Charting a path towards achieving the targets of the Paris Climate Agreement

At a time when the world is in a race against time in the face of the climate emergency, **the Government is acting to accelerate our country's ecological transition.**

The target? Drastically reduce our greenhouse gas emissions to reach climate neutrality in 2050[1] **and reduce our consumption-based emissions taking into account imported emissions,** to fully contribute to the global action required by the Paris Agreement, ensuring a just and socio-economically sustainable transition for all actors. Keeping the global average temperature increase well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C is a collective duty. Every tenth of a degree counts in the fight against climate change and the preservation of our ecosystems, while climate change is already perceptible in the daily lives of French people.

France has embarked on an ecological planning process to achieve these targets. This planning also aims to improve the quality of life of our fellow citizens, reindustrialise our country, create jobs in France and strengthen our sovereignty, while limiting the use of standards and coercion.

The new European climate ambition commits us to go faster and further. At national level, it means raising the target of reducing our greenhouse gas (GHG) emissions from -40% to around -50% between 1990 and 2030 (excluding carbon sinks).[2] This 2030 milestone is important to put France on the right path to achieving climate neutrality.

To meet our targets, we will now have to reduce our net GHG emissions (with carbon sinks) by around 5% each year between 2024 and 2030 and by around 7% between 2030 and 2050, compared to an average of 3% from 2017 to 2023. [3] This challenge requires us to continue our action to anchor the recent GHG emission reductions over time and increase GHG removals, with structural transformations to come throughout our economy (transport, agriculture, industry, buildings, energy, waste, land and forests, digital, etc.).

The third National Low-Carbon Strategy (SNBC 3) gives concrete expression to the Government's action to succeed in this challenge. It reflects France's framework for action on climate change mitigation. Its construction is the result of a planning exercise started in 2021, aiming to set, based on modelling work co-constructed with stakeholders, an energy and climate scenario based on a set of measures and assumptions, intended to guide collective action, and taking into account the associated uncertainties. **The Government relies on this as**

[1] *Climate neutrality is understood as a balance between GHG emissions and GHG removals by human-managed ecosystems (forests, agricultural soils) and technological processes (carbon capture and storage or reuse).*
[2] *Land and forestry sector and technology sinks.*
[3] *According to the 2025 edition of the Citepa Secten report.*

a basis for its climate and energy policy by adopting the carbon budgets,[4] sectoral targets and public policy measures and guidelines necessary to comply with the trajectory. Through this strategy, a path is mapped out to operate the country's climate transition on the ground. **This strategy mobilises all the emitting sectors of our economy, to switch between** a France where net emissions amounted to 521 megatonnes[5] of CO2 equivalent (Mt CO_{2e}) in 1990 (gross emissions of 539 Mt CO_{2e}) and a carbon-neutral France in 2050.

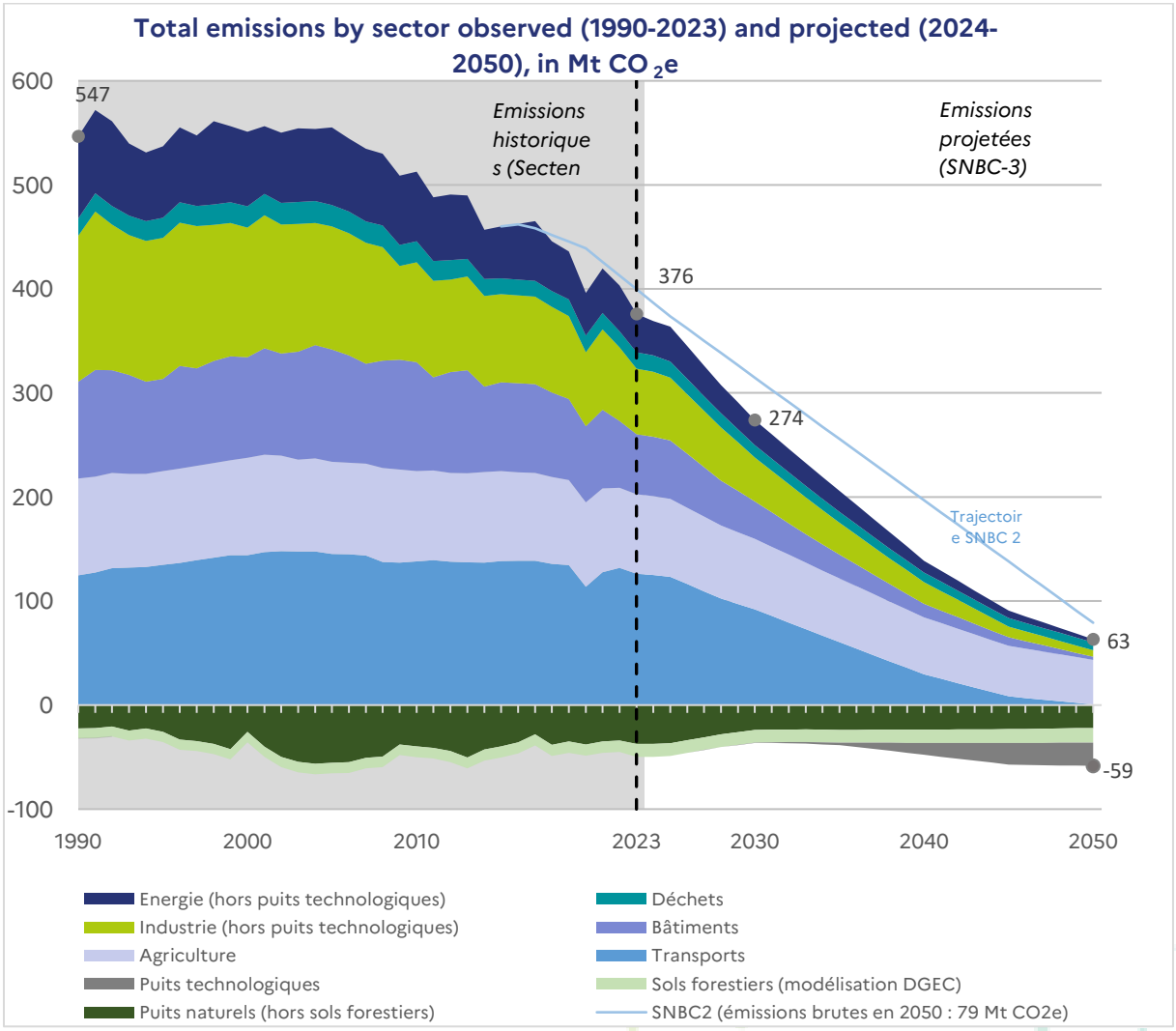

***Figure: 1** Trends in territorial greenhouse gas emissions (Sources: Citepa National Greenhouse Gas Emission Inventory - Secten 2025, DGEC modelling – WAM run 3)*

[4] *Greenhouse gas mission ceilings, decided by decree not to be passed, expressed as an annual average per 5-year period.*
[5] *One megatonne is equivalent to one million tonnes.*

The levers of action identified and quantified to achieve the ecological transition affect all dimensions of French life. The graph below illustrates the **distribution of GHG emissions sector by sector for 2030 and 2050** from the modelling results.

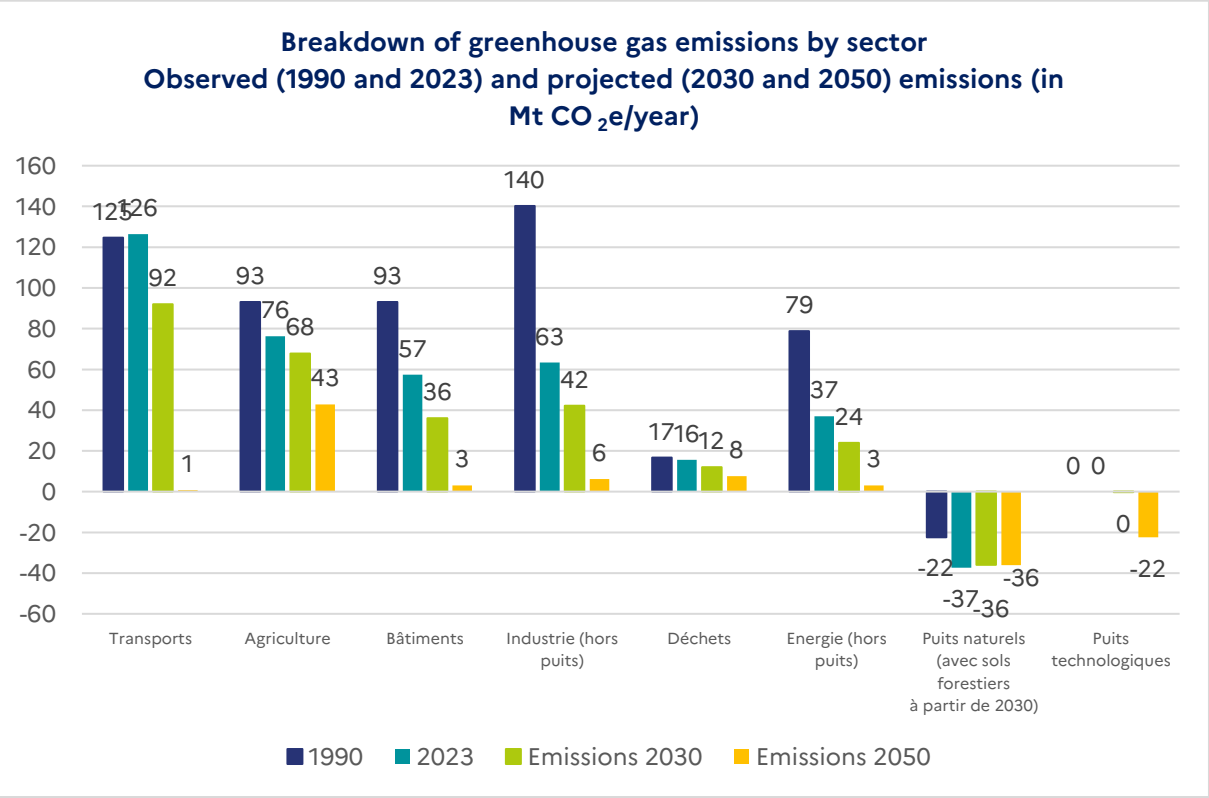

Figure: 2 *Distribution of GHG emissions by sector (Sources: national inventory of greenhouse gas emissions Citepa - Secten 2025; DGEC modelling – WAM run 3)*

Beyond territorial emissions, France is committed to reducing its consumption-based emissions, which takes into account imported emissions from all French consumption. Reducing our consumption-based emissions means decarbonising our economy while favouring production from decarbonised countries (and, in particular, national production in order to avoid reducing our territorial emissions by relocating them). Based on scientific knowledge, and in order to reduce France's consumption-based emissions at a pace consistent with the targets of the Paris Agreement, while recognising the influence of the decarbonisation of the rest of the world, **the target is to achieve a consumption-based emissions between 160 Mt CO_{2e} and 215 Mt CO_{2e}, a reduction of -71% to -79% in 2050 compared to 2010**. Returned per capita, the average consumption-based emissions of a French person would thus be between 2.3 t CO_2e/hab and 3.1 t CO_2e/hab in 2050.

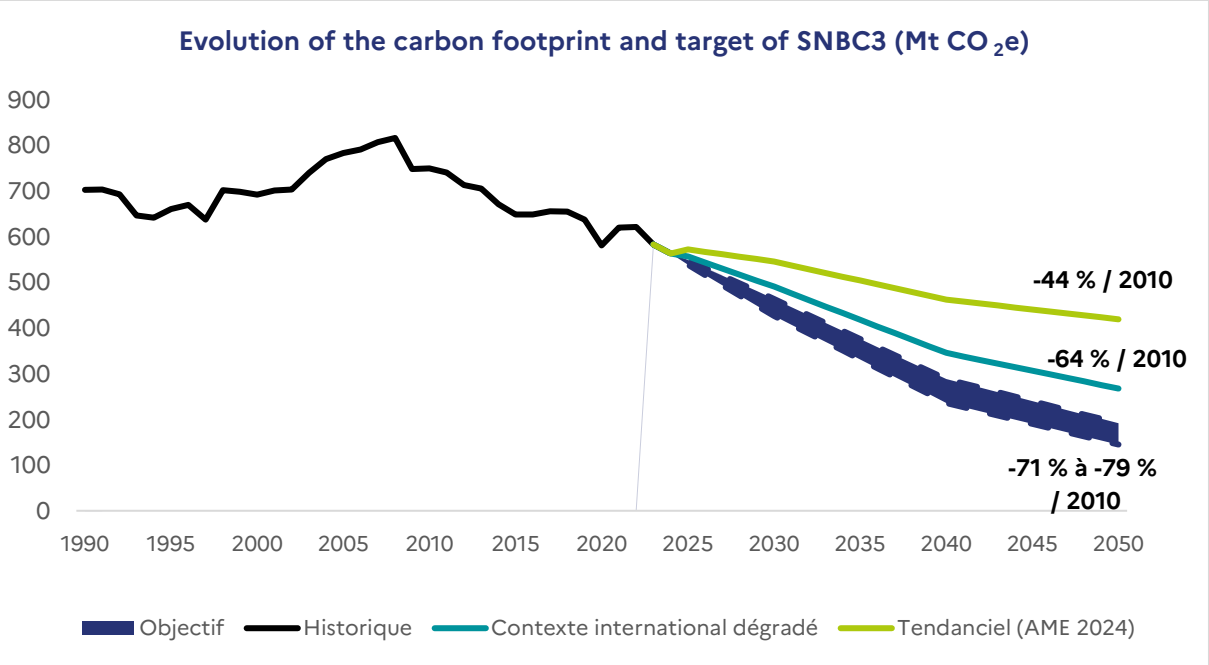

Figure: 3 *Evolution of the consumption-based emissions in SNBC3 (Sources: Estimated consumption-based emissions of France SDES-INSEE 2024; DGEC / ADEME modelling). The full parts correspond to the variable ranges of France's consumption-based emissions reduction target. The trend scenario corresponds to a scenario "With existing measures" on the national territory and at the global level. The "Degraded international context" scenario corresponds to a transition scenario on the national territory, but with less ambitious international policies.*

The transition to climate neutrality envisaged by SNBC 3 ultimately generates economic benefits compared to climate inaction, the cost of which remains well above the cost of decarbonisation in the medium and long term. The macroeconomic impact of the transition on activity remains relatively small compared to the trend scenario, particularly in terms of its evolution over the period, improved security of supply and energy sovereignty, and job creation. Decarbonisation will require significant investment needs which the State will seek to make more profitable and financially viable for households, in particular through accompanying measures for the most modest. **Household energy bills are expected to fall slightly by 2030 compared to the trend scenario and 2023 before falling sharply in the long term thanks to the energy savings enabled by SNBC.** Decarbonising and supporting the most vulnerable households will reduce their exposure to fossil fuel prices.

This version of the National Low-Carbon Strategy is a 'project' version, the aim of which is to serve as a basis for public participation, prior to the final adoption of the SNBC. All figures and targets are based on up-to-date work and modelling, which is still subject to change until final adoption.

Construire la Stratégie nationale bas-carbone : *présentation de ses fondements*

I. The foundations the National Low Carbon Strategy

A. International Framework for Action to tackle climate change

Climate change requires countries around the world to collaborate. At this level, the fight against climate change is guided by the United Nations Framework Convention on Climate Change (UNFCCC) adopted in Rio in 1992. **That convention aims to stabilise greenhouse gas (GHG) concentrations 'at a level that prevents dangerous anthropogenic interference with the climate system',** stating that such a level 'should be achieved within a sufficient period of time to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to continue in a sustainable manner'.[6]

In 2015, at the 21st United Nations Climate Change Conference, **the Parties adopted the Paris Agreement. This legally binding international treaty** on climate change **aims to keep "the global average temperature increase well below 2°C above pre-industrial levels" and to continue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels".** The Paris Agreement provides that the Parties shall seek to achieve a 'global cap on GHG emissions as soon as possible', followed by rapid reductions thereafter in order to 'achieve a balance between anthropogenic GHG emissions by sources and removals by sinks in the second half of the century, on the basis of equity and in the context of sustainable development and the fight against poverty'. France ratified the Paris Agreement in June 2016 by Law No 2016-786. France is a 'Party' to the Paris Agreement as a member of the European Union (EU) (according to a French perimeter with the outermost regions (ORs) including the overseas departments and regions and Saint Martin) and as whole of France (including the French Overseas Countries and Territories, not included in the EU).

To achieve this collective target, the Paris Agreement is based on a bottom-up approach, based mainly on cooperation to encourage all types of actors to engage and act on climate. The Paris Agreement established a formal mechanism to increase climate ambition over a 5-year cycle, starting with the publication by the Parties to the Agreement of their Nationally

[6] *Article 2 of the United Nations Framework Convention on Climate Change*

Determined Contributions[7] (NDCs), followed by their implementation and ending with the *Global Stocktake* [8] (GST). The third round of ambition started in **2025 with the publication of the NDCs by 2035, which were due for COP30 in Belém. The French NDC has two parts:** a component on its French perimeter included in the European Union (Mainland France and Outermost region (RUP)), which derives directly from the EU NDC,[9] and a component on the perimeter of Overseas Countries and Territories not included in the EU.[10]

In addition to these NDCs, **the Paris Agreement encourages the Parties to the Agreement to propose long-term low GHG emission development strategies** (LT-LEDS), to guide each Party's action in limiting global warming, with a view to achieving global climate neutrality by mid-century. NDCs must be aligned with these LT-LEDS. SNBC is France's LT-LEDS in that context.[11]

Commitments under the Paris Agreement allowed to reduce anticipated global warming at the end of the century from 4°C before the agreement to a range of 2.3°C to 2.5°C if NDC commitments are fully met, and 2.8°C under current policies, according to the latest UNEP report.[12]

In order to promote international cooperation in the achievement of global decarbonisation targets, Article 6 of the Paris Agreement allows for "international transfer of mitigation outcome". This means that the achievement of a Party's NDC can be achieved either by decarbonising domestic emissions to the NDC target, or by funding climate change mitigation projects outside its territory at the same level, or by a combination of both. The priority of French and European climate action is given to the decarbonisation of domestic economies. However, in the long term, the mobilisation of Article 6 could allow, to a limited extent, for a more efficient and cost-effective decarbonisation outside the European Union, in order to facilitate the collective achievement of limiting climate change.

To keep global warming at 1.5°C, the IPCC states that global GHG emissions must peak before 2025 and be reduced by 43% by 2030 and 60% by 2035 compared to 2019.[13] However, **the latest UNFCCC Synthesis Report on NDCs**[14] **indicates that we face an ambition gap** (the

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[7] States' mitigation commitments (GHG reduction) are reflected in their Nationally Determined Contributions (NDCs). Pursuant to Article 4 of the Paris Agreement, the Parties undertake to communicate a new NDC every five years, representing a progression from the previous NDC and the highest possible level of ambition, taking into account common but differentiated responsibilities and respective capabilities, taking into account different national situations. States may also submit a Long-Term Low Emission Development Strategy (LT-LEDS) (Article 19 of the Paris Agreement), which specifies their trajectory and contribution to the collective target.

[8] According to Article 14 of the Paris Agreement, the global stocktake makes it possible to 'assess collective progress towards the [Agreement] and its long-term goals'. Ultimately, "the results of the global stocktake inform Parties in updating and strengthening their [climate action] […] measures as well as intensifying international cooperation". The first global stocktake (1/CMA.5) was held in 2023 at COP28.

[9] The latest EU NDCs set targets of -55% in 2030, and -66.25 % to 72.5% net emissions in 2035 compared to 1990 levels (see Part I.B)

[10] https://unfccc.int/sites/default/files/2026-01/20250106-Composante-PTOM-CDN-FR_vF.pdf

[11] https://unfccc.int/process/the-paris-agreement/long-term-strategies

[12] https://www.unep.org/resources/emissions-gap-report-2025

[13] IPCC Sixth Assessment Report https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

[14] Applying the commitments contained in the NDCs would lead to a 12% reduction in global net GHG emissions (with an uncertainty range between -7% and 18% reduction) in 2035 compared to 2019 https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/2025-ndc-synthesis-report

commitments contained in the current NDCs would lead to a 12% decrease in emissions in 2035 compared to 2019 instead of the 60% needed) **and an implementation gap** (the measures taken by Parties do not meet the commitments contained in their NDCs).

In this critical decade for climate action, it is now necessary for all Parties to the Paris Agreement to enhance and implement their commitments, in order to achieve the expected GHG emission reductions to hopefully limit climate change and preserve the habitability conditions of the Earth system. Within the European Union, **France is playing its full part in the global effort required by the Paris Agreement through the adoption of this third SNBC,** setting out the path to collectively succeed in reducing our emissions, our consumption-based emissions and projecting us into a habitable, just and desirable world.

The next assessment of collective climate action, the 'Global Stocktake', will take place in 2028 at COP33. The process of this second global stocktake begins in 2026 with a phase of collection of all relevant information by the UNFCCC secretariat, followed by a technical assessment from 2027 onwards.

B. European framework for action to tackle climate change

The Regulation 'establishing the framework for achieving climate neutrality', known as the 'European Climate Law',[15] has enshrined in European law the target of climate neutrality in 2050 and provides for intermediate milestones in terms of reducing greenhouse gas emissions.

By 2030, the European Union (EU) has set itself the target [16] **of reducing its greenhouse gas emissions by at least -55% net in 2030 compared to 1990** (compared to at least -40% gross previously). The assessment of the national energy and climate plans of the Member States, including France, carried out by the European Commission in May 2025[17] shows that the EU is on track to achieve a 54% reduction in greenhouse gas emissions by 2030, close to the 55% target, provided that all the measures provided for by the EU and the Member States are fully implemented.

To reflect these targets, **several European laws and targets have been revised, including:**

- **The revised European Effort Sharing Regulation (ESR),** [18] which aligned Member States' targets for reducing GHG emissions from the transport, buildings, agriculture and waste sectors[19] with the new EU 2030 target. As such, **the new reduction target assigned to France on this perimeter involves a compliance to two carbon budgets 2021-2025 and 2026-2030**

[15] *Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law').*
[16] *Article 4 of the above-mentioned Regulation.*
[17] *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52025DC0274&qid=1749138488640*
[18] *Regulation (EU) 2023/857 of the European Parliament and of the Council of 19 April 2023 amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and Regulation (EU) 2018/199920181999.*
[19] *"Diffuse" sectors not subject to the current HTA.*

defined by an emissions reduction trajectory reaching **-47.5% by 2030 compared to 2005 (instead of -37% previously).** This new target largely scales up the decarbonisation effort that France must make for the perimeter of these emitting sectors.

- **The European regulation on land use, land-use change and forestry** (LULUCF),[20] which defines the targets of the Member States in terms of forest management, strengthening long-lived uses for wood from French forests, and carbon storage on agricultural land (e.g. preservation of grasslands, … hedges) or reduction of land take. In this regard, France should successfully improve its carbon sinks by 6.7 Mt CO_{2e} between the average of the years 2016 to 2018 and 2030, as measured in the inventories to be submitted in 2032.
- **Directive 2023/1791/EU on energy efficiency** (EED),[21] which sets out the targets that Member States must provide for reducing energy consumption. The scope of this Directive covers final energy consumption (non-energy consumption is excluded) as well as aviation transport bunkers, but excludes maritime transport bunkers and ambient energy (heat in the environment for heat pumps). This Directive sets an energy consumption target of 1 243 TWh in final energy and 1 844 TWh in primary energy[22] in 2030[23]. **Achieving these targets implies a 29% reduction in France's final energy consumption in 2030 compared to 2012.**
- **Directive (EU) 2023/2413 on the promotion of energy from renewable sources** (RED III), which sets an overall target for the share of renewable energy in the EU's gross final consumption of energy in 2030 and sets out the non-binding targets that Member States must provide for the production of renewable energy. **This target has been set at 42.5% binding and 2.5% additional non-binding at EU level, with non-binding targets for each of the Member States.**
- **Directives (EU) 2023/958[24] and (EU) 2023/959,[25] which revise the EU Emissions Trading System** (EU ETS, the European carbon market) to increase its environmental ambition. These Directives increase the ambition of the ETS to reduce emissions by 2030 at European level[26] (-62% compared to 2005, compared to -43% before the revision), extend the scope of the

[20] Regulation (EU) 2023/839 of the European Parliament and of the Council of 19 April 2023 amending Regulation (EU) 2018/841 as regards the scope, simplification of reporting and compliance rules, and setting of Member States' targets for 2030, and Regulation (EU) 2018/1999 as regards improved monitoring, reporting, monitoring of progress and review.

[21] Article 4 of Directive 2023/1791/EU on energy efficiency sets a European 2030 target for maximum consumption of 763 Mtoe e n final energy and 992.5 Mtoe primary energy. These targets aim to reduce energy consumption by at least 11.7% in 2030 compared to the projections of the 2020 Union reference scenario.

[22] According to the definitions of primary and final energy consumption of the Energy Efficiency Directive (EED, 2023/1791/EU)

[23] Article 4 of the revised EED provided for an update, at the end of 2023, of the scenario for modelling each Member State's energy consumption targets. The French targets have been updated accordingly to reach 1 243 TWh (Ef) and 1 844 TWh (Ep).

[24] Directive (EU) 2023/958 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC as regards aviation's contribution to the emission reduction target in all sectors of the Union economy and the appropriate implementation of a global market-based measure.

[25] Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system.

[26] These Directives do not set a specific target for France.

EU ETS to the maritime transport sector, phase out free allowances for the aviation sector and create a new carbon market at European level covering in particular emissions from road transport and buildings. In addition, they link the EU ETS with the implementation of the Carbon Border Adjustment Mechanism (CBAM), also adopted in 2023 by the European Union (Regulation (EU) 2023/956). They thus provide for the phasing out, between 2026 and 2034, of free allowances for the emitting industrial sectors covered by the CBAM (steel, cement, aluminium, fertilisers and hydrogen), while gradually strengthening their allocation conditions for the other sectors.

- **Regulation (EU) 2024/1787 on the reduction of methane emissions in the energy sector,** which specifies EU rules to limit methane emissions from the energy sector in Europe and worldwide. In particular, it provides for progressive reporting obligations for importers of hydrocarbons and fossil energy producers. Given its low hydrocarbon production, France is more concerned with combating indirect methane emissions associated with hydrocarbon imports than with direct methane emissions in its energy sector (around 0.1% of global emissions).
- **The EU Nature Restoration Regulation,** which entered into force on 18 August 2024, aims to contribute to "achieving the Union's overall targets of climate change mitigation, adaptation and land degradation neutrality"[27] (Article 1). It recognises the key role of ecosystems in the fight against climate change, in particular as natural carbon sinks and requires Member States to deploy restoration measures on habitats capable of storing carbon sustainably: forests, peatlands, wetlands, agricultural soils. Monitoring indicators for the future national restoration plan could include, inter alia, soil organic carbon from crop and forest land and standing or ground deadwood.

Beyond the Methane Regulation, **the European Union (EU) and France** [28]individually **committed to the Global Methane Pledge (GMP),** [29] a collective commitment **to reduce global methane emissions by 30% between 2020 and 2030.** This initiative covers all sectors of activity, while recognising that the energy sector concentrates the main deposits in the short term. The European Union published its Action Plan on Methane under the GMP at **the end of 2022,**[30] **which states that EU-wide methane emission reductions by 2030 would reach 23% compared to 2020 and just over 50% compared to 1990.** This target should enable the EU to contribute to this global ambition in line with the methane emission reduction fields on its territory.

The combination of the revised effort sharing regulation ('ESR') target and the expected reductions in the sectors covered by the European carbon market ('ETS') leads to a **national emission reduction target** (excluding LULUCF and technological sinks) **in 2030 of around -50%** (approximately 275 Mt) compared to 1990 (547 Mt).[31]

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[27] *Regulation of the European Parliament and of the Council on nature restoration and amending Regulation (EU) 2022/869 https://data.consilium.europa.eu/doc/document/PE-74-2023-REV-1/en/pdf*
[28] *France reduced its methane emissions by 5% between 2020 and 2023.*
[29] *An initiative launched at COP26 (https://www.globalmethanepledge.org/)*
[30] *https://energy.ec.europa.eu/document/download/f9a49150-903e-46a6-aec7-f2c21272e9e0_en?filename=EU_Methane_Action_Plan.pdf*
[31] Applying a 50% reduction in 1990 gross greenhouse gas emissions (547 Mt CO_{2e}) results in 273 Mt CO_{2e} (Secten 2025).

The European Commission published a communication in February 2024, recommending a target of a net reduction in greenhouse gas emissions of 90% [32] **by 2040** compared to 1990 levels. It supports this recommendation on the basis of the opinion of the European Climate Change Advisory Board (ESABCC)33 and its impact assessment detailing several scenarios and options for intermediate targets for 2040 aimed at achieving climate neutrality in the European Union by 2050, without specifying a breakdown by Member State. On 2 July 2025, the Commission published its proposal for a legislative revision of the European Climate Law[34] to include a binding 2040 climate target of a 90% reduction in net greenhouse gas emissions compared to 1990. A general approach on the amendment to the 'climate law' was adopted at the Extraordinary Environment Council on 4 November 2025, after the Heads of State set a course for the broad guidelines at the European Council on 23 October. The European Parliament voted on 13 November on a text very similar to that adopted in the Council of the European Union, and a provisional agreement was reached in trilogue on 9 December 2025.[35] On 10 February 2026, the European Parliament supported the political agreement, and the Council then formally adopted the amended European Climate Law on 5 March, before publication in the Official Journal of the European Union on 18 March 2026.[36]

This target of a 90% reduction in net emissions includes three options for flexibilities:

1. An adequate contribution of high-quality international credits of up to 5% of 1990 emissions, starting in 2036. A pilot period to develop the market for these international credits linked to Article 6 of the Paris Agreement is also planned for the period 2031-2035.
2. A role for permanent carbon capture in the carbon trading system (EU-ETS) to offset hard-to-abate emissions.
3. Enhanced flexibility between and across sectors and instruments, to support the achievement of targets in a simple and cost-effective way, allowing Member States to fill gaps in a sector without compromising overall progress.

The amendment to the European law establishes a set of principles and enabling conditions that the Commission will have to take into account in developing the post-2030 climate framework towards the 2040 intermediate target, in order to ensure a fair, cost-effective and socially balanced transition, while preserving the competitiveness of the European economy. For France, the key enabling conditions regarded technological neutrality for the energy sector, support for European competitiveness (European preference, strengthening the carbon border adjustment mechanism, steel safeguard plan, decarbonisation of industry), taking into account uncertainties on natural and technological carbon sinks, and a limited contribution from high-quality international credits compatible with the Paris Agreement. In addition, a review clause

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[32] To this end, it is counting on a reduction in emissions in 'all sectors' of the order of -82% gross (850 Mt CO_2e in 2040), an ambitious development of removals from the land sector (-316 MtCO_2) and technological removals (essentially CCS) (-75 Mt CO_2).

[33] The European Scientific Advisory Board on Climate Change (ESABCC), the equivalent of the HCC at European level made up of 15 independent scientific experts, published an opinion on 15 June on the 2040 climate target.

[34] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law').

[35] https://ec.europa.eu/commission/presscorner/detail/en/ip_25_2967

[36] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202600667

will be activated in 2029, 6 months after the second global stocktake of the Paris Agreement, to assess the overall 2040 target and the measures implemented to achieve it in the light of the latest scientific evidence, technological developments and the competitiveness of European industries. The review will also take into account energy price developments and their impacts on households.

The adoption of the general approach by environment ministers on 4 November 2025 allowed them to unanimously adopt the EU Nationally Determined Contribution (NDC), a climate plan submitted to the UN Climate (UNFCCC) before COP30. That NDC sets an emission reduction target for 2035, ranging from -66.25 % to -72.5% compared to 1990, representing a linear approach between, for the lower bound, the 2030 target and the climate neutrality target in 2050, and for the higher bound, the 2030 target and the 2040 target.[37]

C. France's framework for action to combat climate change

1. The National Low-Carbon Strategy, what are we talking about?

The National Low-Carbon Strategy (SNBC) was established by Law No. 2015-992 of 17 August 2015 on the energy transition for green growth.

The **National Low-Carbon Strategy is France's framework for action on climate change mitigation:** it seeks to delineate greenhouse gas emission reduction targets into annual emission reduction trajectories by sector, considering a set of assumptions and measures to achieve them. SNBC legally reflects France's commitment to decarbonisation, in line with its international and European obligations. The SNBC is governed by Articles L. 222-1 A to L. 222-1 E of the Environmental Code.

This roadmap shall include:

- **A long-term target:** achieving climate neutrality by 2050 (climate neutrality is a balance between greenhouse gas emissions and removals) and reducing the consumption-based emissions of French people ;
- **A target trajectory to achieve this in line with the climate and energy targets of the intermediate frameworks:** SNBC sets out a clear path towards the long-term target and towards meeting the intermediate framework targets (in particular by 2030), based on a set of measures and assumptions. This indicative reference scenario enables the Government to adopt SNBC's carbon budgets, sectoral targets and public policy measures and guidelines;
- **Carbon budgets – adopted by decree:** these are greenhouse gas emission ceilings not to be exceeded, expressed as an annual average over a five-year period in million tonnes of CO2 equivalent, broken down by sector of activity and by greenhouse gas;

[37] https://unfccc.int/sites/default/files/2025-11/DK-2025-11-05%20EU%20NDC.pdf

- **Public policy guidelines** to achieve these targets.

The law provides for the revision of SNBC every five years, which makes it possible to take account of the uncertainties inherent in that planning. **In particular, SNBC's 2050 horizon is still a long way off. The successive revisions of the SNBC make it possible to fine-tune the trajectory and targets as much as possible,** taking into account the results and developments observed **in order to stay on track over time in line** with our international commitments.

In practice, **SNBC enables France to comply with the obligations of the European Regulation** (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.[38]

The SNBC is accompanied by a report[39] drawn up pursuant to the Environmental Code, which:

- **Presents an assessment of the previous SNBC;**
- **Describes how the carbon budgets and the new SNBC incorporate France's European and international commitments;**
- **Assesses the environmental,[40] social and economic impacts** of the carbon budget for future periods and the new SNBC, in particular on the competitiveness of economic activities subject to international competition, on the development of new local activities and on growth.

The State, local and regional authorities and their public institutions are required, respectively, to take SNBC into account in their planning and programming documents which have a significant impact on greenhouse gas emissions.[41]

The Climate and Resilience Act extended this principle to certain economic actors by requiring the identification of decarbonisation levers available to them and their operational translation into decarbonisation roadmaps.[42] The SNBC reference scenario is intended to guide these actors in the preparation of their planning documents.

SNBC is part of the French Strategy for Energy and Climate (SFEC). The SFEC aims to address the challenges of decarbonisation in a coherent and integrated manner and to strengthen the necessary articulation between climate change mitigation and adaptation policies. It is composed of SNBC, the Multiannual Energy Plan (MEP) and the National Climate Change Adaptation Plan (PNACC). **These three documents are fully articulated:**

- **The SNBC and the MEP are based on a common energy and climate scenario (see Part SNBC - I.C.2.).** Their development is thus closely linked, which makes it possible to ensure that all sectors are in line with energy needs and resources.

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[38] *In particular: the communication of an **integrated national energy and climate plan,** updated every 5 years, which details, inter alia, the national energy and climate targets, planned policies and measures and their impacts for **a period of 10 years 'taking into account a longer-term perspective'** and the communication every 10 years of a **long-term strategy** which must contain, **inter alia, the 2050 projections for reducing emissions and enhancing greenhouse gas removals.***

[39] *II of Article L. 222-1 D*

[40] *In accordance with the Environmental Code, SNBC has been subject to an environmental assessment.*

[41] *III of Article L. 222-1 D of the Environmental Code*

[42] *Article 301 of the Climate and Resilience Act, https://www.legifrance.gouv.fr/jorf/article_jo/JORFARTI000043956974*

- **The SNBC defines the mitigation roadmap for all sectors** (including energy production and transformation) **with long-term visibility,** in conjunction with the MEP, which operationally describes the energy policy orientations for the next ten years.
- **SNBC aims to contribute to the collective target of the Paris Agreement:** keep the average temperature rise well below 2°C above pre-industrial levels and possibly at 1.5°C. The NAPCC, for its part, aims to prepare France for +4°C warming in 2100, a scenario corresponding to the implementation of global mitigation policies in place and additional commitments by states as expressed in their national contributions requested by the Paris Agreement.
- **The SNBC shall include an analysis of the sensitivity of the assumptions in its reference scenario** to future climate change and shall, in conjunction with the PNACC, define measures to strengthen the resilience of the SNBC to the effects of climate change.

2. The construction of an energy and climate scenario to achieve France's climate and energy targets

The development of the French energy and climate strategy is based on extensive forward-looking **modelling work.** In **this context, the Directorate-General for Energy and Climate (DGEC) is coordinating the construction of a energy and climate scenario.**

This scenario describes a target trajectory for reducing greenhouse gas emissions to climate neutrality in 2050 (the 'with additional measures' or 'WAM scenario).

This work is not a forecasting exercise but an iterative planning exercise. Modelling translates the effect of the envisaged assumptions, policies and measures on sectoral greenhouse gas emission trajectories.

In this exercise, the State positions itself as a strategist, makes choices and proposes a credible and robust path to achieve our climate and energy framework targets. This scenario is not prescriptive, it is indicative. It illustrates the path chosen to date by the Government and the main strategic axes envisaged to achieve the various targets. **The State relies on this as a basis for its climate and energy policy by adopting the carbon budgets, sectoral targets and public policy measures and guidelines necessary to comply with the trajectory.**

This comprehensive modelling exercise of our economy, our energy supplies, the availability of the various resources, their economic closure, and emissions, **is based on the definition of the evolution of several thousand hypotheses,** determined on the basis of a broad consultation and dialogue with stakeholders **and on a set of sectoral models,** mobilising internal tools and external actors (CIRED, Solagro, Enerdata, etc.). Some assumptions, known as "framework" assumptions (evolution of population, GDP and import prices of fossil fuels in particular), are common to all models and are provided by the European Commission in order to ensure the consistency of all the exercises carried out by the Member States.

Sectoral models make it possible to estimate certain data on sectoral activities, such as vehicle traffic, the number of energy renovations of dwellings, fertiliser consumption or energy consumption. They are used to set sectoral targets and identify public policies to secure the achievement of these targets.

The results of the sectoral modelling are then aggregated, first in the form of energy balances and then in the form of GHG emission inventories, in a manner consistent with the statistical data published annually.

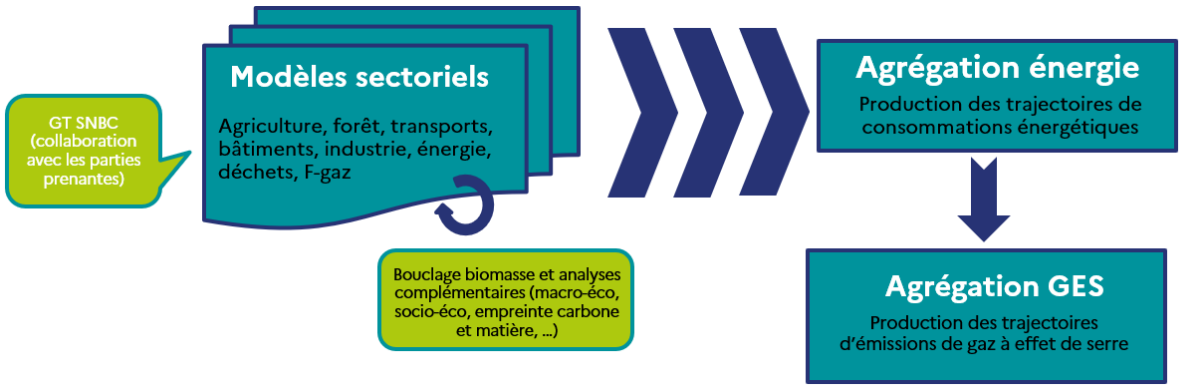

Figure: 4 *Modelling chain used to construct the SNBC Reference Scenario - DGEC*

Finally, the modelling exercise is complemented by a specific verification to ensure the overall consistency of the results between them ("closing"). At each time horizon, and for each of the sectors (transport, agriculture, buildings, industry, energy, waste) and energy carriers, **the aim is to check the adequacy of resources** (electricity generation, biomass volumes, etc.) **with the needs** arising from the reference scenario, **to assess its economic impact and acceptability,** and **to confirm the overall stability of the scenario and its robustness.**

Another aspect of this modelling exercise is to anticipate the role that each actor (State, local authorities, economic actors, citizens) can play in providing solutions.

The scenario is also a way of studying the impacts on the various environmental issues and taking them into account.

The **scenario shall take into account:**

- Existing national policies and their extension or strengthening in order to achieve our targets;
- the climate and energy targets laid down in European legislation;
- all EU climate and energy legislation that has an impact on energy prices or creates incentives for decarbonisation;
- European legislation that provides guidance in the development of certain technologies, such as regulations setting CO_2 emission performance standards for vehicles or the Energy Performance of Buildings Directive;
- **It aims to** comply with the international targets of the bodies in which France participates and which commit our country, for example the decarbonisation targets set by the International Maritime Organisation (IMO) with regard to international maritime transport.

The evolution of the main social dynamics is also taken into account in this scripting exercise. This aims both to ensure internal consistency between the different assumptions of the scenario, and to better explain the changes expected in the scenario in terms of lifestyles. For example, as regards health and well-being, the reference scenario takes into account 'non-

climate policies', which aim to reduce pollution (brightness, noise, air,[43] etc.), and which encourage the population to adopt balanced diets with more fruits, vegetables, legumes and whole grains and more fresh, local, seasonal and quality foods (labels), to exercise more regularly. Where possible, these developments are reflected in the assumptions of the scenario.[44]

This modelling work is subject to several sources of uncertainty. They concern both historical data related to the construction of the Secten greenhouse gas emissions inventory produced by Citepa[45] and forward-looking trajectories (future impacts of climate change, macro-economic and geopolitical context, implementation of long-term climate policies, etc. – see Part Complements - II. E). The uncertainties inherent in the definition of a long-term strategy are minimised, as far as possible, in the choice of trajectories chosen to develop a scenario that is as robust as possible, i.e. resilient to exogenous shocks and unforeseen events. Sensitivity tests are also conducted on certain assumptions and targets to reflect their uncertainties: they allow other possible trajectories to be considered, either to show their deadlocks and avoid them, or to show their probability and prepare for them. For each sensitivity test performed, the impacts in terms of deviations from the central scenario are presented, both in terms of greenhouse gas emissions and energy consumption. The figures displayed are indicative and should be taken as orders of magnitude. Some of these tests (and their possible combinations) form possible variants of the "central" scenario.

The construction of SNBC, including through this prospective modelling **work, is iterative:** it consists of readjusting trajectories and levers to each modelling iteration (so-called 'run'), in order to ensure that targets are achieved by identifying additional measures to compensate for the risk areas identified in the modelling. In practice, iterativeness means identifying levers, assessing their impact, comparing them with the overall climate target and starting again if the latter is not achieved. **The central reference scenario of SNBC 3 is thus the result of several iterations conducted between 2021 and 2026.**

3. A strategy that is part of ecological planning

The National Low-Carbon Strategy, like the other components of the French Strategy for Energy and Climate (SFEC), is part of the ecological planning process[46] initiated in France in 2022 by the President of the Republic in response to the environmental emergency.

Ecological planning sets society in motion to achieve our targets on climate, biodiversity, pollution reduction and the management of water resources in particular, by mobilising all stakeholders: the State, households, businesses and local and regional authorities. This

[43] *By way of example: policies to combat noise and air pollution support the assumptions of converting the vehicle fleet to electric and policies to combat light pollution support the assumptions of reducing public lighting and window lighting.*
[44] *In the case of the examples cited, the developments are reflected in the assumptions relating to street lighting, power supply and the modal share of the bicycle.*
[45] *Citepa's national greenhouse gas emission inventories are established according to internationally shared accounting and control rules. However, uncertainties, which vary according to source types, substances, etc., accompany the inventories. In 2023, the combined uncertainty in % of total emissions, with LULUCF, is estimated at 8%.*
[46] https://www.Gouvernement.fr/france-nation-verte

approach aims to ensure that all decisions that are now made for public policies are consistent with our climate and environmental targets.

This comprehensive approach to the green transition aims to act in a coordinated manner to:

- Reducing greenhouse gas emissions and limiting the effects of climate change;
- Adapting to the unavoidable consequences of climate change;
- Protecting and restoring biodiversity;
- Reduce the exploitation of our natural resources to a sustainable pace;
- Reduce all pollution that impacts health.

It establishes a framework for thinking, action and commitment, so that everyone – citizens, local and regional authorities, businesses, associations – has adapted and ambitious targets and is mobilised within this framework to the extent of its means, competences and impact. **This framework integrates all the themes of the ecological transition** having a direct impact on the lives of French people for tomorrow: better to move, better protect and value our ecosystems, better feed, better produce, better house, better consume, according to the axes fixed by the reference "France nation verte".

The territorialisation of ecological planning is an essential pillar for the success of national work. The latter takes the form, in the territories, of regional Conferences of the Parties (COPs) which make it possible to define regional targets in line with national planning, to mobilise all the actors of the territories and to achieve a 2030 roadmap with concrete actions to be taken to accelerate and implement the ecological transition of each territory, according to the specificities of the latter (see Part Complements - I.C Mobilisation of local and regional authorities). The targets defined through the COPs are reflected in particular, at local level, in the contractualisation of a 'Contract for the success of the ecological transition' (CRTE).

SNBC builds on the work carried out to deliver the first version of the Action Plan to Succeed in the Green Transition, published in summer 2023.

Articulation between the preparatory work for SNBC 3 and the work carried out by the Government in the area of environmental planning.

The preparatory work for SNBC 3 fed into the 'mitigation' part of the work carried out by the Government in the field of ecological planning[47] and was fed back by them:

- **The preparatory work for SNBC 3,** and in particular the first modelling exercise ('run 1') conducted in that context, **fed into the first version of the Action Plan to Succeed in the Green Transition published in the summer of 2023.** [48] This work made it possible, in particular, to set initial sectoral targets for reducing greenhouse gas emissions by 2030 (provisional) and to specify the levers envisaged.

[47] https://www.Gouvernement.fr/france-nation-verte/publications

[48] *This comprehensive plan identifies all the additional levers to be mobilised to achieve our environmental targets (mitigation, adaptation, biodiversity, resources, health and the environment). It can be accessed at the following link: https://www.Gouvernement.fr/upload/media/content/0001/07/dc29785bc6c40139f4b49ee2ac75c2a154856323.pdf*

- These elements were, in turn, taken into account in the second modelling exercise ('run 2'), so as to refine sectoral emission trajectories and targets for 2030.
- The ecological planning work and in particular the sectoral targets were made consistent on the basis of this second modelling iteration and presented in the draft version of SNBC 3 by 2030 agreed between November and December 2024.
- **The third modelling iteration, prepared since early 2025 following the consultation, is the current scenario chosen by the Government.** This scenario made it possible to set sectoral targets for reducing greenhouse gas emissions for 2030 and targets for 2050, specifying the levers envisaged. This document illustrates the trajectories resulting from this scenario, developed for the round of consultations of the mandatory bodies, prior to the adoption of the SNBC.
- This approach illustrates that the work of modelling and setting the target targets, in a coherent manner over the different time horizons and in a complete manner (adequacy need - resource), is an iterative process, in continuous improvement.

Eco-planning provides for regular sector reviews to analyse the results achieved and identify possible corrective measures to be deployed to meet our climate and energy targets. It will thus contribute, even after the adoption of this SNBC, to ensuring its compliance through the adoption of appropriate public policy measures.

In April 2026, in the context of the war in the Middle East, the government presented an electrification plan to reduce dependence on imported fossil fuels and accelerate decarbonisation. This electrification plan was built with all stakeholders, following the green planning approach. The 22 measures presented are the result of these exchanges and target the sectors most dependent on fossil fuels: transport, construction, industry and crafts. This plan must allow a collective mobilization and constitute a turning point in our pace of exit from fossil fuels.

D. An energy and climate strategy based on consultation and dialogue

The State has chosen to **place public debate at the heart of the energy-climate programming exercise.** This programming exercise sets out framework targets, sectoral targets, trajectories and levers for action to support stakeholders. The **State's intention is to ensure the practical implementation of these targets on the ground,** through projects that are fair, realistic and desirable for all French people. To respond effectively to these challenges, identify the social impact of the proposed measures and provide answers, **the development of SNBC 3 is based on extensive consultation and dialogue with many stakeholders (business** representatives, employee representatives, associations, local authorities, NGOs, citizens), which has been ongoing since October 2021.

In this context, **the State has:**

- **Involved all stakeholders** (scientists, economic actors, local authorities, associations, etc.) through a dedicated committee and sectoral experts via workshops and working groups (WGs) to discuss the first hypotheses and levers to be mobilised;
- **Involved citizens** through consultation phases aimed at gathering their guidance on the country's climate and energy policy;

- **Accompanied the economic actors** of the most emitting sectors in the identification of the decarbonisation levers available to them and their operational translation into decarbonisation roadmaps (Article 301 of the Climate and Resilience Law,[49] roadmaps of the sectoral strategic committees of the National Industry Council,[50] roadmaps of the 50 most emitting industrial sites, etc.).

1. A participatory and inclusive process

The preparatory work for the third edition of the SNBC mobilized 5 sectoral working groups (transport, building, agriculture, soil-biomass-forest and industry/waste) and 5 transversal working groups (lifestyles, overseas, consumption-based emissions, economy, local authorities). These WGs, composed of around 100 stakeholders each, were convened several times between 2022 and 2025.

Three national consultations and national-level work have been organised since the end of 2021.

A first public consultation on 12 topics covering a wide range of the challenges of the low-carbon transition was conducted from 2 November 2021 to 15 February 2022. During this consultation, 14,325 contributions and more than 100 actors' notebooks were submitted. The contributions received were the subject of several analyses available online.[51] Cross-cutting to all the themes, **a few key lessons were drawn from these contributions and incorporated into the discussions during the preparation of this SNBC:**

- The contributors expressed **strong expectations of the State's programmatic intervention** via the French Energy and Climate Strategy to set a course, guide and guide the action of stakeholders (local authorities, businesses, citizens) in a spirit of pedagogy, transparency and co-construction with all stakeholders (companies, citizens, environmental associations, experts, etc.). Expectations were also expressed on governance to structure and clarify the policy framework, and on international cooperation, which is essential to address global climate challenges.
- The **use of sufficiency** is widely **perceived as a sustainable and effective solution** that has its place in achieving our climate and energy targets. Sufficiency is included in a broad acceptance. It can be applied at all levels and in all sectors of activity.
- To explain and accompany the behavioural changes needed for the transition, there is a consensus on **the need to step up efforts to raise awareness, pedagogy and educate citizens** in all sectors of intervention.
- Participants also focused **on social justice challenges** in the decarbonisation of our economy. Contributors expressed expectations in terms of supporting households, companies, employees and territories in this transition.

[49] https://www.ecologie.gouv.fr/feuilles-route-décarbonation-des-filieres-plus-émettrices
[50] https://www.conseil-national-industrie.gouv.fr/decouvrez-19-csf
[51] https://concertation-strategie-energie-climat.gouv.fr/

A **second phase of public consultation on the "energy mix of tomorrow"** was launched on 20 October 2022 and ended on 22 January 2023 with a Youth Forum, attended by 200 young people aged 18-35. This citizens' consultation resulted in a Tour de France in each region. The summary of these regional meetings, the table of 31 355 contributions from the online public consultation, the Guarantor Assessment Report[52] submitted on 10 March 2023 and the Government's response[53] are available online.[54] Several **lessons have been learned from this citizens' consultation:**

- **Energy sufficiency has been described as a real social issue,** to be put at the heart of the new model that we need to invent. There is a consensus on the importance of **energy** sufficiency not being limited to an accumulation of individual actions, but being a collective affair involving all stakeholders – the State, local authorities, businesses, etc.
- Citizens demand 'clear, **transparent and easily accessible information for everyone',** from information on their energy consumption to better control it, to information on the various existing aids and the conditions for benefiting from them, to information on the right actions to take. This request for information is in addition to a request for training, from an early age, on the right actions and behaviours to adopt.
- The report makes it very clear that a consensus is emerging on the need **to define a priori our energy needs** and, consequently, to define precisely for each mode of energy production, a clear direction for the years to come. The participants want local and regional authorities to play a central role in this planning.

In addition, as part of the ecological planning requested by the President of the Republic and at the initiative of the Minister for Energy Transition, 7 working groups were created in May 2023 to update our country's energy and climate strategy. These groups, led by local parliamentarians and elected representatives and involving all the relevant stakeholders (professional federations, social partners, experts, environmental and consumer associations, etc.), have been tasked with sharing the constraints facing our country in the context of the various challenges before it, setting out the diagnosis and identifying possible courses of action. They delivered their conclusions in September 2023.[55] These proposals have informed the preparation of this SNBC.

A joint national prior consultation between SNBC 3 and MEP3 was organised from 4 November to 16 December 2024, under the aegis of three guarantors of the National Commission for Public Debate. This consultation enabled the Government to publish the headline targets for 2030 that it planned to include in the third SNBC and to explain the major challenges for the post-2030 period. Events open to the public were organised throughout the consultation, including expert debates on the place of climate foresight modelling exercises, and topics at

[52] https://www.ecologie.gouv.fr/concertation-sur-mix-energetique-publication-du-rapport-des-garants-commission-nationale-du-debat
[53] https://concertation-strategie-energie-climat.gouv.fr/sites/default/files/2024-11/Rapport_en_r%C3%A9ponse_gouvernement_au%20bilan%20CNDP%20concertation%20avenir%20%C3%A9nerg%C3%A9tique-%20vF_0.pdf
[54] https://concertation-strategie-energie-climat.gouv.fr/concertation-notre-avenir-energetique-octobre-2022-janvier-2023
[55] https://www.ecologie.gouv.fr/dossier-presse-travaux-preparation-strategie-francaise-energie-climat-restitution-des-groupes

the heart of the transition such as financing and societal transformations, as well as educational workshops on building 2050 climate scenarios. A significant mobilisation was observed, with more than 7 600 concrete proposals, almost 1.2 million votes and 365 stakeholders' notebooks. The summaries produced, the report on the balance sheet of the guarantors[56] submitted on 24 January 2025 and the Government's[57] reply, are available online[58].

At the end of 2025, on the occasion of the 10th anniversary of the Paris Agreement, the government presented a new version of SNBC 3, the aim of which was to serve as a basis for consultations with the mandatory bodies (National Council for the Ecological Transition, High Council for Climate, National Council for the Evaluation of Standards, Overseas Local authorities and Corsica, Environmental Authority). Out of transparency, this draft SNBC 3 was also published on the website of the Ministry of the Ecological Transition, to enable everyone to familiarise themselves with it and take ownership of it. The various bodies consulted gave their opinions, which the government took into account in the process of finalising SNBC 3.

2. Mobilising economic actors through the development of decarbonisation roadmaps

Achieving the targets of reducing greenhouse gas emissions **requires the mobilisation of economic actors.** In this context, the State assists emitting economic actors in **identifying the decarbonisation levers available to them and translating them into operational decarbonisation roadmaps (Article** 301 of the Climate and Resilience Law,[59] roadmaps for the sectoral strategic committees of the National Industry Council,[60] roadmaps for the 50 most emitting industrial sites, etc.).

Article 301 of the Climate and Resilience Law provides for the development of a strategy for each sector with a high greenhouse gas (GHG) emissions, identifying measures to achieve France's climate targets. This article seeks to encourage economic actors in these sectors to characterise decarbonisation levers (level of emission reduction, cost, technological maturity, etc.), to identify the obstacles to be removed (regulatory, access to investment, etc.) and the concrete actions to be implemented for their activation. **The first roadmaps (automotive, air transport, trucks, maritime, building life cycle, development, digital, arable crops and cattle sectors, milk, meat) drawn up by the sectors in 2023 were made public.** [61]

For industry, the exercise is carried out at the level of each industrial sector. It has been ongoing since 2021, when first roadmaps were published. The decarbonisation ambition and the level of detail of these roadmaps have been gradually strengthened. Roadmaps **have been**

[56] https://concertation-strategie-energie-climat.gouv.fr/sites/default/files/2025-01/20250123-Bilan%20garants%20SNBC%20PPE.pdf
[57] https://concertation-strategie-energie-climat.gouv.fr/sites/default/files/2025-03/250313_R%C3%A9ponse%20du%20gouvernement%20%C3%A0%20la%20concertation%20SNBC-PPE_vF_0.pdf
[58] https://concertation-strategie-energie-climat.gouv.fr/bilan-de-la-concertation
[59] https://www.ecologie.gouv.fr/feuilles-route-décarbonation-des-filieres-plus-émettrices
[60] https://www.conseil-national-industrie.gouv.fr/decouvrez-19-csf
[61] https://www.ecologie.gouv.fr/feuilles-route-décarbonation-des-filieres-plus-émettrices

published for the agri-food, waste processing and recovery, cement, chemistry, mining and metallurgy, paperboard, lime, glass and tiles and bricks sectors.

In addition, at the request of the President of the Republic, the **50 most emitting industrial sites also** worked during 2023 to develop decarbonisation roadmaps. **This work resulted in the signature, on 22 November 2023, of green transition contracts with the State, reflecting the willingness of public authorities and companies to act in favour of decarbonisation.** [62]

These roadmaps have been the subject of in-depth exchanges between the sectors and the State and have **fed into the ecological planning projects, without being binding on the State.** Indeed, at this stage these roadmaps have been designed by the sectors considering their specific need. However, they show a real ownership of the challenges of ecological transition by economic sectors and main emitting sites. **It is essential for the Government to involve all stakeholders, who are the actors on the ground in the implementation of the transition.**

These roadmaps were developed prior to the finalisation of this SNBC and may be updated iteratively to reflect this SNBC.

[62] *https://www.entreprises.gouv.fr/fr/publication-contrats-transition-ecologique-50-sites-industriels*

Les grands objectifs
de la Stratégie nationale bas-carbone 3

II - The main targets of the National Low-Carbon Strategy 3

A. France's trajectory in relation to its current targets

1. Back on past greenhouse gas emission trajectories

a. Territorial emissions down since 2005 and a 2019-2023 carbon budget respected

France's greenhouse gas emissions excluding carbon sinks **have decreased overall since 2005 with an acceleration of this decline between 2018 and 2023:** annual decrease of -4.1% in 2018, -2.2% in 2019, -9.2% in 2020, +6%in 2021 (but reflecting a decrease of 3.7% compared to 2019, pre-health crisis year), -3.9% in 2022 and -6.8% in 2023. The pace of decline slows in 2024 and 2025, with -1.8% in 2024 and -1.5% in 2025 according to the first estimates published in 2025 and early 2026.[63]

Between 1990 and 2024, greenhouse gas emissions in France excluding carbon sinks (i.e. excluding LULUCF - Land Use, Land Use Change and Forest) decreased **by 32% according to provisional data (Secten 2025),** representing a **decrease of -177 Mt CO_2e**, with **an acceleration of the rate of decline over the recent period** (average annual decrease of -12.8 Mt CO_2e observed over the period 2019-2024, average annual decrease of -2.8 Mt CO_2e observed over the period 2015-2018).

[63] *2025 edition of the Citepa Secten report; Citepa Quarterly Barometer, April 2026*

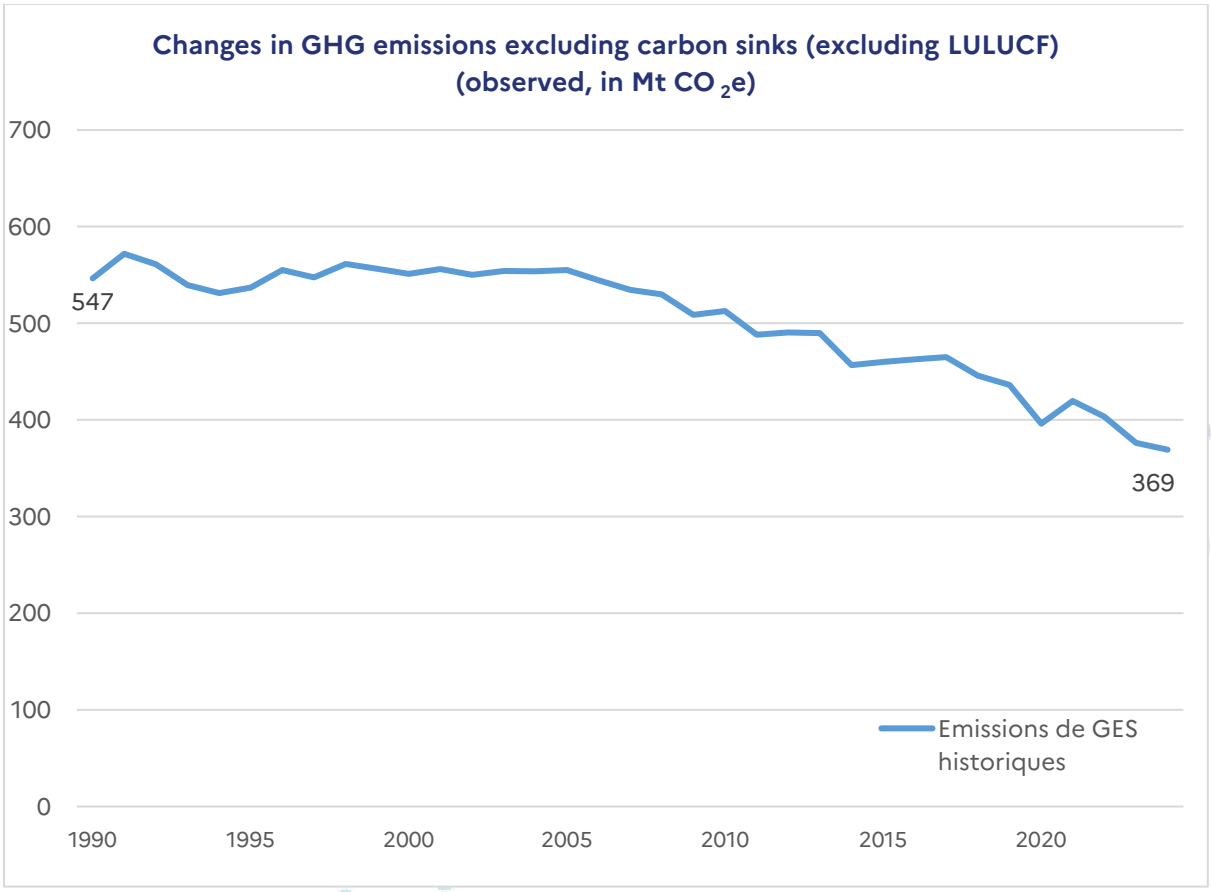

Figure: 5 *Evolution of GHG emissions (Mt CO_2e) excluding carbon sinks. (Source: evolution 1990-2024: National Inventory of Greenhouse Gas Emissions, Citepa, Secten 2025)*

The comparison of France's emissions (based on the most up-to-date inventories) with the "carbon budget"[64] for the period under consideration is a key indicator for monitoring the implementation of the strategy.

The first carbon budget of SNBC 1 [65](SNBC 1 adopted by decree in November 2015) covered the period 2015-2018. It amounted to 442 Mt CO_{2e} per year on average, excluding emissions and removals associated with land use and forestry ('carbon sinks'). This first carbon budget was exceeded by 61 Mt CO2e cumulatively over the period 2015-2018 (i.e. +3.4% over the whole period).

The SNBC 2 adopted in 2020 set new carbon budgets for the periods 2019-2023, 2024-2028 and 2029-2033.

[64] *GHG emission ceilings not to be exceeded in total over a given period.*
[65] *Decree No 2015-1491 of 18 November 2015 on national carbon budgets and the national low-carbon strategy.*

2023 marked the end of France's second carbon budget (period 2019-2023).[66]

According to the national inventory in Secten format for 2025, **SNBC 2's carbon budget (in force) for the period 2019-2023 would be respected, with and without carbon sinks** (LULUCF – Land Use, Land Use Change and Forest sector):

- Total emissions excluding LULUCF amount to **406 Mt CO_{2e} on average** over the period, with a carbon budget of 425 Mt $CO_{2e/year}$ on average.[67]
- Total emissions with LULUCF amount to **370 Mt CO_{2e}** on **average** over the period, with a carbon budget of 380 Mt $CO_{2e/year}$ on average.

This review differs from the provisional review proposed in the draft SNBC 3 submitted for consultation in November 2024, where non-compliance with the carbon budget with sinks (+15 Mt CO_2e cumulative over the period 2019-2023) was anticipated, given a better result for 2023 than expected via the previous Secten (-6.8% gross decrease in GHG emissions between 2022 and 2023) and the inclusion of deadwood in the LULUCF sector as provided for in the EU LULUCF Regulation and the IPCC Guidelines. This smooths carbon emissions from deadwood over the period, instead of considering that all carbon is released at the time of tree death and leads to a significant review of the recent historical trajectory[68] of the LULUCF sector (see details in Part SNBC - III.G.).

The carbon budget of SNBC 2 for the period 2019-2023 excluding carbon sinks was respected with a margin of 91 Mt CO_2e cumulated over the period 2019-2023, making it possible to compensate for non-compliance with the first carbon budget: emissions reached 436 Mt CO_{2e} in 2019, decreased to 396 Mt CO_{2e} in 2020 (mainly due to the COVID-19 crisis), increased to 420 Mt CO_{2e} in 2021, decreased to 403 Mt CO_{2e} in 2022 and then to 376 Mt CO_{2e} in 2023 based on the latest Citepa estimates (Secten 2025).

Given the significant reductions in GHG emissions excluding carbon sinks, the carbon budget with carbon sinks for the period 2019-2023 is respected with a margin of 48 Mt CO2e cumulated over the period 2019-2023.

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[66] https://www.ecologie.gouv.fr/politiques-publiques/suivi-strategie-nationale-bas-carbone#cloture-des-budgets-carbone-2

[67] *The Environmental Code (Article D. 222-1-B) provides for a technical adjustment of the carbon budgets for each period if the changes in the methodology of the greenhouse gas emission inventories lead to changes of more than 1% of the values of the reference years used for the SNBC scenarios. These "technical" adjustments are intended to maintain the consistency of the trajectory initially chosen, maintaining the same sectoral and gas reductions in "relative value". The Code provides for this technical adjustment to take place at the time of the closure of the carbon budget. This adjustment was made in 2025 on the basis of consolidated inventory data for the year 2023 (Secten 2025). These adjustments lead to a carbon budget without sinks of 425 MtCO₂e / year on average (deviation of + 3 MtCO₂e / year from the initial budget) and a carbon budget with sinks of 380 MtCO₂e / year on average (deviation of -3 MtCO₂e / year from the initial budget). For more information: https://www.ecologie.gouv.fr/public-policies/follow-up-national-low-carbon strategy #adjustment-technical-of-budgets-carbon-1*

[68] *In recent years, the difference for a given year between Secten 2024 and Secten 2025 is greater than +10 Mt CO_{2e}, the difference being smaller for older years (less than 5 Mt CO_{2e}).*

The **LULUCF (Land Use, Land Use Change and Forest) sector is currently a net carbon sink.** This means that it generates more CO2 removals than emissions. For the **time being, this is the only way for France to generate CO2 removals. For recent years (2017 to 2024), the Citepa estimates that this net sink represents an annual average of -35 Mt CO_2e**. Strongly increasing during the period 1990-2000 (with a peak at -56 Mt CO_{2e} in 2004), this sink has declined significantly since then (estimated at -37 Mt CO_{2e} in 2024).

Given the significant fall in the level of the forest sink, affected by droughts, fires and health crises (scolytes), which had not been anticipated by SNBC 2, **France has not reached the carbon budget for the LULUCF sector (removals of -36 Mt CO_2e on average over the period, against a carbon budget of -45 Mt CO_2e/year on average, i.e. a difference of +43 Mt CO_2e cumulatively, over the period 2019-2023).** However, the Government is mobilized, via a balanced approach to the various issues relating to the forest, to preserve the carbon sink. These measures aim in particular, to strengthen the resilience of our forests, a massive adaptation of stands and species as well as the strengthening of fire defense. However, the results of these public policies are not very quantifiable, particularly in short time frames. The carbon sink of new and more resilient installed stands will only be significant by 2045 or 2050. The Government will continue and amplify its efforts to preserve this sink.

Annual emissions (in Mt CO_{2e})	Carbon budget 2 (2019-2023) (technically adjusted in 2025[69]) Deviation from the indicative annual carbon budget in Mt CO_{2e} (deviation calculated on the basis of the Secten 2025 report)					
	2019	2020	2021	2022	2023	2019-2023
Transport	+ 1	- 19	- 2	+ 6	+ 3	- 11
Buildings	- 7	- 9	- 2	- 10	- 14	- 42
Agriculture	- 2	- 1	- 1	- 3	- 3	- 9
Industry	+ 1	- 5	+ 3	- 2	- 8	- 11
Energy production	- 5	- 11	- 6	- 2	- 5	- 29
Waste	+ 2	+ 2	+ 2	+ 2	+ 3	+ 10
Land Use, Land Use Change and Forestry (LULUCF)	+ 11	+ 8	+ 10	+ 10	+ 6	+ 43
Total (excluding LULUCF)	- 9	- 43	- 6	- 9	- 24	- 91
Total net (with LULUCF)	+ 1	- 35	+ 3	0	- 18	- 48

Table: 1 *Carbon budget balance covering the period 2019-2023*

b. Significant progress, despite variable sectoral balance sheets

SNBC 2 has been the subject of several evaluations:

- In accordance with the law, **the High Climate Council (HCC) has been drawing up an annual report since 2019** on compliance with the trajectory for reducing greenhouse gas emissions (and in particular SNBC's 'carbon budgets') and on the adequacy of the policies and measures deployed by the State with regard to France's climate ambition. These reports are made public[70] and the Government responds by presenting the measures implemented and those planned in response to the recommendations and proposals of the HCC;[71]

[69] *In accordance with the Environmental Code (Article D. 222-1-B), a technical adjustment of carbon budgets was carried out on the basis of Citepa's 2025 Secten inventory with regard to changes in greenhouse gas emissions accounting for inventories.*

[70] https://www.hautconseilclimat.fr/publications/

[71] *The Government's response to the 2025 annual report of the High Climate Council can be found here:* https://www.hautconseilclimat.fr/wp-content/uploads/2026/01/Réponse-au-rapport-HCC-2025_vdef-avec-synthese.pdf

- **At the same time, the State monitored the implementation of SNBC 2 through a set of 160 indicators,** broken down into several categories. The latest version of the SNBC 2 monitoring indicators is available at the following link: https://www.ecologie.gouv.fr/politiques-publiques/suivi-strategie-nationale-bas-carbone

In parallel, the Government carried out **a review of the sectoral dynamics observed during the period covered by the last carbon budget (2019-2023)** to analyse the deviations (upwards or downwards) from the guidelines of SNBC 2 which had been used to set the targets. This assessment is presented in a comprehensive manner in the accompanying report of the SNBC 3, and a summary of the various sectoral analysis is presented here.

Buildings

Over the period 2019-2023, favourable climatic conditions allowed the **buildings sector** to record lower actual emissions than would have been observed under normal climate conditions. Although compliance with the share of the carbon budget allocated to buildings is not called into question without the climate effects, the margin is greatly reduced: taking the sector's climate-adjusted emissions data, it is now only 5 Mt $CO_{2e,}$ compared to 8 with actual emissions. The decarbonisation of the sector is partly due to the reduction in non-climate related energy consumption, particularly on the heating substation, attributed to two factors: on the one hand, aided thermal renovations of buildings, which have led to significant conventional energy gains, and on the other hand, changes in the consumption of stakeholders and in particular an increase in sufficiency. The reduction in emissions observed in the sector is also associated with the decarbonisation of the energy mix, which may be influenced by a price effect, particularly on gas. Efforts must therefore continue to sustain the decline in emissions in this sector.

Energy production and transformation

In the **energy production and processing sector,** rising energy costs, linked to the international geopolitical situation, as well as calls for sufficiency by the government, have contributed to reducing energy demand. The climatic conditions also participated. On the power generation side, the discovery of the stress corrosion phenomenon reduced the supply of decarbonised electricity, requiring greater use of fossil fuels, especially in 2022. As regards the integration of renewable energies, the observation is similar: if the amounts of renewable energy injected into the grid follow the trajectory of the SNBC 2 reference scenario, the capacity deployment targets as set out in MEP 2 are not met. The decarbonisation of heat production systems is on track: for district heating, while the share of renewable energy and recovery is ahead of energy planning targets, the total volume of heat delivered is lagging behind.

Agriculture

The reduction in emissions from the **agricultural sector** is driven by lower emissions from livestock and crops. Decreased fertiliser deliveries over the period reduced crop-related emissions. Although this indicator is growing faster than projected in the SNBC 2 reference, this is largely due to the sharp increase in fertiliser prices.

Transport

As regards **transport,** the covid crisis has played an important role in meeting the targets set by SNBC 2. The trend increase in passenger travel volume was lower than projected in the reference scenario, linked to travel restrictions in 2020 and 2021, and weaker-than-expected socio-economic conditions. Total mobility has remained below its pre-crisis level, as the development of teleworking has led to a reduction in short-distance travel. The modal shift for passengers has been from carbon-intensive modes (car, aircraft) to low-carbon modes (mass land transport and cycling), although it remains below the targets of SNBC 2. The use of urban public transport has declined slightly following the health crisis, in connection with the development of teleworking, but is on the rise again. Rail traffic is on the other hand dynamic, hexagonal air traffic is declining, in a modal shift favorable to rail. Cycling has made significant progress in relation to the development of cycling facilities, although it does not reach the target of SNBC 2. The electrification of passenger car sales far exceeds the targets set by SNBC 2, with the share of electric cars in the fleet remaining moderate for the time being given the recent nature of electrification. The overall slowdown in sales has limited energy efficiency gains, limiting the penetration of less emitting vehicles into the fleet. As regards freight transport, socio-economic conditions have also slowed down transport volumes, while modal shift, in particular to rail freight, has been somewhat delayed.

Industry

For the **industrial** sector, energy consumption decreased between 2019 and 2023, partly due to energy efficiency measures undertaken by industry and supported by the State and to sufficiency efforts made by the sector, but also due to the increase in energy costs suffered by the sector in 2022 and 2023. Production volumes of energy-intensive industries declined sharply over the last two years of the period. Similarly, the energy mix of industry has been largely transformed by the impact of this energy crisis: the share of gas decreased over the period contrary to the assumptions in the SNBC 2 reference scenario, when the use of marketed heat increased significantly. Compliance with the carbon budget was also enabled by the reduction of emissions from industrial processes, which decreased faster than emissions associated with combustion over the period.

Waste

Although the volume of household and similar waste treated decreased between 2019 and 2023, and the energy and material recovery sectors have progressed, even unevenly, the waste sector is still struggling to decarbonise. This is mainly due to the decomposition of methane in the NSDIs, whose capture rate is decreasing over the period, and remains well below the projections in the SNBC 2 reference scenario.

LULUCF

It should be noted that **the LULUCF sector** is a sector where the uncertainty of current and projected results remains significant at present. The forest crisis experienced by the French territory over the period 2019-2023 does not allow the sector to respect its share of the carbon budget set. Slower tree growth, increased mortality and removals result in a decrease in the amount of carbon sequestered annually by forest ecosystems (although the carbon stock

continues to grow). In addition, the forest contributes downstream to carbon sequestration through the use of wood-materials. Although there is a growth in the harvest for wood energy, this seems to be accompanied by a decrease in self-consumed volumes, indicating a gradual structuring of the sector. The share of wood allocated in-fine (first use and processing residues) for material uses is ahead of the SNBC 2 scenario (35% in 2021 compared to 30% projected in 2030 in SNBC 2).

c. A decreasing consumption-based emissions since 2008

France's consumption-based emissions is the measure of greenhouse gas emissions due to French consumption, whether they took place domestically or abroad. According to the most recent estimate by INSEE and SDES,[72] **it reaches 563 Mt CO_2e, i.e., reduced to the total population, 8.2 t CO_2e/inhabitant in 2024.** The consumption-based emissions consist of half domestic emissions and half imported emissions. The French consumption-based emissions increased towards the end of the 1990s before reaching their peak in 2008 (816 Mt CO_2e). **Since then, the French consumption-based emissions have decreased by an average of 2.3% per year and decreased by 25% in 2024 compared to 2010.** This reduction is mainly explained by the fall in domestic emissions, which is faster than the fall in imported emissions: the latter decreased by 20% in 2024 compared to 2010, while over the same period, emissions from domestic production and direct emissions from households decreased by 29%.

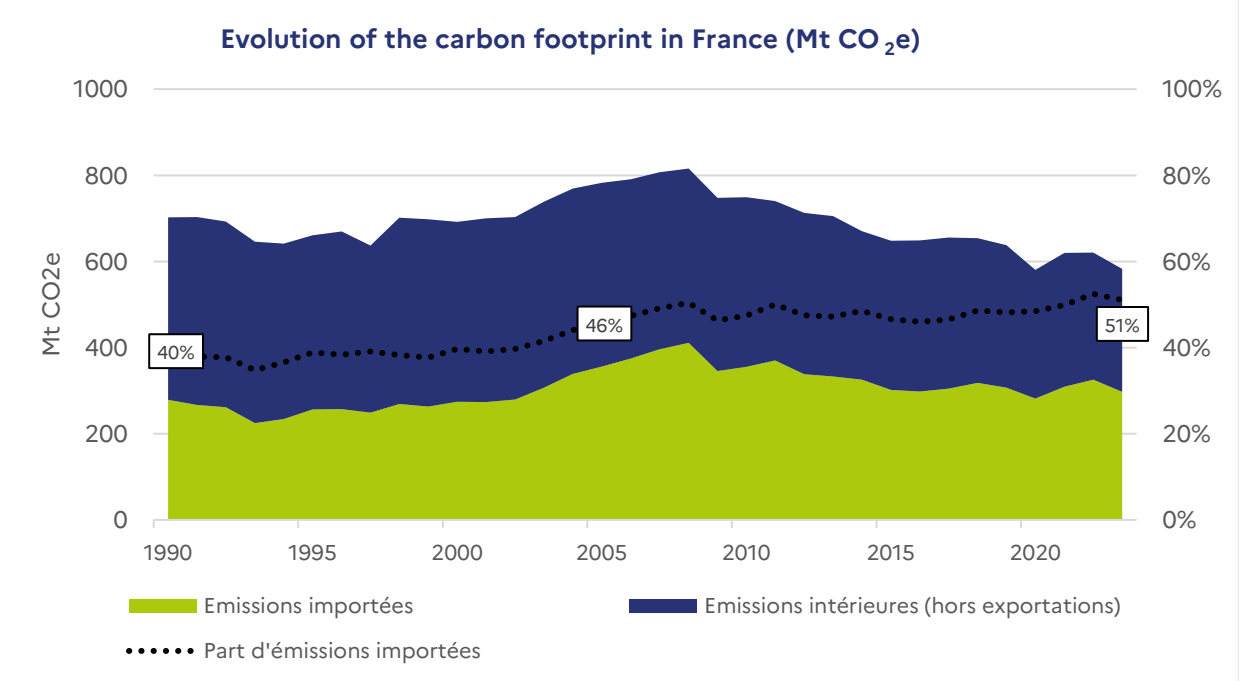


Figure: 6 *Evolution of the consumption-based emissions in France (Source:* Insee; Eurostat; Customs; Citepa; OECD. Treatments: Insee and SDES, 2025)

[72] *France's carbon footprint from 1990 to 2024,* Manuel BAUDE, SDES and Sylvain LARRIEU, Insee, 16/10/2025

2. Presentation of the forecast trajectory with existing measures (known as "WEM")

France regularly produces a scenario "with existing measures" or "WEM". The WEM scenario is an energy-climate scenario that shows national energy and greenhouse gas consumption trajectories both globally and in each of the main emitting sectors, **considering the effect of all existing policies and measures,** assuming no additional measures are put in place.

It helps to inform public decision-making by indicating the current trajectories on which the policies adopted put us. Comparing the WEM scenarios and monitoring the progress of trajectories from one exercise to another makes it possible to measure both the effects of the new public policies adopted and the gap to be filled in order to achieve the targets that France has set itself. With each new financial year, new measures (or removals of measures) are taken into account, as well as the latest historical trends making it possible to assess the effect of existing measures as closely as possible.

The latest version of the WEM scenario available at the time of publication of that SNBC 3 is the WEM scenario constructed in 2024. It incorporates the latest available data, as well as the impact of policies and measures adopted up to 31 December 2023.

In this 'WEM 2024' scenario, **a -39.5% reduction in GHG emissions (excluding carbon sinks) compared to 1990 is achieved in 2030, very close to the target set in SNBC 2 to reduce France's** GHG emissions excluding carbon sinks by 40% in 2030 compared to 1990. **By 2050, the WEM 2024 scenario achieves a 57% decrease in emissions (excluding carbon sinks) compared to 1990.**

The comparison with the previous year "WEM 2023" [73] - which only took into account the measures adopted until the end of 2021 - shows that the policies and measures adopted from the beginning of 2022 to 31 December 2023 would lead to an additional reduction in emissions of the order of 15 Mt CO_{2e} in 2030 and of the order of -38 Mt CO_{2e} in 2050. The main measures adopted in 2022 and 2023 taken into account for the modelling are:

- **At European level,** Regulation (EU) 2023/851 of the European Parliament and of the Council on the strengthening of CO2 emission performance standards for new passenger cars and new , light commercial vehicles to be revised; Regulation (EU) 2023/2405 of the European Parliament and of the Council of 18 October 2023 on ensuring a level playing field for sustainable air transport (known as ReFuelEU Aviation) and Regulation (EU) 2023/1805 of the European Parliament and of the Council of 13 September 2023 (known as FuelEU Maritime);

[73] *The AME 2023 scenario can be accessed at the following links: https://reportnet.europa.eu/public/dataflow/890; https://www.ecologie.gouv.fr/sites/default/files/20230502%20Synth%C3%A8se%20du%20sc%C3%A9nario%20AME2023%20-%202.pdf*

- **At national level,** the French National Strategic Plan (NSP) sets out the new Common Agricultural Policy; the Law of 10 March 2023 on the acceleration of renewable energy production (Law APER) and the Law of 22 June 2023 on the acceleration of procedures related to the construction of new nuclear installations; Law No 2023-973 of 23 October 2023 on green industry;
- **As well as:** the law of 18 December 2023 on the programming of public finances for the years 2023 to 2027 and the 'France 2030' investment plan.

The following figure shows the gross greenhouse gas emission trajectories in the WEM 2024 and compares them with previous versions (WEM 2021 and WEM 2023), as well as with the trajectories of the scenario of SNBC 2 and the scenario of SNBC 3. It illustrates both the progress made thanks to the policies and measures adopted in recent years and the path still to be taken to achieve France's greenhouse gas reduction targets.

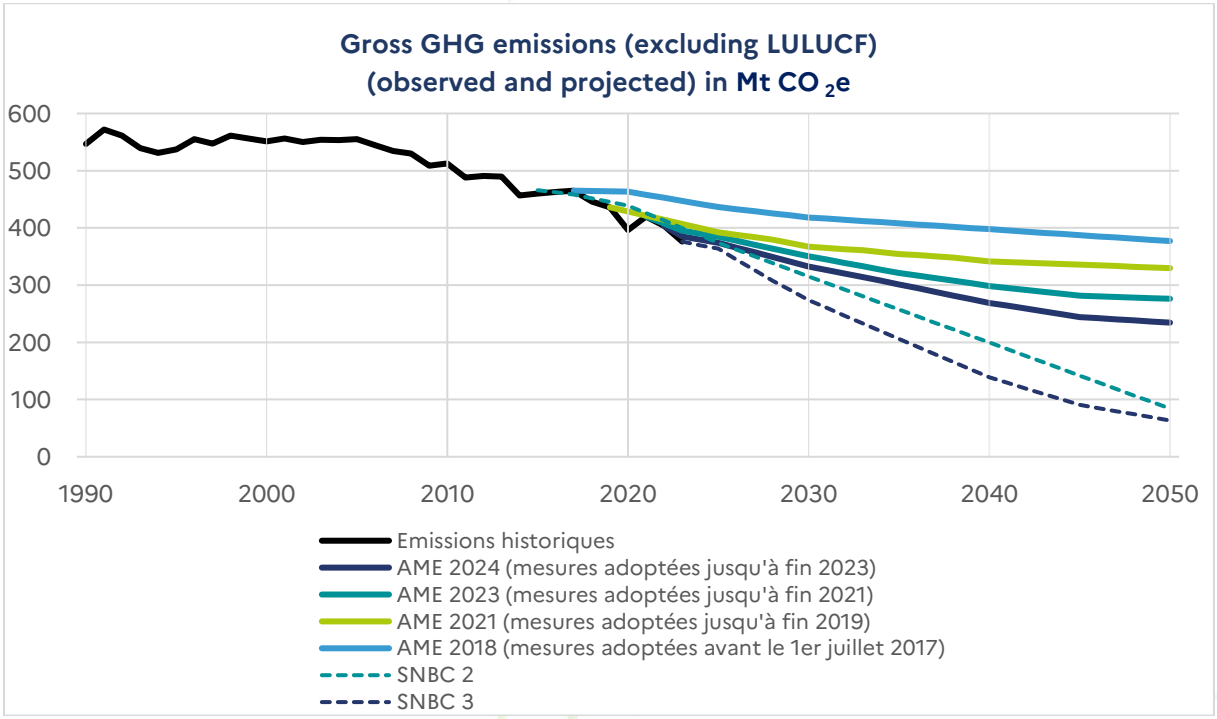


***Figure: 7** Trends in emissions of greenhouse gases excluding carbon sinks in Mt CO_{2e} - WEM scenarios (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC Modelling)*

B. Ambitious strategic targets to combat climate change

Through the SNBC, France sets out its roadmap for climate change mitigation in the short, medium and long term.

This SNBC 3 reflects the strategy chosen to meet the 7 main strategic targets that France sets itself, and to respect the carbon budgets (see Part SNBC - II.C).

These strategic targets are grouped in the following table.

Strategic targets of SNBC 3	Historical value (2023)	Targets
Reduce gross territorial emissions (excluding carbon sinks) in 2030	373 Mt CO_{2e} (excluding LULUCF)	-50% compared to 1990
Achieving climate neutrality in 2050	339 Mt CO_{2e} (with LULUCF)	Division of gross emissions by a factor greater than 6 compared to 1990[74] Climate neutrality in 2050
Ensuring energy sovereignty and moving away from fossil fuels	Fossil fuels account for 57% of final consumption	Coal exit in 2030 Outflow of oil by 2040-2045, outflow of fossil gas by 2050 Availability of energy resources in electricity and biomass needed for decarbonisation(, exit from imported fossil fuels
Reducing our final energy consumption	1509 TWh	1243 TWh in 2030 or about -29% compared to 2012 -50% in 2050 compared to 2012
Consolidating the natural carbon sink	-37 Mt CO_{2e}	Improvement of -7 Mt CO_{2e} between the average of 2016-2018 and 2030, as measured in the inventories to be submitted in 2032
Ensuring a just and sustainable transition		Preserving the competitiveness of economic activities, developing jobs and growth in a dynamic of reindustrialisation. Preserve the purchasing power of households. Target the action plan on the most effective measures by ensuring that the carbon content of imports is not increased.
Reducing France's consumption-based emissions	583 Mt CO_{2e} or 8.5 t CO_{2e}/inhabitant	Indicative carbon budgets indicated in part SNBC II.C Achieve between 160 Mt CO_{2e} and 215 Mt CO_{2e} in 2050 i.e. -71 % to -79 % compared to 2010

Table: 2 *Strategic targets of SNBC 3*

[74] *Target introduced by Law No 2019-1147 of 8 November 2019 on energy and climate and included in Article L. 100-4 of the Energy Code. Modelling carried out as part of the preparation of this SNBC shows that achieving climate neutrality would henceforth imply a division by a factor of more than 8 of our emissions in 2050 compared to 1990.*

Figure: 8 *The 7 main strategic targets of SNBC 3*

Beyond these targets, in line with the ecological planning published by the Government, SNBC 3 pursues the following sectoral targets of reducing GHG emissions. These targets take into account the specificities of each emitting sector and their differentiated emission reduction potentials (e.g. the lowest mitigation potential of the agricultural sector due to the partly incompressible nature of its emissions, in particular those related to ruminant biology (enteric fermentation) and the biogeochemical cycle of nitrogen (fertilisation)).

These sectoral targets are accompanied by 'physical sub-targets' set out in Chapters SNBC – III, IV and Supplements – I, for example the rate of electrification of passenger cars, the number of major renovations, the volumes of waste stored in ISDND, etc.

Sectoral targets of SNBC 3	Historical value (2023)	2030 targets	Modelling results up to 2050
Transport (in Mt CO_2e)	126	92 i.e. -26% compared to 1990	0,6
Agriculture (in Mt CO_{2e})	76	68 i.e. -27% compared to 1990	43
Industry (excluding sinks) (in Mt CO_{2e})	63	42 i.e. -70% compared to 1990	6 *(and 6 technological sinks)*
Buildings (in Mt CO_2e)	57	36 i.e. -61 % compared to 1990	3

Energy production (excluding sinks) (in Mt CO_{2e})	**37**	**24** **i.e. -70%** compared to 1990	**3** *(and 9 technological sinks)*
Waste (in Mt CO_{2e})	**16**	**12** **i.e.** -28% compared to 1990	**8**

Table: 3 *Sectoral targets for reductions in greenhouse gas emissions of SNBC 3*

The following figure illustrates the distribution of emissions between the different emitting sectors.

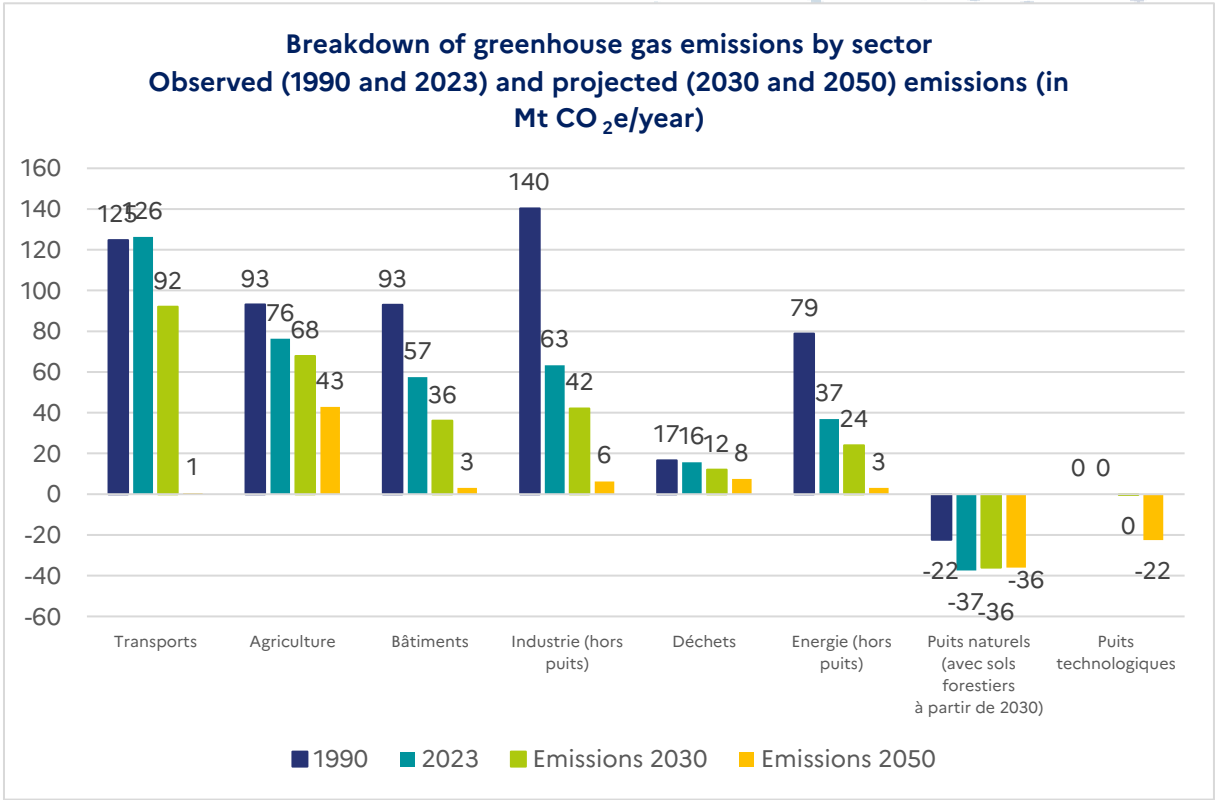


Figure: 9 *Breakdown of gross GHG emissions by sector (Sources: Citepa National Greenhouse Gas Emission Inventory - Secten 2025, DGEC modelling – WAM run 3).*

The following figure illustrates the trajectory of decreasing GHG emissions and increasing carbon sinks between 1990 and 2050.

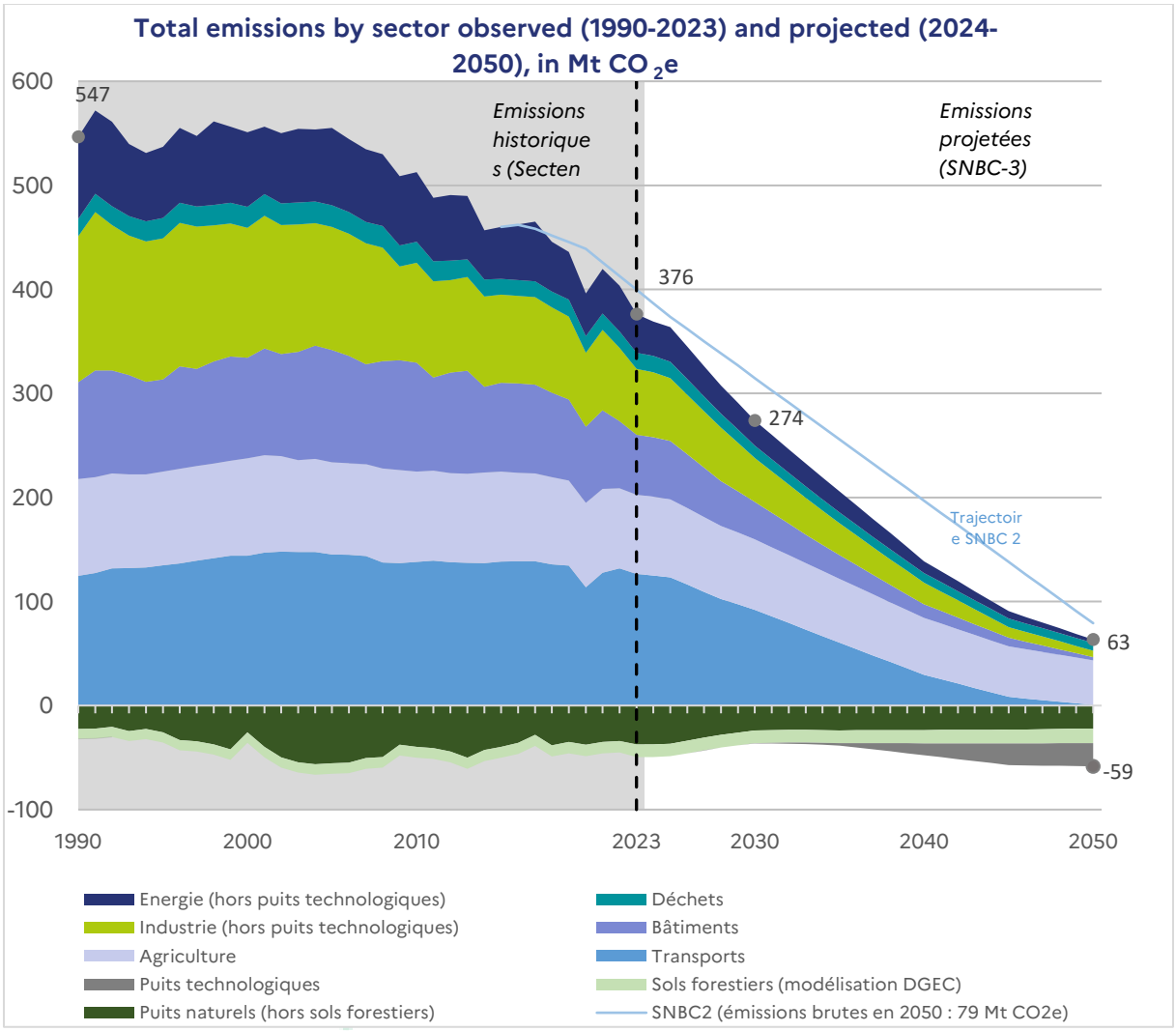


***Figure: 10** Trends in territorial greenhouse gas emissions (Sources: Citepa National Greenhouse Gas Emission Inventory - Secten 2025, DGEC modelling – WAM run 3)*

Even beyond achieving climate neutrality in 2050, reducing cumulative emissions by 2050 is key to limiting global warming. Indeed, the quasi-linear relationship between cumulative CO_2 emissions and the increase in average surface temperature shows that the climate impact depends on all past and future emissions. The challenge, therefore, lies not only in the target level of emissions in 2050, but also in the form of the reduction trajectory that should allow emissions to be contained throughout the period. The following figure thus illustrates the evolution of cumulative greenhouse gas emissions according to this SNBC 3 and SNBC 2[75] since

[75] *SNBC 2 was adopted by decree on 21 April 2020. It can be accessed at the following link: https://www.ecologie.gouv.fr/politiques-publiques/strategie-nationale-bas-carbone-snbc-2-vigueur*

1990. **SNBC 3 reduces cumulative gross greenhouse gas emissions to the atmosphere by 1.1 billion tonnes by 2050 compared to SNBC 2.**

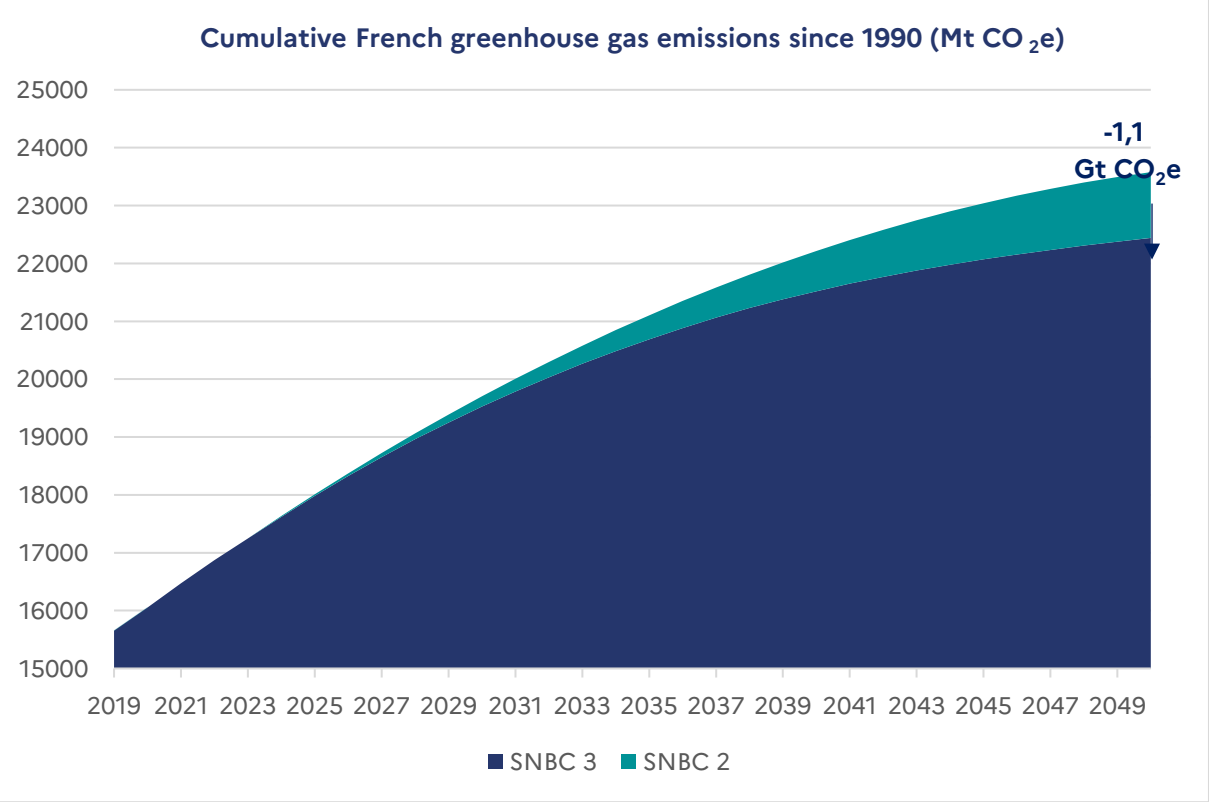


***Figure: 11** Cumulative gross territorial greenhouse gas emissions between 1990 and 2050 according to SNBC 3 and SNBC 2 (Sources: Citepa National Greenhouse Gas Emission Inventory - Secten 2025, DGEC modelling – WAM run 3, SNBC 2)*

To achieve these targets, the strategy is based on realistic assumptions to ensure a fair and effective mobilisation of levers to reduce greenhouse gas emissions. In particular, it is based on a reasoned solicitation of the levers of sufficiency, associated with a change in consumption patterns, **and energy efficiency**, to the maximum of the technologies known today.

In the long term, it is not based on major technological bets, while realistically and ambitiously using a number of new technologies (carbon capture and storage, industrial processes, etc.) in a manner consistent with international projection exercises (IPCC, International Energy Agency, European Commission).

Over the period 2023 – 2050, the weight of each of the levers in the strategy was calculated on the basis of the indicative decompositions of the levers of each sector presented in the document. Electrification of uses accounts for 41% of emission reductions, improving energy efficiency 15%, mobilising biomass 13%, sufficiency 11%, carbon capture and storage and low-carbon production, each accounting for 10%. These estimates relate only to emission reductions and may mask the weight of certain levers in other dimensions (in particular in terms of reducing household bills, reducing energy consumption, etc.).

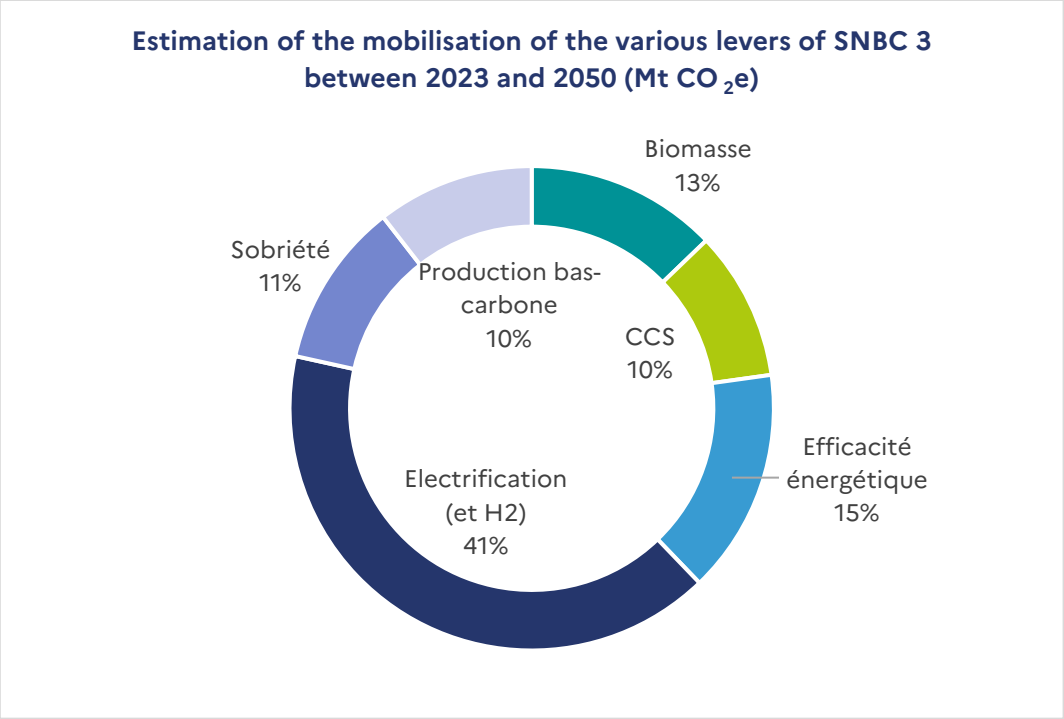


Figure: 12 *Estimated share of each lever in greenhouse gas emission reductions in SNBC 3.*

SNBC 3 presents a number of public policy orientations (sectoral, consumption-based emissions and cross-cutting) to achieve these targets. These guidelines are based on sectoral policies already adopted, which will have lasting effects on the reduction of greenhouse gas emissions, **their reinforcement over time, as well as additional public policies to be initiated.** The guidance detailed in this document may also be complemented by additional measures to achieve all targets by 2030 and 2050.

The SNBC 3 guidelines were built around the following plan for each emission sector (transport, agriculture, buildings, industry, waste, energy production and transformation, natural carbon sinks), the reduction of the consumption-based emissions, and each cross-cutting issue (State, businesses, local authorities, citizens, spatial planning, research, economy, jobs, digital):

- Description of the state of play and challenges of each theme (historical broadcasts, public policies, etc.);
- Presentation of the Strategy consisting of:
  - A presentation of the levers of actions and their impacts in terms of GHG emission reductions, in the form of 'cascade charts';
  - A table of the main physical sub-targets;
  - public policy guidelines;
  - The list of assumptions of the reference scenario accompanied for some sensitivity tests to illustrate alternatives and the associated consequences (order of magnitude of the impacts on emissions and energy consumption). Some assumptions may differ from the physical sub-targets chosen, where all levers to achieve the targets are not identified, or where the scenario retains a single crossing point where the targets are presented in ranges.

1. Strategic target 1: Halving territorial emissions (excluding carbon sinks) by 2030 compared to 1990

By 2030, in line with European climate commitments, **France has set itself the target of reducing its GHG emissions** (excluding the LULUCF sector and technology sinks) **by around -50% compared to 1990** (i.e. reducing its non-well emissions by around 275 Mt CO2e in 2030).[76]

Since emissions and removals from the land use and forestry (LULUCF) sector are difficult to control and particularly uncertain, with public policy results that are not very quantifiable over short periods of time, this sector should be treated separately (see Target 5).

On the scope of the so-called *Effort Sharing Regulation* (ESR), which sets out the rules for the allocation of GHG emission reduction targets for 'historic' European non-carbon market sectors (ETS 1) (road transport, buildings, agriculture and waste), the revised regulation, which entered into force in 2023, assigned France a **new GHG emission reduction target of 47.5% (instead of -37% previously) by 2030 compared to 2005.** France's compliance with the ESR Regulation concerns two 2021-2025 and 2026-2030 carbon budgets defined by a trajectory of emission reductions reaching the 2030 target, with flexibilities to achieve them. **The trajectory of this SNBC 3 aims to meet the ESR targets for France.**

The SNBC 3 scenario achieves a 50% reduction in territorial emissions in 2030 compared to 1990 and thus draws a more ambitious scenario than that of SNBC 2.

Achieving this target means reducing our emissions (excluding carbon sinks) by approximately 100 Mt CO2e between 2023 and 2030[77], i.e. reducing our GHG emissions by an average of 5% each year by 2030, compared to an average of 3% from 2017 to 2023. This acceleration calls for the mobilization of all and transformations in all GHG emitting sectors of our economy. As shown in the following figure, the scenario of SNBC 3 lowers territorial emissions (excluding carbon sinks) to 274 Mt CO2e in 2030.

On the scope of the so-called 'effort sharing' regulation ('road transport, buildings, agriculture and waste'), the Commission published the revised annual allocation trajectories for the years 2023, 2024 and 2025. For the 2026-2030 annual allocations, the Commission has published estimates that will be reviewed against a comprehensive review of 2021, 2022 and 2023 ESR emissions.

The SNBC 3 scenario aims to comply with ESR allocations by 2030.

[76] *The previous SNBC (SNBC 2) adopted by decree in April 2020, aimed to reduce France's greenhouse gas emissions, excluding the land and forest sector (LULUCF), by at least 40% in 2030 compared to 1990, and to achieve climate neutrality by 2050.*

[77] *According to the 2025 edition of the Citepa Secten report.*

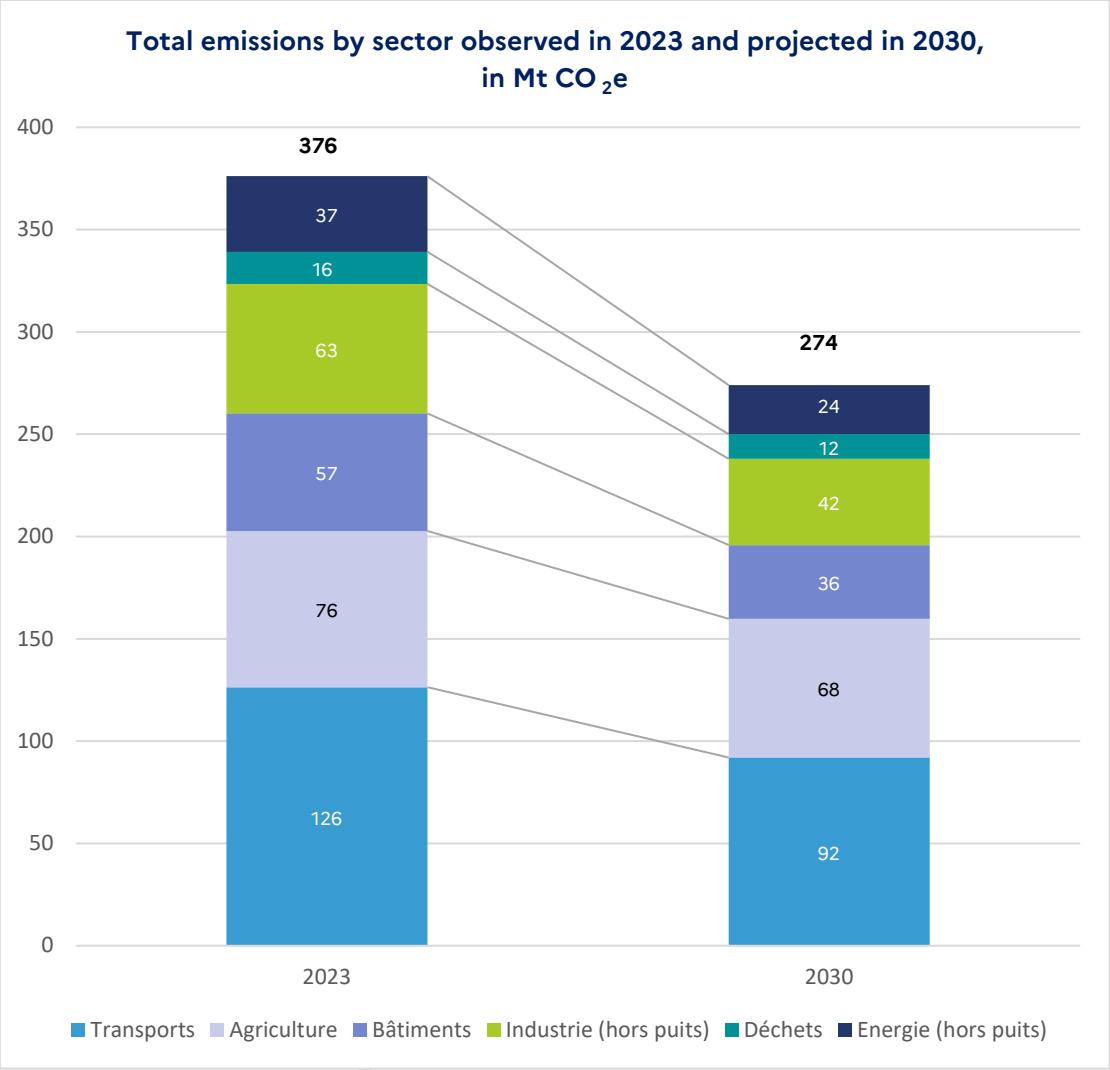


Figure: 13 *Greenhouse gas emissions in Mt CO_{2e} per sector in 2023 (historical) (excluding carbon sinks) and 2030 (projected in the SNBC 3 reference scenario) (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC Modelling – WAM run 3)*

<u>In 2040: a crossing point of the SNBC scenario compatible with the amended European Climate Law, adopted in March 2026</u>

The 2040 horizon is also the subject of specific attention in that SNBC 3 in view of the 2040 target adopted and published in the Official Journal of the European Union on 18 March 2026. In early July 2025, the Commission proposed a net greenhouse gas emission reduction target of -90% in 2040 compared to 1990. A General Approach (GA) on the amendment to the European Climate Law was adopted at the EU Council of Environment Ministers on 4 November 2025. The European Parliament adopted its position on the Commission proposal on 13 November. An agreement was reached in trilogue on 9 December 2025. On 10 February 2026, the European Parliament supported the political agreement, the Council then formally adopted the amended European Climate Law on 5 March, before being published in the official journal on 18 March 2026.

The 2040 target is -90% net emission reduction, including up to 5% "adequate" contribution of high-quality international credits, consistent with the Paris Agreement. Negotiations will take place to decide on the post-2030 climate framework outlined in the amended European Climate Law (technological neutrality, decarbonisation of industry, strengthening of CBAM, effort sharing).

The adoption of the general approach by environment ministers on 4 November allowed them to unanimously adopt **the EU Nationally Determined Contribution (NDC), a** climate plan submitted to the UN Climate (UNFCCC), before COP30. That NDC sets an **emission reduction target for 2035 in ranges from -66.25 % to -72.5% compared to 1990**, representing a linear approach between, for the low bound, the 2030 target and the climate neutrality target in 2050, and for the high bound, the 2030 target and the 2040 target. **As highlighted by the High Climate Council in its opinion on the draft SNBC 3 of March 2026, the 2035 and 2040 crossing points of the SNBC 3 scenario are broadly consistent with the levels of reductions of these European targets.**

In terms of gross emissions but including technology sinks, the SNBC 3 scenario achieves a reduction in GHG emissions of -77% in 2040 compared to 1990. The following spreadsheet details the sectoral declines.

Crossing point 2040	emissions 1990 (in Mt CO_2e)	emissions 2040 (in Mt CO_{2e})	Key Underlying Assumptions
Energy industry	78,9	11,3 (-86 %)	Strong decline in electricity production from gas after the end of coal and fuel oil, used only for the peak.
Manufacturing and construction	140,3	20,8 (-85 %)	Continued energy efficiency gains. Strong electrification. Deployment of electrolytic hydrogen and CCUS. Mobilisation of non-fossil material inputs.
Centralised waste treatment	16,7	9,2 (-45 %)	Methane capture rate in (apparent) ISDND of 70% in 2040 (compared to 52% today).
Use of buildings and residential and tertiary activities	93,0	13,0 (-86 %)	17M of heat pumps (PAC) installed in the residential, and no more sieve in the park. In the tertiary sector, achievement of milestone 2040 of the "Tertiary Decree" (-50% energy consumption).
Agriculture	93,1	54,8 (-41 %)	Further development of diets. Further development of agroecological systems and deployment of precision farming techniques. Reaching about half of the fleet of agricultural machinery running

			on non-fossil energy. Strong mobilization of bioenergy.
Transport	124,7	29,6 (-76 %)	Development of electric vehicles, modal shift, development of shared uses (carpooling) 65% of electric cars in the fleet
Total excluding LULUCF, excluding technology sinks	546,6	138,7 (-75 %)	/
Total excluding LULUCF, with technology sinks	/	127,4 (-77 %)	Deployment of BECCS and first DACCS units
LULUCF (including forest soils)	-32	-36,4	Decrease of the forest well from its level at the beginning of the century. Increase in the area of new forests. Preservation of forest soils. Implementation of the cascading use of biomass and development of the wood products well, by strengthening the dynamics of development of long-lived uses of wood products, in particular by strengthening demand. Reducing the rate of land take. Reduced emissions from cropland and grassland.
National total with LULUCF (including forest soils) and with technology sinks	514,6	91,0 (-82 %)	/

The more precise translation of the European intermediate targets at national level will depend on the forthcoming negotiations on the post-2030 framework and in particular the sharing of effort between EU Member States. Similarly, the policies and measures to be implemented to achieve these milestones remain to be determined, via the definition at European level of the post-2030 climate framework and their declination at national level. Once these elements are known, the French target for 2040 will be set out more precisely in the context of the fourth edition of SNBC.

Reduction of methane emissions by 2030

Methane (CH_4) is the second largest anthropogenic greenhouse gas in terms of quantity. It has a shorter lifetime in the atmosphere than CO2, but absorbs more energy during this period. Thus, its impact on the climate is significant, with a global warming potential (GWP) of 84 to 86 times that of CO_2 to 20 years, and 28 times that of CO_2 to 100 years (IPCC AR5). Methane also affects air quality as a precursor to ground-level ozone, an air pollutant. Thus, **targeted action to reduce methane emissions is likely to bring short-term results in the fight against climate change.**

France's main challenges in reducing its methane emissions concern gas infrastructure,[78] **agriculture and waste.** With the gradual end of fossil energy production on the territory (France does not have major oil and gas production on its territory, the fields of reduction of territorial methane emissions are however smaller and more diffuse than for other countries), and the capture of methane in landfills, CH4 emissions are falling rapidly in the SNBC reference scenario.

France is also concerned by the fight against indirect methane emissions associated with hydrocarbon imports[79] (through the reduction of its consumption of fossil fuels).

The SNBC 3 scenario achieves **a methane emission reduction of 18%**[80] **in 2030 compared to 2020** [81](i.e. -36% in 2030 compared to 1990).

In addition, in accordance with the law, SNBC 3 includes methane-specific carbon budgets covering the periods 2024-2028, 2029-2033 and 2034-2038 (see Part SNBC - II.C).

[78] Work on gas networks has already been carried out; GRTgaz, estimates a division by three of the methane leaks associated with its network between 2016 and 2020 (from 30.9 million tonnes of Nm^3 to 10.3 million tonnes of Nm^3)
[79] Methane emissions from foreign extraction and transport of hydrocarbons in France
[80] The reference scenario of SNBC 2 projected a decrease of 14% between 2020 and 2030. The WEM 2024 scenario projects a decrease of 13% between 2020 and 2030.
[81] Global Methane Pledge Reference Year

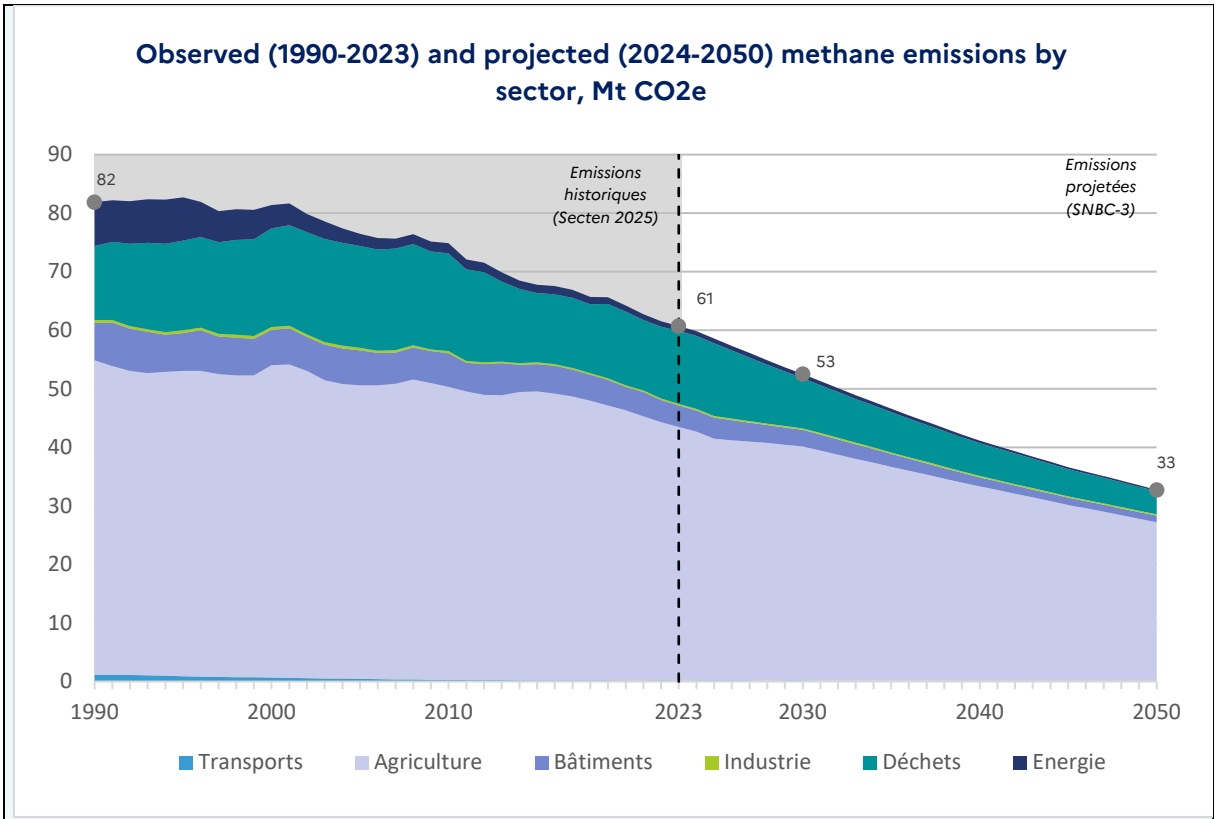


Figure: 14 *Evolution of historical methane (CH4) emissions and projections according to the SNBC 3 scenario, in Mt CO2e between 1990 and 2050 (source: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC modelling - WAM run 3)*

2. Strategic target 2: Achieving climate neutrality in 2050, a major challenge given the degradation of forest sinks and the need to develop technology sinks

By 2050, our compass has been, since 2017 and in accordance with the commitment of the Paris Agreement, the achievement of climate neutrality, [82]defined in the Energy Code as *'a balance, on the national territory, between anthropogenic emissions by sources and anthropogenic removals by sinks of greenhouse gases, without taking into account international carbon offset credits'.*

In addition, in line with the recommendations of the High Climate Council (HCC), France will strive, as far as possible, **to achieve climate neutrality by including emissions**

[82] *The French climate target is that of 'climate* neutrality', any GHG, although we use sometimes the term 'carbon neutrality' by misuse of language.

attributable to France from international air and maritime transport (reported outside the total in the national GHG inventory).

SNBC 3 pursues this challenge, which, in addition to the rapid decline in gross emissions, involves increasing greenhouse gas removals to capture incompressible residual emissions.

SNBC 3 mobilises all levers to eliminate or **otherwise significantly reduce greenhouse gas emissions** in each sector (including non-energy sectors). **By 2050, however, a certain level of emissions seems incompressible, particularly** in the non-energy sectors (agriculture in particular). **These emissions must be offset by carbon sinks.**

The evolution of natural and technological sinks will be key to achieving climate neutrality. In SNBC 2, sinks were estimated at 77 Mt CO_{2e} in 2050, of which 67 Mt CO_{2e} were stored by natural sinks and 10 Mt CO_{2e} by technological sinks.

However, the natural sink has fallen sharply in recent years, in connection with a major forest crisis linked in particular to the effects of climate change. In order to emerge from this period of crisis, adaptation measures are being and will be put in place to strengthen fire protection and renew existing forests with species more adapted to France's future climate. **However, the impact of these renewal plans on the carbon sink can only be observed in the long term and sometimes after 2050.** Indeed, only stands planted in the next ten years will be able to reach maturity and should be able to sequester significant amounts of carbon in the long term by 2050. On the other hand, while other measures are also envisaged (see Part SNBC - III.G), **there is still considerable uncertainty about the evolution of the natural carbon sink, in particular depending on the climate** (see Part Supplements - II). Thus, with constant public policies, according to recent IGN-FCBA work, up to around 50 Mt CO2e in 2050 can separate the most optimistic scenarios from the most pessimistic ones in terms of forest-wood sinks.[83] In general, all scenarios foresee a decrease in sink absorption, linked to climate warming. These data will have to be reliable and a follow-up of the expertise on the subject will have to be ensured in order to reduce as much as possible the uncertainties. The SNBC reference scenario therefore adopts a central scenario for the forest sink (partly explained by SNBC III.G.), and presents low and high scenarios depending on the evolution of the forest sink.

Uncertainties related to the sensitivity of the forest sink to global warming:

The evolution of the carbon storage capacity of the LULUCF sector is highly dependent on the chosen scenario of climate effect on tree growth and mortality in forest areas. The assumption used in SNBC 3 is based on scenario C2 of the IGN study 'Projections of wood supplies and carbon stocks and flows in the French forestry sector', which estimates a moderate effect, between the optimistic scenario C1 and the pessimistic scenario C3.

If the observed climate effect scenario on forests were ultimately similar to scenario C3 of the IGN study, this could lead to a collapse of the forest-wood carbon sink, becoming a

[83] *Projections of wood availability and carbon stocks and flows in the French forest sector, study report, May 2024, IGN-FCBA*

carbon source by 2050 (excluding forest soils), and thus complicate the achievement of climate neutrality at this time horizon. This scenario is considered a "low scenario" for achieving climate neutrality.

Otherwise, if the effects of climate change are ultimately close to what the C1 scenario estimates, the forest-wood carbon sink would be improved by 8 Mt CO_2e/year in 2030 and by 19 Mt CO_2e/year in 2050 (excluding forest soils), which would facilitate the achievement of climate neutrality in 2050. This scenario is considered a "high scenario" for achieving climate neutrality.

Similarly, the evolution of CO2 removals allowed by forest soils, not included in the inventory, is subject to high uncertainties. The central scenario assumes the central hypothesis of the IGN study, and low and high bounds are considered taking into account the different estimates of scientific studies.

Beyond the forest carbon sink, it is necessary to maintain and improve the carbon sequestration capacity of all natural and semi-natural ecosystems in connection with nature conservation and restoration policies.

In addition to natural sinks, SNBC 3 involves several technologies for the removal of greenhouse gas emissions in order to achieve climate neutrality by 2050, but their development will remain limited:

- **Bioenergy with Carbon Capture and Storage (BECCS) technologies,** which originate from the production of heat from biomass in the energy production and industrial sectors and thus capture biogenic emissions and store them in deep geological layers. **The central scenario of SNBC 3 projects around 16 Mt CO2 of BECCS in 2050** - in addition to 11 Mt of biogenic emissions captured and reused to produce mainly synthetic fuels (energy BECCU) or reused as non-energy inputs for industry. Low and high scenarios, taken from the CCUS deployment outlook in France published in July 2024, are also considered. A framework creating a financial incentive to capture these biogenic emissions will be needed to support the development of these technologies.
- **Direct Air Carbon Capture and Storage (DACCS) technologies,** which remove CO2 from the atmosphere and store it also in a geological layer. **The central scenario of SNBC 3 forecasts 6 Mt CO_2 of DACCS in 2050, halfway between the low and high scenarios drawn from the CCUS deployment outlook in France published in July 2024.** [84] Research and development of these technologies will have to be continued in order to achieve the energy efficiency gains and lower costs necessary for their deployment. These technologies are also deployed in the decarbonisation scenarios of international bodies (International Energy Agency, IPCC, European Commission, etc.).

[84] *https://www.entreprises.gouv.fr/la-dge/actualites/deployment-of-capture-of-storage-and-recovery-of-carbon-ccus-en*

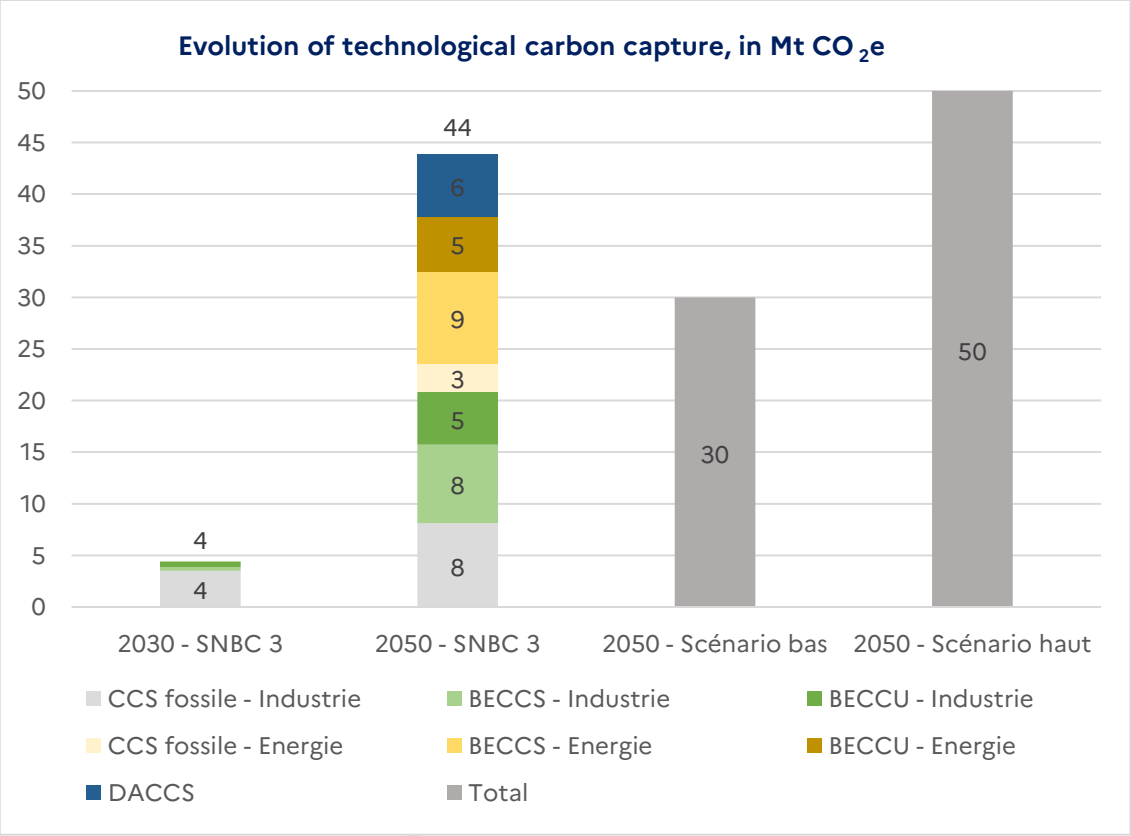


Figure: 15 *Total volumes captured in Mt CO_{2e} in 2030 and 2050, by sector (industry or energy production), in the reference scenario of SNBC 3, and according to the fossil CCS, BECCS, BECCU distribution*[85] *(sources: DGEC modelling – WAM run 3 scenario). The low and high scenarios taken from the CCUS deployment prospects in France are given for 2050 as a comparison.*

There are also other carbon dioxide removal technologies, such as direct capture of CO2 in the ocean, but their maturity is even lower and they are not considered in the scenario at this stage.

The SNBC 3 scenario takes into account this dual constraint (degradation of natural sinks **and limited technological sinks) and the challenges of overall coherence (closing) in its trajectory towards climate neutrality in 2050.**

In view of these factors, SNBC 3 aims to mobilise all emitting sectors to minimise residual emissions by 2050: in view of the expected natural and technological removal capacities for 2050 in the SNBC 3 reference scenario, **achieving climate neutrality now means reducing our gross emissions by a factor of more than 8 compared to 1990.**[86]

[85] *The SNBC 3 reference scenario does not use fossil CCUs, so as to anticipate the end of fossil CO2 recognition by 2041 for the recovery of carbon captured in e-fuels.*
[86] *The target currently enshrined in the Energy Code is a six-fold division of greenhouse gas emissions between 1990 and 2050*

Given the strong decarbonisation assumptions made on international air and maritime transport, in line with European regulations and the international commitments of stakeholders, **the inclusion of international bunkers in the neutrality target would add only few emissions to be offset in 2050 (2-3 Mt CO_{2e})**. However, attention will be paid to ensuring consistency between the national targets set by France and the targets set by the main international organisations in the sector (International Civil Aviation Organisation and International Maritime Organisation).

The distribution of expected emissions and removals by the SNBC 3 scenario in 2050 is presented in the following graph. Low and high greenhouse gas removal scenarios, taking into account uncertainties about the evolution of the forest sink and the deployment of negative emissions technologies, are also considered. **The central reference scenario is very close to climate neutrality.**

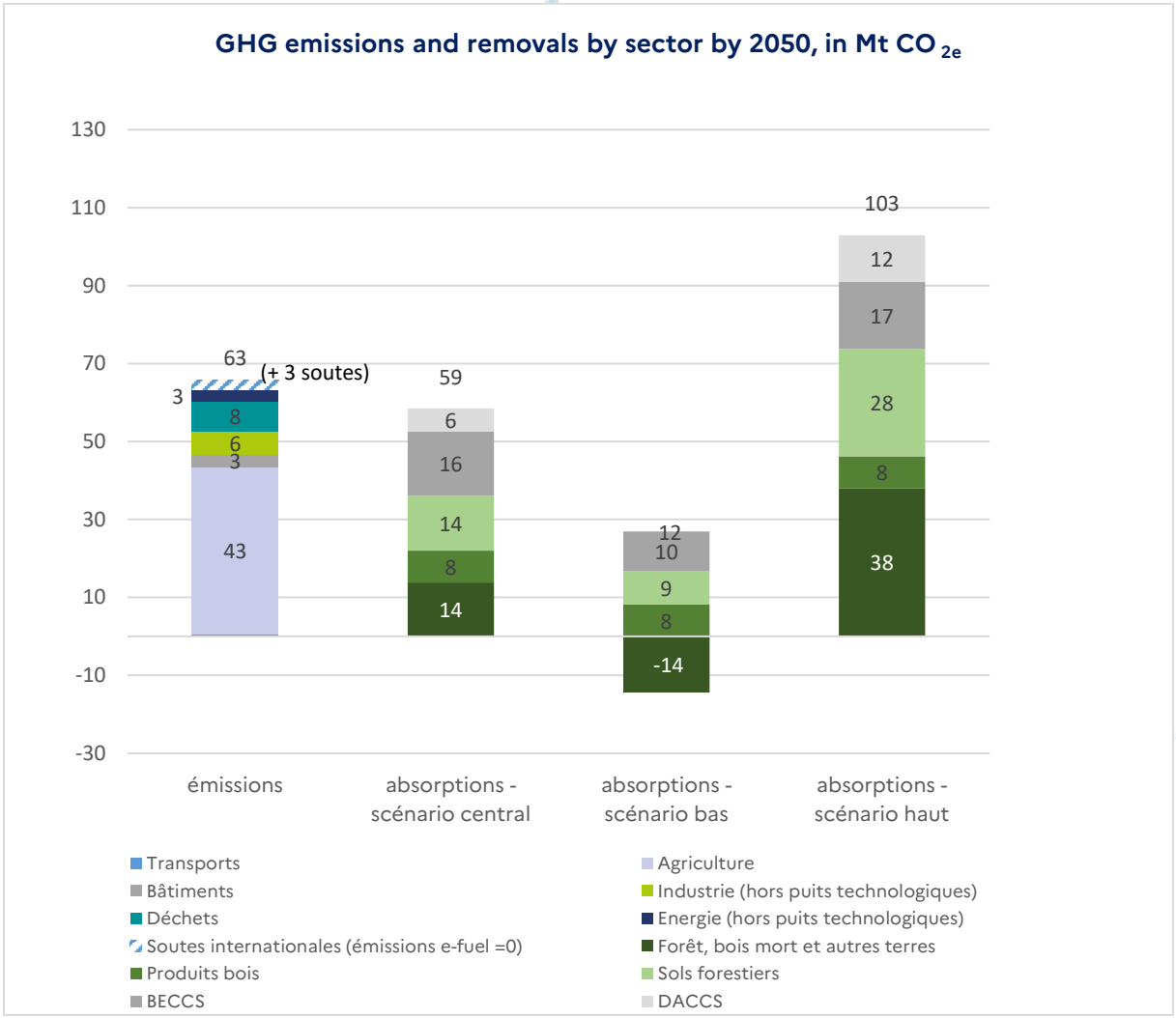


Figure: 16 *Greenhouse gas emissions and removals in Mt CO_{2e} per sector in 2050 in the reference scenario of SNBC 3, according to several assumptions of natural and technological removals (sources: DGEC modelling – WAM run 3 scenario). In the low scenario, the forest, deadwood and other land sector has become a source of greenhouse gas* ***emissions.***

Thus, according to the reference scenario, in 2050:

- **Residual emissions result** mainly from the agricultural sector, given its specificity (emissions from partly incompressible biological processes) and its importance for food sovereignty, as well as waste (degradation of waste emits methane). Residual emissions from industry and energy are reduced through carbon capture technologies: around 8 Mt CO2e fossils are captured in industry in 2050, and 3 Mt CO2e are captured in refineries and waste energy recovery units (counted in the energy sector). However, these sectors still emit some greenhouse gases by 2050, due to certain processes with incompressible emissions and for which carbon capture solutions are not technically and economically viable.
- **With regard to carbon sinks:** natural removals could capture between 1 and 73 Mt CO_2e/year in 2050 - around 36 Mt CO_2e/year in the central scenario, thanks to the forest sink (including soils) and the carbon stored mainly in wood products. Technology sinks (between 10 and 30 Mt CO_2e/year - around 22 Mt CO_2e/year in the central scenario) enhance removal capacities, either through the capture of emissions from biomass (BECCS) or through the direct capture of CO_2 in air (DACCS).

The SNBC 3 scenario goes until 2050. However, achieving climate neutrality in 2050 is only a crossing point that guides climate action. It will have to be sustainable after 2050.

In order to ensure that climate neutrality is maintained after 2050, SNBC 3 describes the measures to be undertaken in the short and medium term, both to ensure a reduction in gross emissions and to develop or maintain natural and technological carbon sinks.

Indeed, forest carbon sink projections remain pessimistic after 2050, where all the scenarios studied today show a continuous decline in forest growth and a continuous increase in forest mortality, including those taking into account ambitious public policies that would allow for a reduced fall. **Achieving climate neutrality in 2050 therefore does not guarantee its maintenance in 2055 or 2060.**

Post-2050 trends are highly dependent on actions over the next ten years on climate change adaptation, firefighting, forest renewal and the preservation of healthy and healthy natural and semi-natural ecosystems, including wetlands. The implementation of the fire-fighting strategy, a 10 % forest renewal in 10 years, an active implementation of the various measures to adapt the forest to climate change to move towards more resilient stands, soil protection, as well as the implementation of nature conservation and restoration policies (in particular for wetlands), will reduce the risks of too large a decline in the well post-2050. **Given the current state of knowledge, taking into account the trajectory adopted in the SNBC 3 scenario and the anticipated effects of global warming, it is likely that emissions from the forest sector will become equal to its removals before the end of the century. As a result, the entire LULUCF sector would follow the same trajectory over a close timeframe. Maintaining climate neutrality is therefore essentially based on the mobilisation of technology sinks.**

After 2050, net negative emissions are also targeted at EU level in the 2021 Climate Law. [87] Achieving negative net emissions will require stepping up actions to reduce residual emissions in 2050 and enhance greenhouse gas, natural and technological removals. The aim will be to identify, in the next SNBC exercises, the residual emissions that could still be reduced after 2050 by technical progress and innovation, as well as by additional changes in lifestyles.

3. Strategic target 3: Ensuring energy sovereignty and moving away from fossil fuels

Multiannual Energy Plan 3[88] sets the target of moving from an energy mix dominated by fossil fuels today (58% in 2023) to a mix where fossil fuels are in the minority in 2030 (40%).

At COP28, the President of the Republic set an exit target for energy consumption of coal by 2030, oil by 2045 and natural gas by 2050.[89] **These targets make it possible to set a course and initiate the structural transformations of our energy system with a view to moving away from fossil fuels and improving French energy sovereignty.**

Fossil fuels, which are mostly imported, will therefore gradually be replaced by decarbonised energies in our energy mix, primarily electricity and biomass. In order to ensure its energy sovereignty and the robustness of its decarbonisation strategy, France has set itself the target of ensuring the availability of energy resources in electricity and biomass necessary for decarbonisation.

As in most major industrialised countries, **our energy mix is still dominated by fossil fuels,** with 39% oil and 18% natural gas in our final energy consumption in 2023.[90] This creates, for France, a deleterious dependence both for the climate, due to the consequences in terms of greenhouse gas emissions, and in economic terms, exposing France and French people to geopolitical and market hazards. Achieving climate neutrality in 2050 requires drastically reducing fossil energy consumption and associated emissions.

The SNBC 3 scenario reaches 40% fossil energy in the energy mix in 2030, thanks to a strong use of electricity and biomass as an alternative to oil, fossil gas and coal in all sectors.

The phase-out of coal consumption by 2030 is included in SNBC 3, including the target of phase-out of coal-fired electricity production in 2027.

The exit from oil consumption by 2045 is included in SNBC 3, in the geographical scope of domestic consumption (excluding international bunkers) and in the scope of energy use, with, however, a slight heel of energy consumption of petroleum products retained in domestic

[87] *Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law')*
[88] *https://www.economie.gouv.fr/ppe-3-programming-multiannual-lenergy*
[89] *Non-energy consumption is not part of the scope.*
[90] *https://www.statistiques.developpement-durable.gouv.fr/edition-numérique/chiffres-cles-energie/donnees-cles*

transport (29 TWh) in 2045 for the existing fleet of vehicles, representing less than 6% of the consumption of petroleum products in 2023. Consumption of non-energy petroleum products is maintained in industry, in particular in order not to increase the strain on the limited biomass resource.

Finally, the exit from fossil gas consumption in 2050 is ensured through the integration of low-carbon gases (biomethane and other low-carbon gases) into the grid and the sharp decrease in gas consumption. By 2050, the goal is for all gas consumption to be based on low-carbon gas.

The following figures illustrate the fossil gas and petroleum product consumption trajectories in the SNBC 3 reference scenario.

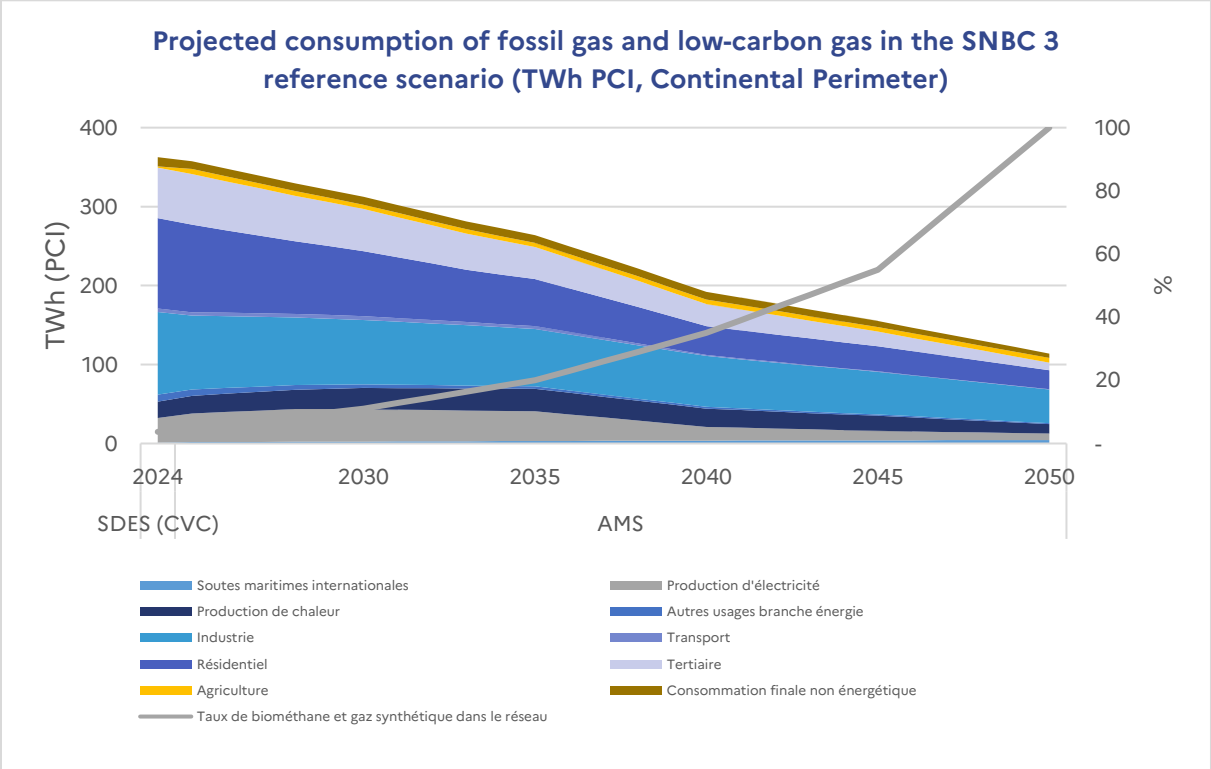


Figure: 17 *Consumption of fossil gas and low-carbon gas in 2024 (corrected for climate variations) and projected in the central scenario of the National Low-Carbon Strategy 3 until 2050 (Source: CGDD/SDES for 2024 and DGEC for projections, Continental scope, TWh PCI)*

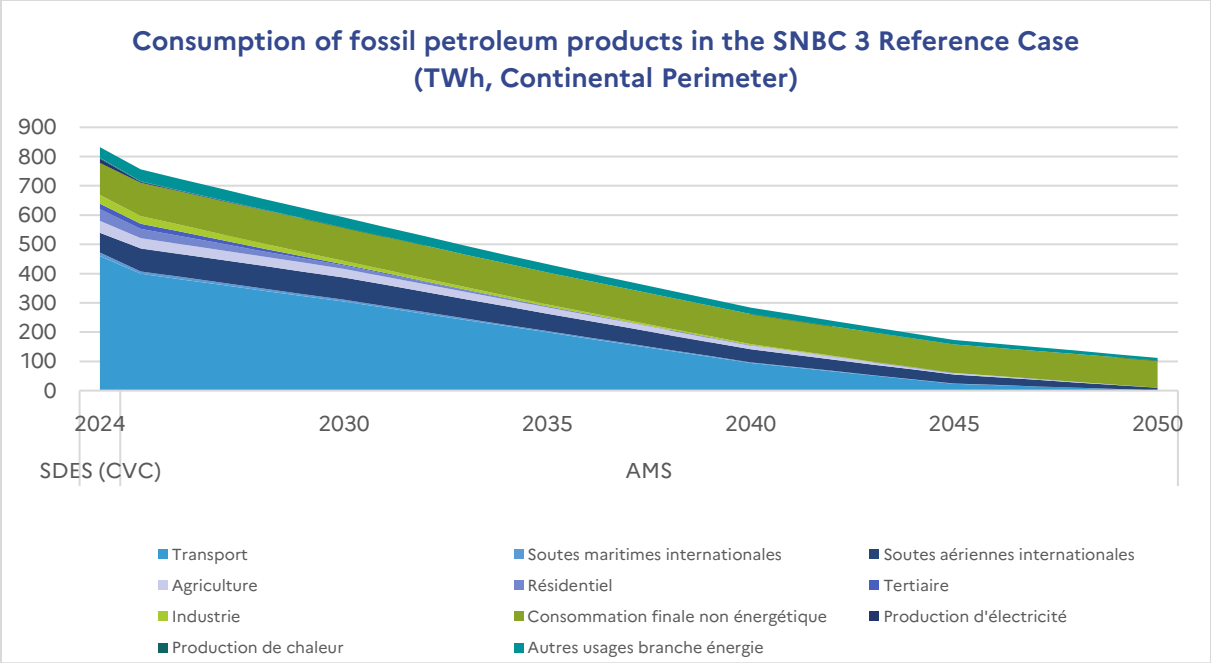


Figure: 18 *Consumption of petroleum products in 2024 (adjusted for climate change) and projected in the central scenario of the National Low Carbon Strategy 3 up to 2050 (Source: CGDD/SDES for 2024 and DGEC for projections, Continental scope)*

The phasing out of fossil fuels will be made possible by the growth in the consumption of decarbonised energy, starting with electricity and biomass.

In the central reference scenario of SNBC 3, anticipated electricity consumption increases significantly, driven by the electrification of uses, reindustrialisation, new needs for hydrogen and synthetic fuels and the deployment of digital and artificial intelligence. Having the electricity consumption trajectory of the reference scenario allows us to sufficiently develop the supply of decarbonised electricity, in response to growing needs and to ensure our security of supply.

The increased use of biomass, in particular for energy purposes, raises the crucial question of the adequacy between 'supply' and 'demand' in terms of both quantity and nature of energy recovery (solid, liquid, gaseous) in forward-looking scenarios. This issue was already raised by SNBC 2 published in 2020 which highlighted the importance of this topic given the limited nature of the agricultural and forestry resource. This challenge is reinforced by the fact that, despite the limited nature of the resource, it seems reasonable to aim over time, given France's potential for biomass production (1st agricultural area and 4th forest area in the EU), for an overall balance between domestic biomass supply and demand in France, without recourse to net imports. This target is all the more valid given that issues of sustainability of biomass imports from non-European countries may arise, in particular as regards the risk of imported deforestation. Ensuring the "biomass closure" is an issue of overall coherence of the SNBC reference scenario. If it were to ultimately rely on massive imports of biomass, France's decarbonisation model would be neither sustainable nor globally transposable.

The SNBC reference scenario makes it possible to assess at each step of time the demand for decarbonised electricity and energy biomass, and to verify that the available energy supply makes it possible to meet these needs. These issues are developed in the Complements Part - II.

In total, the SNBC 3 scenario makes it possible to move from an energy mix dominated by fossil fuels to a fully decarbonised energy mix in 2050.

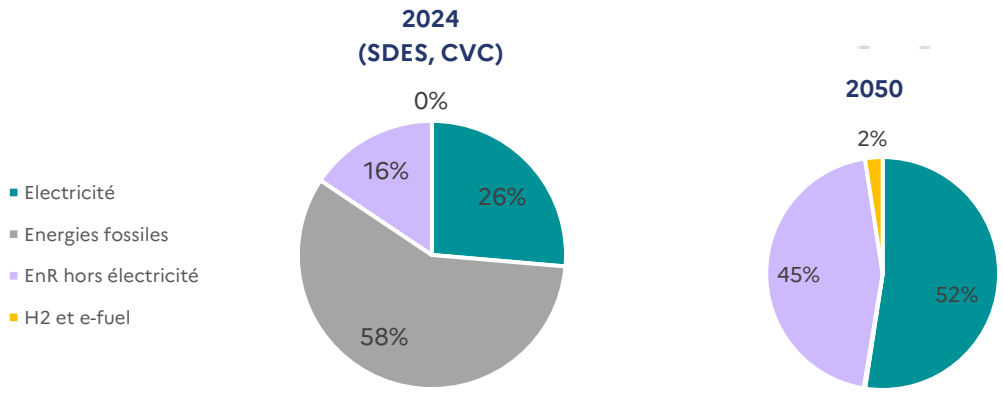


Figure: 19 *Final energy consumption mix in 2024 (climate-adjusted) and 2050 in the reference scenario of SNBC 3 (Source: CGDD/SDES for 2024 and DGEC for projections, Kyoto scope)*

4. Strategic target 4: Reducing our final energy consumption

Reducing our **energy consumption is essential for achieving our climate targets:** it both reduces greenhouse gas emissions and secures our ability to meet our decarbonised energy needs in the short, medium and long term. It also improves our energy independence. There are **two main levers to reduce energy consumption, mobilised in SNBC 3:**

- **Energy efficiency**, which consists of consuming less energy for the same service (e.g. by improving the insulation of one's home or by using a car that consumes less). **Replacing fossil fuels with decarbonised energy,** for example by electricity, can achieve better energy efficiency at the same time (e.g. an electric car uses less energy than a conventional thermal car to travel the same distance, because a thermal engine releases the majority of the energy contained in petrol or diesel in the form of heat).
- **Energy sufficiency,** which consists in reducing energy consumption through changes in behaviour or better organisation of consumption (lower heating temperature, regulation of periods and spaces heated according to needs, reduction of lighting, use of active mobilities, etc.).

France's final energy consumption amounted to 1 510 TWh in 2023, corresponding **to a decrease of around 14% compared to 2012.**

The new European Energy Efficiency Directive (EED), revised on 20 September 2023 as part of the Fit for 55 legislative package, sets France a final energy consumption target of

1 243 TWh by 2030, for the perimeter it covers[91], which corresponds to a **reduction in final energy consumption of around 29% over the period 2012-2030[92].**

By 2050, the Energy Code (Article L. 100-4) sets a target of reducing total final energy consumption by -50% compared to 2012.

The SNBC 3 scenario leads to a final energy consumption in France of 1 469 TWh (or 1 423 TWh according to the scope of the EED) in 2030 and 1 178 TWh (or 1006 TWh according to the scope of the EED) in 2050, i.e.[93] a **reduction of 19% of final energy consumption in 2030 and 43% in 2050 respectively compared to that of 2012 (1 756 TWh).** This reduction is achieved by accounting for the increases in energy consumption on the national territory associated with the assumptions of reindustrialisation,[94] of the order of 50 TWh, as well as those of the deployment of data centers on the territory.

These significant declines reflect ongoing dynamics. Complementary levers will therefore have to be mobilised in order to secure the achievement of the targets of reducing energy consumption, in particular by 2030. These energy savings will result from the operational declination of the steps already taken such as the energy sufficiency plan, the plans for the acceleration of geothermal and solar thermal energy, the measures for the electrification of uses (transport, building, digital, industry), the implementation of the measures transposing the Energy Efficiency Directive or the 6th period of the Energy Economy Certificates scheme 2026-2030. All of these measures will be key to ensuring that our 2030 energy consumption targets are met.

5. Strategic target 5: Consolidating the natural carbon sink

Forests, soils, oceans, seas and natural environments can capture carbon. These are natural carbon sinks.

However, in the national GHG accounts, **emissions and removals from the sea and oceans are not taken into account in the national greenhouse gas emission inventories[95], which only cover land under anthropogenic management.** However, emissions and removals from certain coastal and marine ecosystems, sometimes referred to as 'blue carbon' – such as mangroves – are included in these inventories when changes in use are identified (accounted for in the

[91] The scope of this Directive covers final energy consumption (excluding non-energy consumption) as well as air bunkers, but excludes sea bunkers and ambient energy (heat in the environment for heat pumps). Article 4 of the revised EED provided for an update, at the end of 2023, of the scenario for modelling each Member State's energy consumption targets. The French targets have been updated accordingly to reach 1 243 TWh (Ef) and 1 844 TWh (Ep).
[92] In the sense of final energy consumption as defined by the Energy Efficiency Directive (EED, 2023/1791/EU)
[93] In the sense of final energy consumption as defined in Article 2 of the Energy Efficiency Directive (2023/1791/EU)
[94] This reduces the French and European carbon footprint
[95] This is due to the very large uncertainties in the assessment of the stock and emissions and removals of these ecosystems.

LULUCF sector). The LULUCF (Land Use, Land Use Change and Forest) sector is currently a net carbon sink.

France is continuing its efforts to preserve natural carbon sequestration capacities.

The LULUCF *Regulation sets the* **target** *for France to* **increase the sink by 6.7 Mt CO2e between the average of the years 2016 to 2018 and the year 2030,** as measured in the inventories to be submitted in 2032. Compliance with the Regulation will be examined in the light of various flexibilities, including, for example, one linked to extreme climatic events (forest fires, storms, etc.).

The absolute level of sinks to be reached by France in 2030 for the LULUCF sector will therefore not be definitively decided until 2032.

By 2030, in the SNBC 3 scenario, the LULUCF sector remains a net carbon sink and the main means for France to generate CO2 removals.[96] Modelling shows that we would reach a natural carbon sink (LULUCF sector) of -24 Mt by 2030 (excluding forest soils).[97]

Methodological developments have taken place in the 2025 inventory to integrate deadwood sinks and are being studied for forest soils, adding **significant uncertainty in the assessment of the natural carbon sink in 2030.**

Compliance with the target of the European regulation will be examined taking into account the methodological developments mentioned, but also in the light of various flexibilities provided for in the text, including, for example, those related to natural disturbances (forest fires, storms, etc.) and the long-term impact of climate change. In this sense, a study will be carried out in the short term to assess the share of the decline in the natural carbon sink due to climate change and natural disturbances.

The natural carbon sink is a sector in difficulty throughout the European Union, rising from -300 Mt CO_{2e} in 2000 to -236 Mt CO_{2e} in 2022.[98] In particular, the main forest countries on the continent (Finland, Sweden, Germany, Poland) have experienced or are anticipating a decline in their sinks, corresponding to a deviation from their national 2030 target.[99] Although the reasons for this trend may change in proportion to the country concerned, this context reflects difficulties shared by the Member States.

The State will continue and amplify its action, via a balanced approach to the various issues relating to forests and wood, **to preserve this natural carbon sink (see Part SNBC III.G).**

Moreover, **France has the second largest exclusive economic zone (EEZ) in the world** (with nearly 10 million square kilometres), **which is both an exceptional opportunity and a major responsibility in the management of blue carbon.** Through its policy of protecting and restoring

[96] *By 2030, SNBC's reference scenario projects removals of 1 Mt CO2e by technology sinks.*
[97] *Forest soils are excluded here as they are not yet accounted for in the national inventory in Secten format.*
[98] *https://ec.europa.eu/eurostat/databrowser/view/sdg_13_21/default/table?lang=en*
[99] *Climate Action Progress Report 2024 - Leading the way: from plans to implementation for a green and competitive Europe, European Commission, 2024.*

marine biodiversity, including mangroves, seagrass beds, salt marshes and corals, France contributes to the preservation of ocean carbon sinks.

6. Strategic target 6: Ensuring a just and socio-economically sustainable transition

The guidelines and measures of the National Low-Carbon Strategy ensure a just and sustainable socio-economic transition for all stakeholders (citizens, businesses, local authorities, the State) by ensuring that:

- Preserving the competitiveness of economic activities subject to international competition and fostering the development of new local activities in a dynamic of reindustrialisation, in particular by guaranteeing competitive energy prices;
- Preserving and developing jobs and growth;
- Preserve the purchasing power of households by assessing, in particular, the impact of the strategy on household bills;
- Do not replace the national mitigation effort with an increase in the carbon content of imports;
- Target the action plan on the most effective measures taking into account the low mitigation potential of certain sectors.

An assessment of the macroeconomic and socio-economic impacts of SNBC 3 (available in the accompanying report) was carried out following the mission led by Jean Pisani-Ferry and Selma Mahfouz of May 2023[100] **and the two reports of the Directorate-General for the Treasury on the economic challenges of the transition to climate neutrality**[101] **(December 2023, January 2025),** with the support of a working group bringing together several administrations and external participants. **These reports recalled that the transition to climate neutrality ultimately generates economic benefits compared to climate inaction.** The assessment of SNBC 3 shows in particular that:

- The assessment shows uncertain macroeconomic effects of mitigation at modelled horizons. These effects would likely be small at the level of the economy as a whole (even taking into account modelling uncertainty), both in relation to the cost of inaction, in relation to the EU reference scenario for GDP growth and in relation to the magnitude of the potential impact of other economic shocks. The transition to climate neutrality will also be accompanied by co-benefits that are not taken into account in modelling (e.g. reduction of air pollution, health benefits, etc.);
- The low-carbon transition could also support employment. In addition, it will improve several dimensions of security of supply and energy sovereignty. In particular, as fossil products are mainly imported, the transition will reduce this item in the trade balance and reduce the economy's exposure to price shocks, determined on world markets;

[100] *Pisani-Ferry, J. and Mahfouz S. (2023) "Economic impacts of climate action – Synthesis report"*
[101] *DG Trésor (2023), 'Interim report – The economic challenges of the transition to climate neutrality' and DG Trésor (2025), 'Final report – The economic challenges of the transition to climate neutrality'.*

- Decarbonisation will require significant investment needs which the State will seek to make more profitable and financially viable for households, in particular through accompanying measures for the most modest;
- Household bills are expected to fall slightly by 2030 compared to the trend scenario and 2023 before falling sharply in the long term thanks to the energy savings enabled by SNBC. Decarbonising and supporting the most vulnerable households will reduce their exposure to fossil fuel prices.

In addition, SNBC sets out a long-term economic framework for decarbonisation, including by advocating an economic value of climate action. The **value of climate action** (VAC) **reflects the value that the community chooses to give to public and private actions to avoid the emission of one tonne of CO2 equivalent to achieve climate neutrality at the lowest cost in the context of SNBC 3.** It cannot therefore be assimilated to a tax. **A new trajectory was proposed** by the committee chaired by Alain Quinet in March 2025[102], **which acts on an upgrade of the VAC proposed in SNBC 2, mirroring the increase in the 2030 target.** It stood at €256 $_{2023}$ as early as 2025, a significant additional step compared to the level projected by the 2019 trajectory (€187 $_{2023)}$. It reaches 300 €/t CO_2e in 2030 and 563 €/t CO_2e in 2050. The "Economic Policy" section (see the "Complements" section) further details the trajectory.

[102] https://www.strategie.gouv.fr/files/files/Publications/2025/2025-03-20%20-%20Valeur%20de%20l%27action%20pour%20le%20climat/FS-2025-RAPPORT%20QUINET_19mars20h-COUV-vdef.pdf

7. Strategic target 7: Reducing France's consumption-based emissions

France's consumption-based emissions measures emissions associated with French consumption, whether produced in France or imported. While France's international commitments relate to its territorial emissions, **the Government has also committed to reducing France's consumption-based emissions, taking into account imported emissions.**

In accordance with Article L.222-1B of the Environmental Code, **SNBC 3 presents for the first time indicative carbon budgets relating to the consumption-based emissions,** calculated by adding to the territorial carbon budgets the emissions generated by the production and transport to France of imported goods and services and by subtracting those generated by the production of exported goods and services.

The Government has also committed to setting a long-term indicative consumption-based emissions target. France thus becomes the first country to set itself a consumption-based emissions reduction target by 2050, [103]showing the Government's commitment to permanently limit 'carbon leakage' but also to reduce its overall impact by aiming to reduce indirect emissions generated by French consumption. This target is consistent with the Government's strategy to reindustrialize France, by producing high environmental performance industrial goods on the national territory, rather than importing them. France will also support the definition of a target at European level and will spearhead its development.

The reduction of the consumption-based emissions depends in particular on the carbon intensity of our imports and thus on the decarbonisation of France's trading partners in the long term [104]and on the ability of our economy to reduce carbon imports.[105] Several levers exist to redirect value chains, stimulate the decarbonization of the economies of our trading partners or change consumption structures. The estimation of the consumption-based emissions is also subject to methodological challenges and is not harmonised at global level. **The consumption-based emissions target and budgets are thus set in the form of a range to mark France's ambition while recognising the influence of the international context on its level and the uncertainties on the estimate** of the consumption-based emissions.

France's long-term consumption-based emissions target was based on scientific knowledge and several global decarbonisation scenarios to comply with the Paris Agreement. The median decrease in net greenhouse gas emissions of the IPCC Sixth Assessment Report scenarios to limit the increase in global warming to 1.5°C is estimated to be around 75-85% in 2050

[103] *A Swedish intergovernmental mission has also already proposed a not formally adopted 2045 neutrality target.*
[104] *The carbon intensity of imported goods depends mainly on the carbon intensity of production processes.*
[105] *It is also influenced by developments in the location of the activities and value chains that currently issue the most – and many of which have been relocated – as well as the possible relocation of the activities and value chains that currently issue the most.*

compared to 2019, and around 49-64% for 2°C warming.[106] These targets have been declined in France by several proposals to set a consumption-based emissions target.

The High Climate Council proposed in 2020[107] a French target of 2.3 t CO_2e/hab in 2050 to limit warming to 1.5 °C. A recent note from the '2 tonnes' institute[108] updates this analysis with the scenarios in the latest IPCC report, with a global median crossing point in 2050 of 2.3 t CO_2e/hab/year for +1.5 °C (with or without overshoot) and 3.1 t CO_2e/hab/year for +2 °C, taken as the national crossing point. The working group on sufficiency, which met in 2023 to update our country's energy and climate strategy, proposed a reduction in the consumption-based emissions in 2050 of between -60 % and -80 % compared to 2005,[109] i.e. 2.2 to 4.4 t CO_2e/hab.

The target set by France is defined on a consumption-based emissions perimeter excluding emissions from land use, land use change and forest and technology sinks. The consumption-based emissions include emissions from combustion, industrial processes and waste management, and accounts for all GHGs also accounted for on domestic emissions (CO_2, CH_4, N_2O, F-gases).

On the basis of this scientific knowledge, and in order to reduce France's consumption-based emissions at a pace consistent with the targets of **the Paris Agreement,**[110] **France sets itself the indicative target of achieving a consumption-based emissions consistent with limiting the increase in global warming to +2 °C under the IPCC scenarios, while targeting the target proposed by the High Climate Council to limit global warming to +1.5 °C.**

France sets itself the indicative target of achieving a consumption-based emissions of less than 215 Mt CO_2e in 2050 while aiming at a target of 160 Mt CO_2e, corresponding to a decrease in the consumption-based emissions of -71 % to -79 % compared to 2010, i.e. a consumption-based emissions per capita of between 2.3 t CO_2e/hab and 3.1 t CO_2e/hab.

The achievement of these targets depends heavily on the strategies adopted by other countries, in particular those which are very present in the value chains of products imported by France. A global scenario "with current policies", leading to a warming of around ~3 °C, could jeopardise the achievement of these targets.

To meet these targets, **France will now have to reduce its consumption-based emissions by 3.9 to 5% each year between 2024 and 2050,** at a pace close to the decline observed between 2023 and 2022 (-6%) and 2024 and 2023 (-3.3%), against a pace of 1.5% annual reduction on average from 2017 to 2022. This acceleration calls for a mobilisation on all consumption patterns and transformations of our economy, as well as special attention to levers that specifically reduce our imported emissions.

[106] https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_TechnicalSummary.pdf *(page 79)*
[107] *https://www.hautconseilclimat.fr/wp-content/uploads/2020/10/hcc_rapport_ footprint-carbone.pdf*
[108] https://www.2tonnes.org/_files/ugd/70cba7_086dabd38863439c88068171685c5102.pdf
[109] *https://www.ecologie.gouv.fr/sites/default/files/documents/23186_worksPreparationSFEC%20-%20Restitution.pdf*
[110] *The low and high bounds of the range correspond to the consumption-based emissions levels in a context of +1.5 °C and +2 °C.*

SNBC 3 sets indicative carbon budgets for the consumption-based emissions for the periods 2024-2028, 2029-2033 and 2034-2038 in line with this new climate ambition (see Part SNBC II.C) and seeks to **operationalise this acceleration by** detailing the **policies and measures to achieve these new targets.**

In order to assess the achievement of those targets, an assessment of the consumption-based emissions of the SNBC 3 reference scenario was conducted using the MatMat model[111] developed and piloted by the ADEME, a model which was used, in particular, to assess the consumption-based emissions of the ADEME Transitions 2050 scenarios.[112] Three contrasting scenarios of decarbonisation of the rest of the world have been simulated[113] to represent the sensitivity of the trajectory to the international context.

In a context of decarbonisation of the rest of the world on a trajectory of +1.5 °C to +2 °C, the consumption-based emissions of the SNBC 3 reference scenario makes it possible to achieve the targets with 145 to 191 Mt CO_{2e} in 2050. Trajectories from this model were used to develop indicative carbon budgets in consumption-based emissions and to decline budgets by sub-items (food, habitat, capital goods, transport and services).

In a 'Degraded international context' counterfactual scenario corresponding to a domestic transition scenario, but with less ambitious international policies, the consumption-based emissions of the SNBC 3 scenario could reach up to 267 Mt CO_{2e} in 2050, with a sharp increase in the share of imported emissions (around 73%). The targets and guidance may be updated in the light of new scientific knowledge by SNBC 4. Estimates of the INSEE-SDES consumption-based emissions are also likely to change due to future methodological developments, mainly driven by future improvements in global data sources.

[111] https://hal.science/hal-04672116v1
[112] https://librairie.ademe.fr/société-et-politiques-publiques/6250-prospective-transitions-2050-feuilleton-empreintes.html
[113] *The IEA's STEPS ('Current Policies'), APS ('Advertised Policies') and Net Zero ('Climate neutrality') scenarios (WEO 2022) achieve global warming increase targets close to +3 °C, +2 °C and +1.5 °C in 2100 with a 50% probability.*

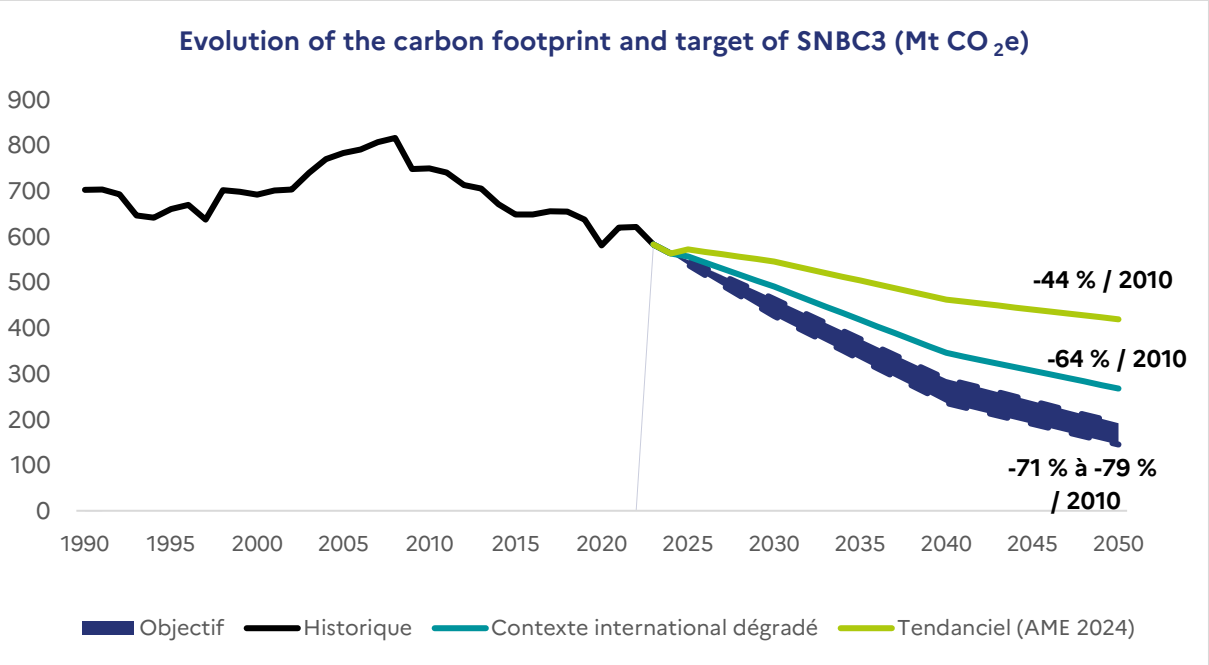


***Figure: 20** Evolution of the consumption-based emissions in SNBC 3 (Sources: Estimated consumption-based emissions of France SDES-INSEE 2024; DGEC / ADEME modelling). The full parts correspond to the variable ranges of France's consumption-based emissions reduction target. The trend scenario corresponds to a scenario "With current policies" on the national territory and at the global level. The "Degraded international context" scenario corresponds to a transition scenario on the national territory, but with less ambitious international policies.*

C. Presentation of carbon budgets

Every 5 years, a new carbon budget is defined during the revision of the SNBC and **"future" budgets are adapted if necessary.** SNBC 2 (in force), set the 2nd, 3rd and 4th carbon budgets covering the periods 2019-2023, 2024-2028 and 2029-2033, in line with the French climate ambition of the time.[114]

The 2nd carbon budget (2019-2023) came to an end in 2023. A full account of this 2 nd budget is presented in Part II.A.1 and in the SNBC accompanying report.

SNBC 3 updates the 3rd and 4th carbon budgets (periods 2024-2028 and 2029-2033) in line with France's new climate ambition and **adopts the 5th carbon budget** (period 2034-2038):

- The 3rd carbon budget of SNBC 3 is set at **342 Mt CO 2e/year excluding carbon sinks (technological sinks and LULUCF sector).**

[114] *Reduce France's gross greenhouse gas emissions by at least 40% in 2030 compared to 1990 and achieve climate neutrality by 2050 (see Decree No 2020-457 of 21 April 2020).*

- The 4th carbon budget of SNBC 3 is set at **261 Mt CO ₂e/year excluding carbon sinks (technological sinks and LULUCF sector).**
- The 5th carbon budget of SNBC 3 is set at **193 Mt CO ₂e/year excluding carbon sinks (technological sinks and LULUCF sector).**

In accordance with the law, these budgets are broken down by areas of activity (emitting economic sector), by major regulatory sectors (ETS, ESR) and by category of greenhouse gas. These budgets are also divided into indicative annual emission tranches.

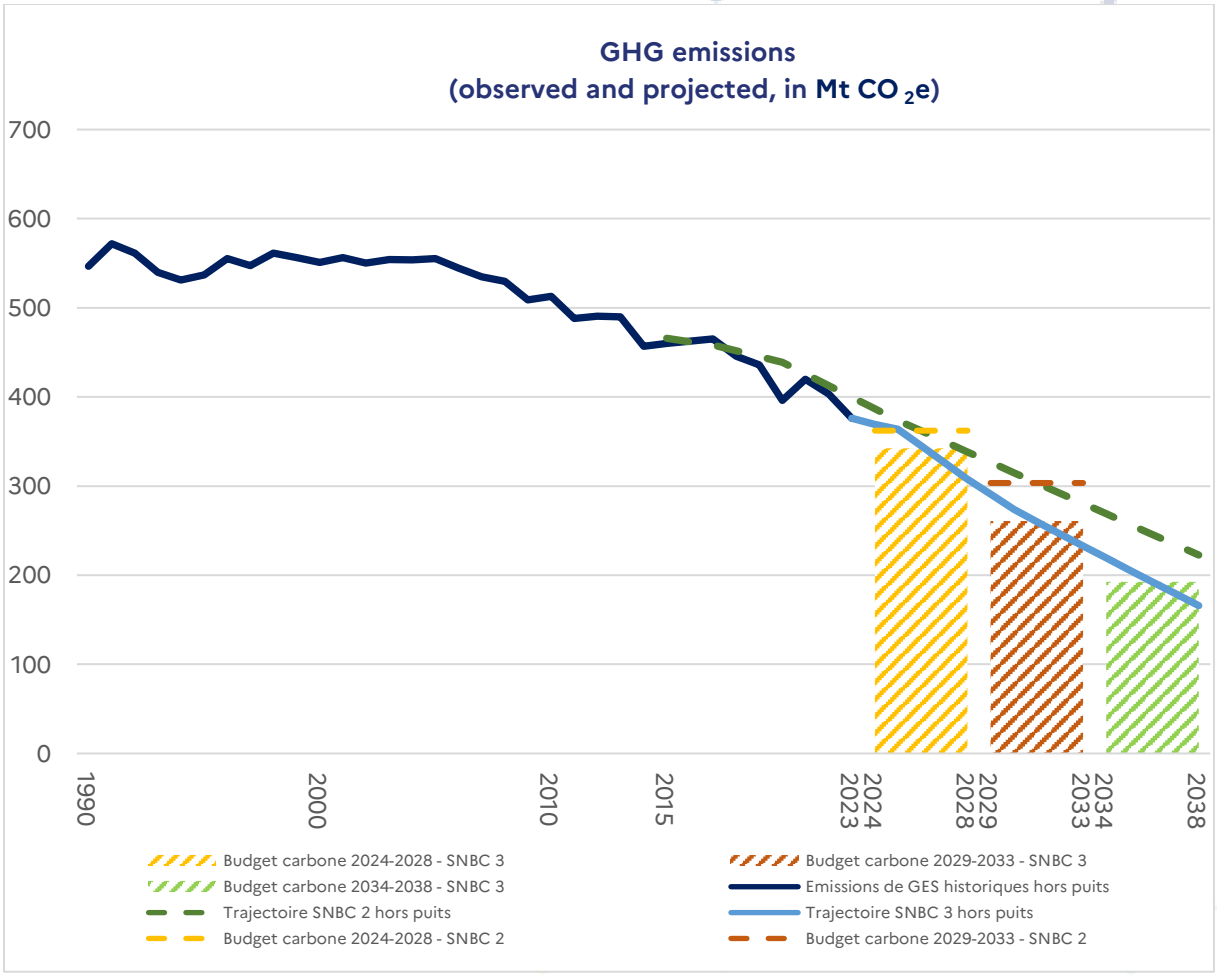


***Figure: 21** Evolution of GHG emissions (Mt CO ₂e) outside the land sector, comparison of the carbon trajectories and budgets of SNBC 2 and SNBC 3.*
(Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC Modelling)

The **breakdown of carbon budgets by area of activity,** rounded to the nearest 1 Mt CO2e, is as follows.

Average annual emissions (in Mt CO_{2e})	Reference years (Secten 2025)			3rd carbon budget (2024-2028)	4th carbon budget (2029-2033)	5th carbon budget (2034-2038)
	1990	2005	2023	SNBC 3	SNBC 3	SNBC 3
Transport	125	145	126	115	85	54
Buildings	93	108	57	51	33	21
Agriculture	93	89	76	73	66	60
Industry	140	118	63	57	40	29
Energy production	79	74	37	31	24	19
Waste	15	21	16	15	12	10
Total (excluding carbon sinks)	547	555	376	342	261	193

Table: 4 *Breakdown of SNBC 3's 3rd, 4th and 5th carbon budgets by area of activity.*

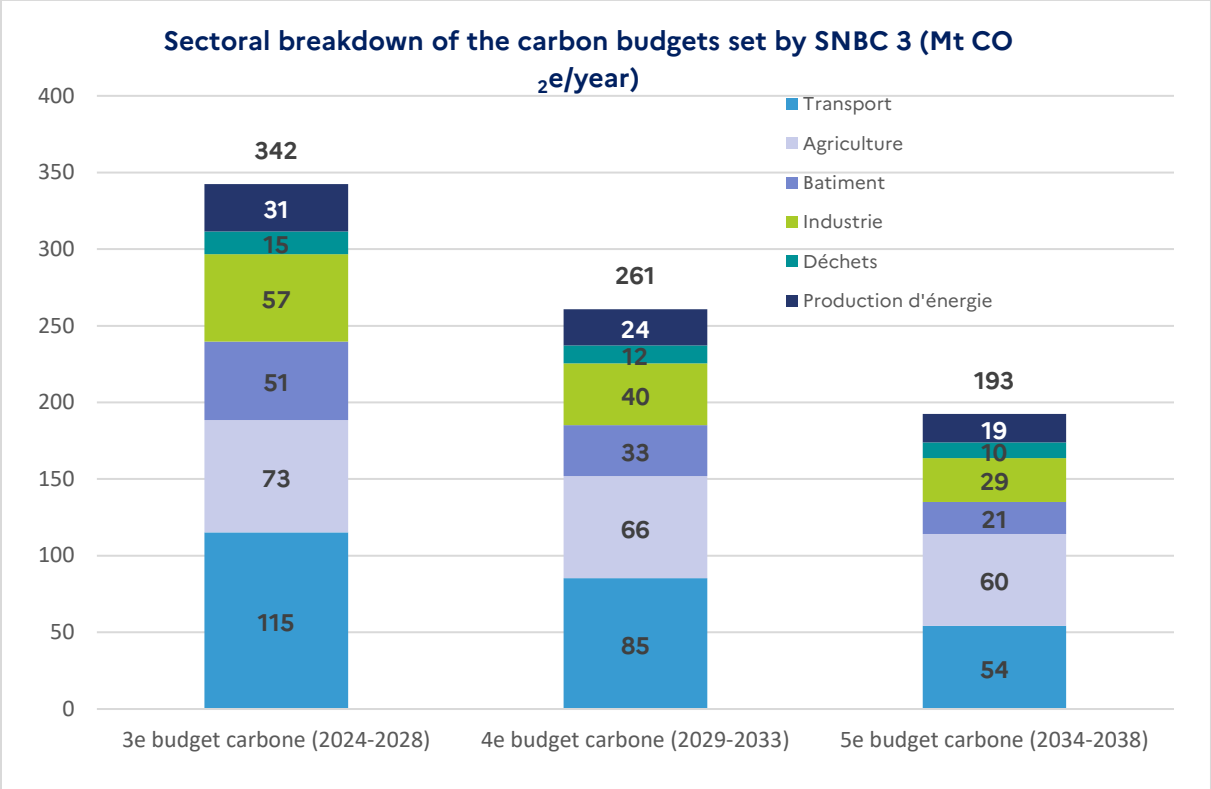


Figure: 22 *Breakdown of SNBC 3's 3rd, 4th and 5th carbon budgets by area of activity.*

The breakdown of carbon budgets by major regulatory sectors (carbon markets, ESR), rounded to the nearest 1 Mt CO2e, is as follows.

Average annual emissions (in Mt CO_{2e})	Reference years (Secten 2025)			3rd carbon budget (2024-2028)	4th carbon budget (2029-2033)	5th carbon budget (2034-2038)
	1990	2005	2023	SNBC 3	SNBC 3	SNBC 3
Sectors covered by the EU Emissions Trading Scheme under Chapter III (Fixed installations) (excluding civil and maritime aviation) (EU ETS or European carbon market)	-	-	70	64	46	34
Sectors covered by the Effort Sharing Regulation (transport, buildings, agriculture, waste, energy and industry not covered by the EU ETS or the European carbon market)	-	-	298	275	211	156
Domestic civil aviation	-	-	4	4	4	3

Table: 5 *Distribution of SNBC 3's [3rd,] 4th and 5th carbon budgets by major regulatory sectors. For 2023, the available data are not yet updated with the latest Citepa emissions figures.*

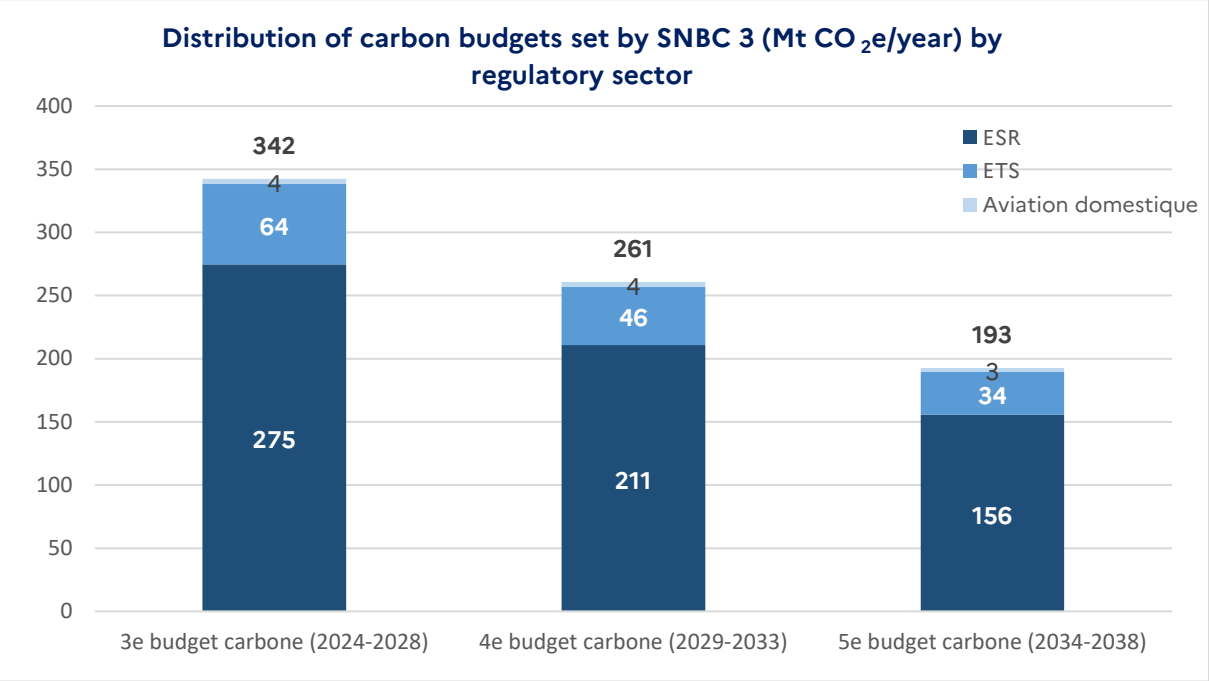


Figure: 23 *Distribution of SNBC 3's 3rd, 4th and 5th carbon budgets by major regulatory sectors.*

The **breakdown of carbon budgets by categories of greenhouse gases,** rounded to the nearest 1 Mt $CO_{2e,}$ is as follows.

Average annual emissions (in Mt CO_{2e})	Reference years (Secten 2025)			3rd carbon budget (2024-2028)	4th carbon budget (2029-2033)	5th carbon budget (2034-2038)
	1990	2005	2023	SNBC 3	SNBC 3	SNBC 3
CO_2 (excluding carbon sinks)	400	426	279	251	182	123
CH_4 (excluding carbon sinks)	82	76	61	57	51	45
of which Agriculture	54	50	43	41	39	36
of which waste	13	17	12	11	8	7
N_2O (excluding carbon sinks)	54	38	27	26	23	21

of which Agriculture	28	26	22	21	18	17
of which waste	2	2	2	2	2	2
Fluorinated gases (excluding carbon sinks)	11	16	9	8	4	3

Table: 6 *Breakdown of the 3rd, 4th and 5th carbon budgets of SNBC 3 by categories of greenhouse gases.*

The breakdown into indicative annual emission tranches of the third, fourth and fifth carbon budgets, rounded to the nearest 1 Mt CO2e, is as follows.

Indicative annual shares of the 3rd carbon budget (in Mt CO_2e) SNBC 3					
Year	2024	2025	2026	2027	2028
Total excluding carbon sinks	369	364	345	326	308

Indicative annual shares of the 4th carbon budget (in Mt CO_2e) SNBC 3					
Year	2029	2030	2031	2032	2033
Total excluding carbon sinks	291	274	260	246	233

Indicative annual shares of the 5th carbon budget (in Mt CO_2e) SNBC 3					
Year	2034	2035	2036	2037	2038
Total excluding carbon sinks	219	203	188	179	166

Table: 7 *Breakdown into indicative annual emission tranches of SNBC's 3rd, 4th and 5th carbon budgets 3.*

In addition, and in accordance with the law,[115] SNBC 3 adopts for the first time indicative carbon budgets for international bunkers and consumption-based emissions.

[115] *Article L222-1 B of the Environmental Code*

The **indicative carbon budgets of SNBC 3 for international bunkers,**[116] net of total national emissions in accordance with international standards, rounded to the nearest 1 Mt CO_{2e}, are as follows.

Average annual emissions (in Mt CO_{2e})	Reference years (Secten 2025)			3rd carbon budget (2024-2028)	4th carbon budget (2029-2033)	5th carbon budget (2034-2038)
	1990	2005	2023	SNBC 3	SNBC 3	SNBC 3
International Bunkers	16	25	20	21	20	16

Table: 8 *Distribution of the 3rd, 4th and 5th indicative carbon budgets of SNBC 3 for international bunkers calculated from the SNBC 3 scenario.*

Indicative carbon budgets in **terms of gross consumption-based emissions** (excluding land use, land use change and forestry, and technology sinks) were calculated by adding emissions from the production and transport of imported goods and services to France to territorial carbon budgets and subtracting those from the production of exported goods and services. These budgets are broken down as average annual emission ceilings over three five-year periods from the consumption-based emissions assessment of the SNBC 3 scenario. Carbon budgets are defined in ranges,[117] rounded to the nearest million tonnes of CO2, representing sensitivity to the international context in line with the setting of the indicative target (see policy target 7 described in part SNBC II.B). They are also indicatively broken down by consumption sub-items in the chapter on consumption-based emissions. These indicative budgets could be revised quite significantly with each new update of the methodology and by SNBC 4.

Average annual carbon consumption-based emissions (in Mt CO_{2e})	Reference years			3rd carbon budget (2024 - 2028)	4th carbon budget (2029-2033)	5th carbon budget (2034-2038)
	2010	2019	2024	SNBC3	SNBC3	SNBC3
Domestic emissions	394	331	279	257	210	164

[116] *International transport emissions attributable to France (or "international bunkers") correspond to fuel sales from France to international routes.*

[117] *More specifically, those budgets were drawn up on the basis of the trajectories resulting from the assessment of the consumption-based emissions of the SNBC 3 scenario under two scenarios of decarbonisation of the rest of the world (the IEA's 'Net Zero' and 'Announced Pledges Targets' scenarios, corresponding to global warming scenarios of +1.5 °C and ~+2 °C in 2100), for three crossing points (2030, 2040, 2050). The budgets correspond to an average of the consumption-based emissions for each scenario, the trajectories being interpolated linearly between the crossing points.*

(excluding exports)						
Imported emissions	355	307	284	[259, 274]	[198, 236]	[148, 194]
Consumption-based emissions	749	637	563	[516, 531]	[408, 446]	[312, 358]

***Table: 9 Indicative carbon** budgets for the consumption-based emissions (domestic emissions, excluding exports, and imported emissions) calculated from the SNBC 3 scenario (source: DGEC / ADEME, SDES for historical data). The imported consumption-based emissions and emissions budgets are indicated as a range representing the uncertainty on the decarbonisation scenarios of France's trading partners.*

In addition to these regulatory carbon budgets, France has set itself the target of moving towards the following indicative carbon sink budgets (technological sinks and LULUCF sector).

Average annual emissions (in Mt CO_{2e})	Reference years (Secten 2025)			3rd carbon budget (2024-2028)	4th carbon budget (2029-2033)	5th carbon budget (2034-2038)
	1990	2005	2023	SNBC3	SNBC3	SNBC3
Technology sinks	0	0	0	- 0,1	- 0,8	- 3,9
Of which technological sinks in industry	0	0	0	- 0,1	- 0,5	- 2,2
Of which energy technology sinks	0	0	0	0	- 0,3	- 1,7
Land use, land use change and forestry Sector	- 22	- 56	- 37	- 33	- 24	- 24

***Table: 10** Distribution of the 3rd, 4th and 5th indicative carbon budgets of SNBC 3 for natural and technological sinks calculated from the SNBC 3 scenario.*

Orientations et mesures
de politiques publiques
pour réduire
les émissions territoriales

III - Sectoral Public Policy Guidelines for Reducing Territorial Emissions

A. TRANSPORT

ENSURING ECOLOGICAL TRANSITION FOR MOBILITY AND FREIGHT TRANSPORT, FOR LOW CONSUMING AND DECARBONISED TRANSPORT

Credit: Terra

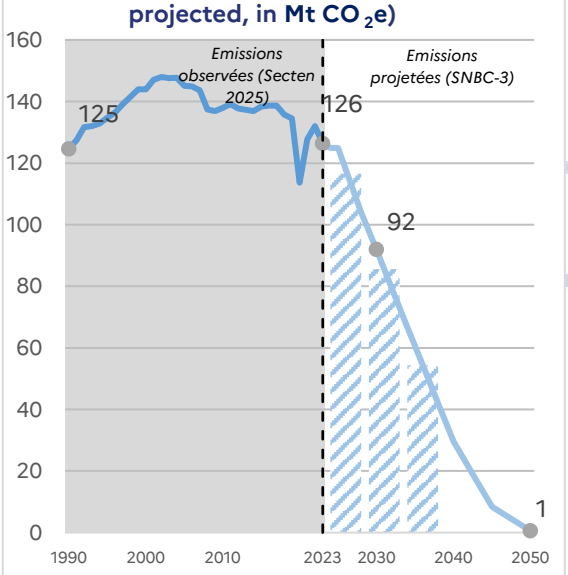
ENSURING ECOLOGICAL TRANSITION FOR MOBILITY AND FREIGHT TRANSPORT, FOR LOW CONSUMING AND DECARBONISED TRANSPORT

1) In 2023, transport emissions amounted to **126.4 Mt CO2e.**

2) The target is to reduce emissions by 26% by 2030, compared to 1990, to reach **92 Mt CO2e** and almost zero emissions (residual emissions in aviation) by 2050.

3) The decarbonisation of the transport sector is based on: **electrification** of land transport (the shift to biofuels and synthetic fuels being reserved for modes of transport that are difficult to electrify, aviation, navigation, or even certain specific uses **of heavy mobility), demand control, modal shift** to active modes and collective transport, **shared uses, including carpooling,** for passengers and mass modes for freight, increasing the average rate of haulage of heavy goods vehicles. The decarbonisation of international air and maritime bunkers is based on **demand management, energy efficiency** and the **decarbonisation of fuels** through the incorporation of biofuels and synthetic fuels. There is still a share of residual fossil fuels in 2050.

Emissions from the domestic transport sector (observed and projected, in Mt CO_2e)



The main public policy guidelines:

Travellers

- Limiting urban sprawl and reducing commuting
- Reducing the most emitting journeys
- Deploying and improving cycling and pedestrian infrastructure
- Developing rail transport, public transport and multimodality
- Encouraging the use of shared modes (carpooling, car-sharing)
- Supporting the production and procurement of affordable and light electric vehicles
- Encouraging the purchase of low emitting and low material-consuming vehicles through maluses and promoting eco-driving
- Deploying a more low-consuming and low-carbon professional mobility
- Electrifying buses and coaches
- Completing the deployment of charging stations (passenger and freight transversal)
- Deploying sustainable fuels, especially in the aviation sector

Goods

- Controlling freight demand and optimizing logistics flows
- Increasing the average weight of heavy goods vehicles
- Developing rail and inland waterway freight
- Supporting the acquisition of electric trucks and encouraging the use of decarbonised commercial modes of transport
- Strengthening distribution networks and the deployment of charging stations (passenger and freight transversal)
- Deploying and using sustainable fuels, including in maritime transport

1. State of play and challenges

1- Domestic transport

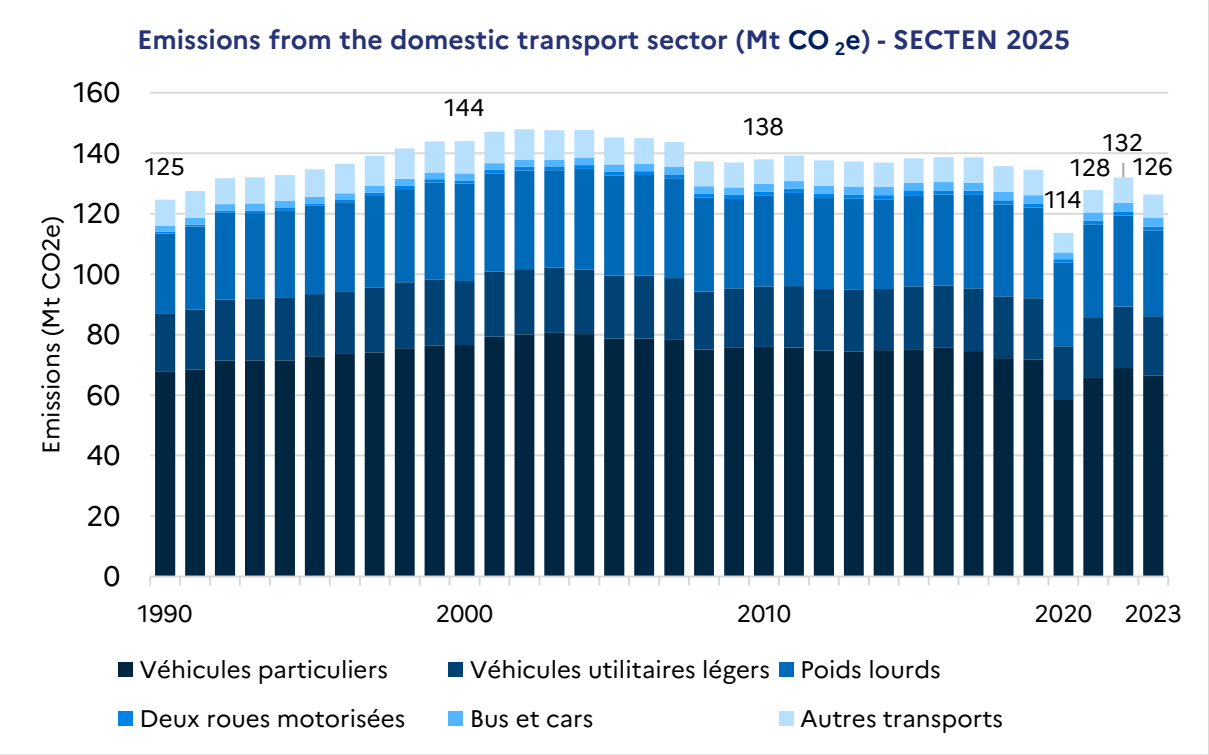


***Figure: 24** Evolution of emissions from the domestic transport sector, in Mt CO 2e (Source: National Inventory of Greenhouse Gas Emissions, Citepa, Secten 2025).*

Transport is the largest greenhouse gas (GHG) emitting sector **in France:** its emissions amounted to 126 Mt CO_{2e} in 2023, representing 34% of national emissions. The two main subsectors are passenger transport, where GHG emissions from passenger cars are 67 Mt CO 2e in 2023, or 53% of the total, and freight transport, where GHG emissions from heavy goods vehicles are 28 Mt CO 2e in 2023 (22% of the total), while commercial vehicles are 20 Mt CO 2e in 2023 (16% of the total). Emissions from the domestic aviation sector represent 4.4 Mt CO 2e, or 3% of the national total (Citepa, Secten 2025). Transport emissions in CO2e equivalent consist of 97.5% CO2, 1.5% HFC, 0.9% N2O. Transport-related energy consumption was 514 TWh in 2023, mainly related to liquid fuels.

Emissions from the transport sector, after having remained for a long time slightly increasing between 1990 and 2003 and then stable until 2017 (the increase in traffic outweighed the decrease in unit consumption), have declined since 2017, driven by an improvement in the energy efficiency of the fleet, the start of electrification of the fleet through its renewal and a slight decline in domestic road and air traffic, which in 2023 did not return to their pre-Covid level.

SNBC 2 provided for a carbon budget of 129 Mt CO_2e/year for the period 2019-2023. The carbon budget was respected with a margin of 2.1 Mt CO 2e/year (i.e. 1.7%), linked to the decrease in traffic during Covid, and the start of electrification of the park. In the latest edition

of the 'with existing measures' scenario (AME 2024 scenario),[118] the measures adopted until the end of 2023 allow emissions to be reduced by 12% in 2030 compared to 1990, and then to reach a reduction of 67% in 2050 compared to 1990, in particular with the targets set at European level on CO2 emissions from new lightweight vehicles.

2- International transport

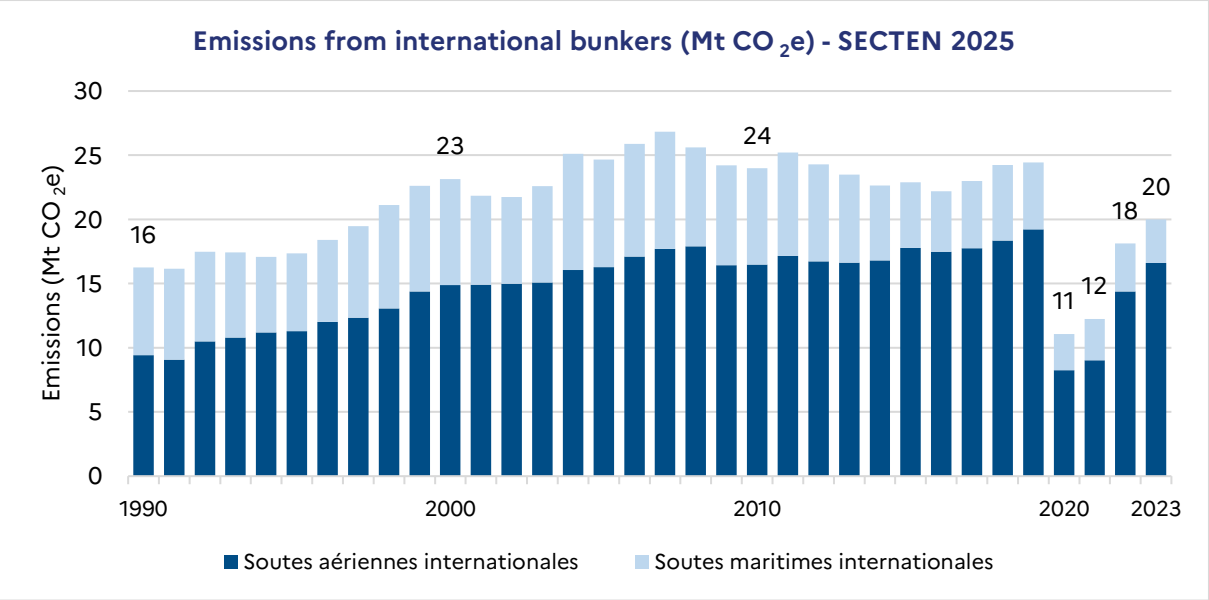


Figure: 25 *Evolution of emissions from international bunkers, in Mt CO 2e (Source: National Inventory of Greenhouse Gas Emissions, Citepa, Secten 2025).*

Emissions from international air and maritime transport attributable to France,[119] i.e. international bunkers (excluded from the national total) grew strongly until 2019 to reach 25 Mt CO 2e (+ 42% between 1990 and 2019), driven by the increase in international air traffic, before experiencing a record drop in 2020 (11 Mt CO 2e) due to the Covid crisis, then a rebound to 20 MtCO 2e in 2023 (including 16.3 Mt CO 2e for air compared to 19.2 Mt CO 2e in 2019 and 3.4 Mt CO 2e for maritime in 2023 compared to 5.6 Mt CO 2e in 2019), below pre-Covid emission levels.

As provided for in the Energy and Climate Act 2019 (Article 3), international bunkers are subject to indicative carbon budgets in this SNBC.

2. Strategy

[118] *WEM report 2024 https://www.ecologie.gouv.fr/politics-public/scenarios-prospectives-energie-climat-air*
[119] *International transport emissions attributable to France correspond to fuel sales from France to international routes.*

a. Presentation of the strategy

1- Domestic transport

Reducing emissions from the transport sector requires action on all levers: demand control, modal shift, increase in the occupancy rate for passenger transport (or vehicle loading rate for freight transport), improvement in the energy performance of means of transport, increase in the share of electric vehicles produced and acquired in France and electrification of means of transport/use of decarbonised energies such as biofuels for uses that are difficult to electrify.

The transport decarbonisation scenario aims to reach **92 Mt CO2e,** a decrease of 26% since 1990 (or 27% since 2023) and a final energy consumption **level of 406 TWh (excluding international bunkers) by 2030.** The aim is to accelerate the electrification dynamics of vehicle fleets by 2030. Two-thirds of new passenger cars sold, half of new light commercial vehicles and heavy goods vehicles sold and 90% of new buses and 30% of new coaches sold in 2030 are 100% electric. Given the rolling stock renewal times, this translates into 15% of the passenger car fleet, and 10% of the electrified trucks fleet in 2030. The energy efficiency of internal combustion engine vehicles, whether through technological improvements or a shift towards lighter and more energy-efficient vehicles, is progressing strongly and contributing to the reduction of emissions. Sufficiency of demand (limitation of urban sprawl, encouragement of the short-distance city), modal shift to active modes (walking, cycling), public and rail transport, as well as the development of carpooling are an essential levers of the reduction of emissions in addition to the change in the vehicle fleet. In freight transport, the target is also to control travel demand and maximise the share of rail and inland waterway freight, in line with the climate-resilience law target of doubling the modal share of rail and increasing the modal share of inland waterway by 50% by 2030.

By 2050, the transport sector is fully decarbonised (at least in the useful phase of the life cycle), with a slight amount of residual emissions in domestic aviation (0.6 Mt $CO_{2e)}$. The fleet of passenger cars and light commercial vehicles is fully electrified in 2050. New trucks sold in 2050 are mostly electric, with some running on hydrogen and some on biofuels. Cycling, public transport and carpooling are reinforced and some trips are avoided or reduced. Urban development takes into account the challenge of limiting travel. Within freight transport, journeys are optimized, rail and inland waterway transport is preferred.

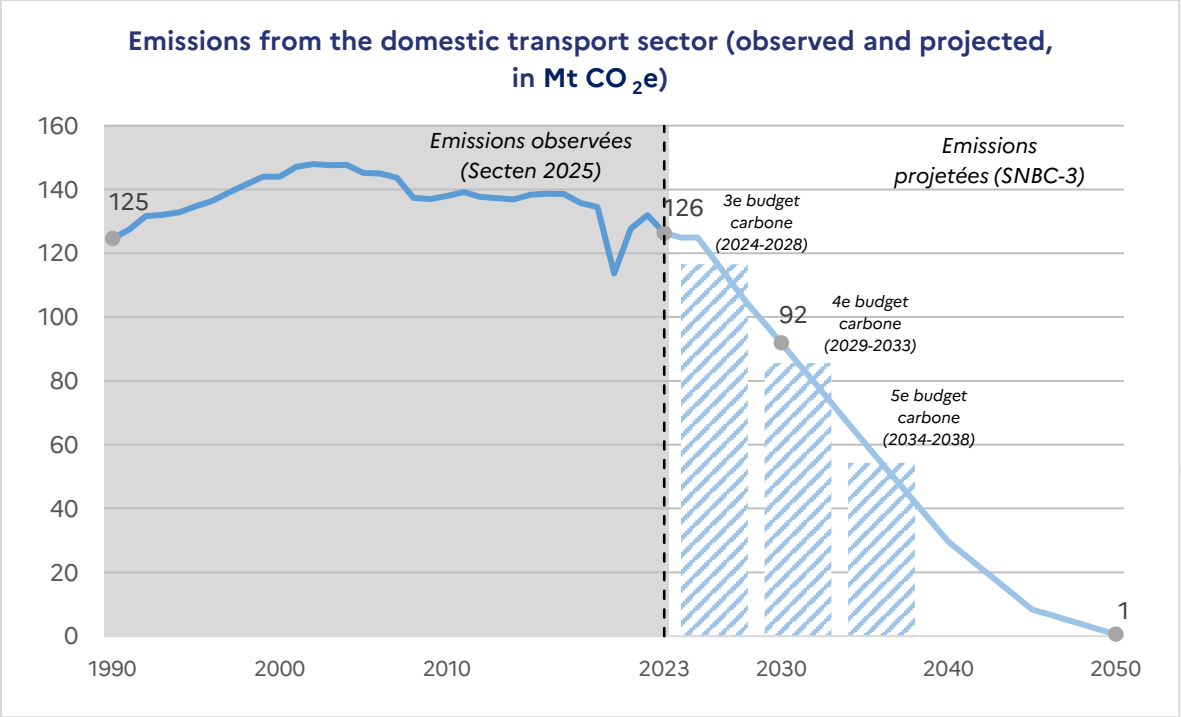


Figure: 26 *Emission trends (historical and projected) in the domestic transport sector (excluding international bunkers) in Mt CO2e between 1990 and 2050 (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC modelling)*

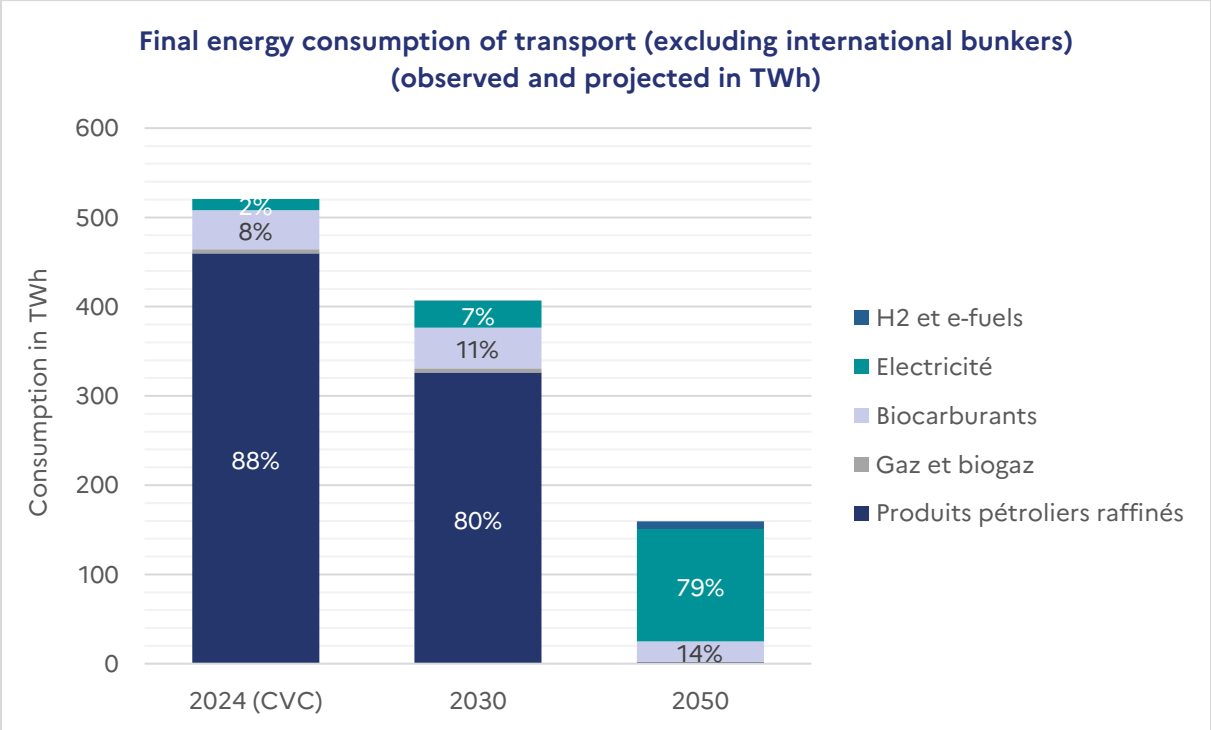


Figure: 27 *Final energy consumption of domestic transport (excluding international bunkers) (history and projections) (Sources: France's energy balance sheet, SDES, 2025 edition; DGEC modelling)*

The GHG emission reductions obtained by levers are described in the following figures.

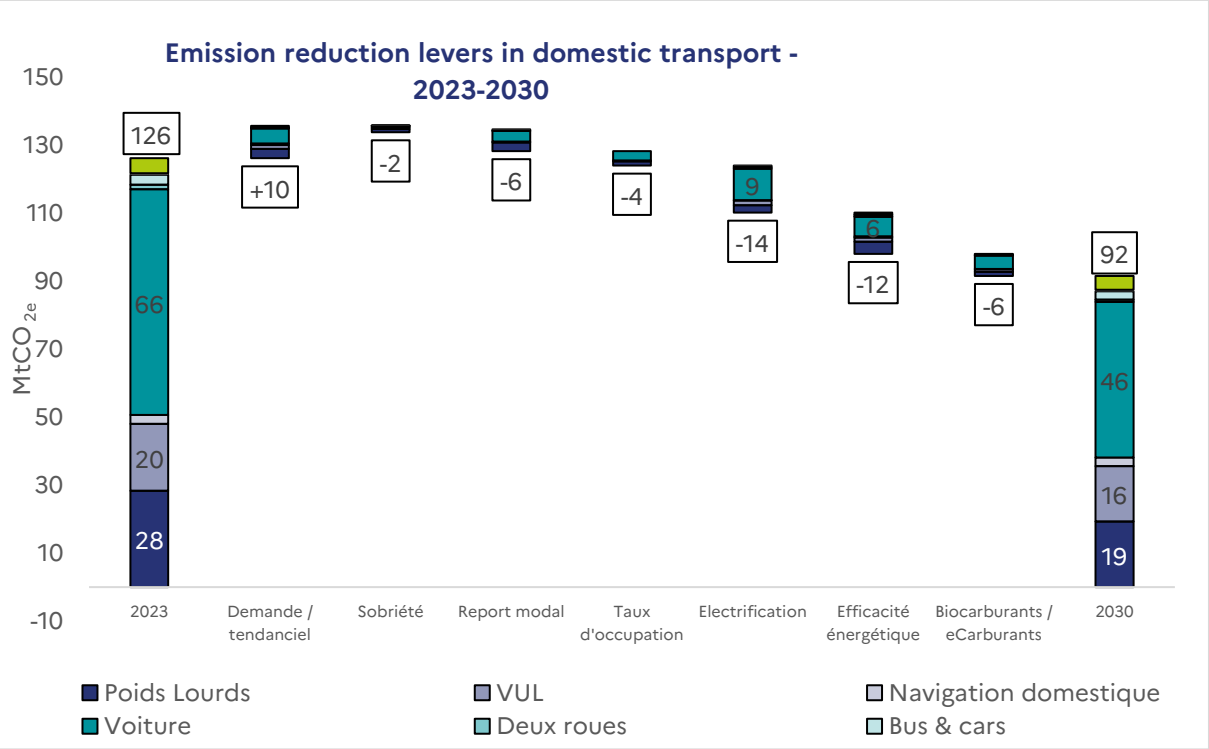


Figure: 28 *Indicative decomposition by lever (LMDI method)[120] of the reduction of greenhouse gas emissions from domestic transport between 2023 and 2030 based on modelling work (Sources: DGEC modelling)*

[120] *The LMDI (Logarithmic Mean Divisia Index) method breaks down the variation in GHG emissions into several explanatory factors: activity, energy intensity, sectoral structure and carbon content of energy. It allows the weight of each lever to be accurately attributed to the overall reduction in emissions, while ensuring that the result remains independent of the order in which those levers are considered.*

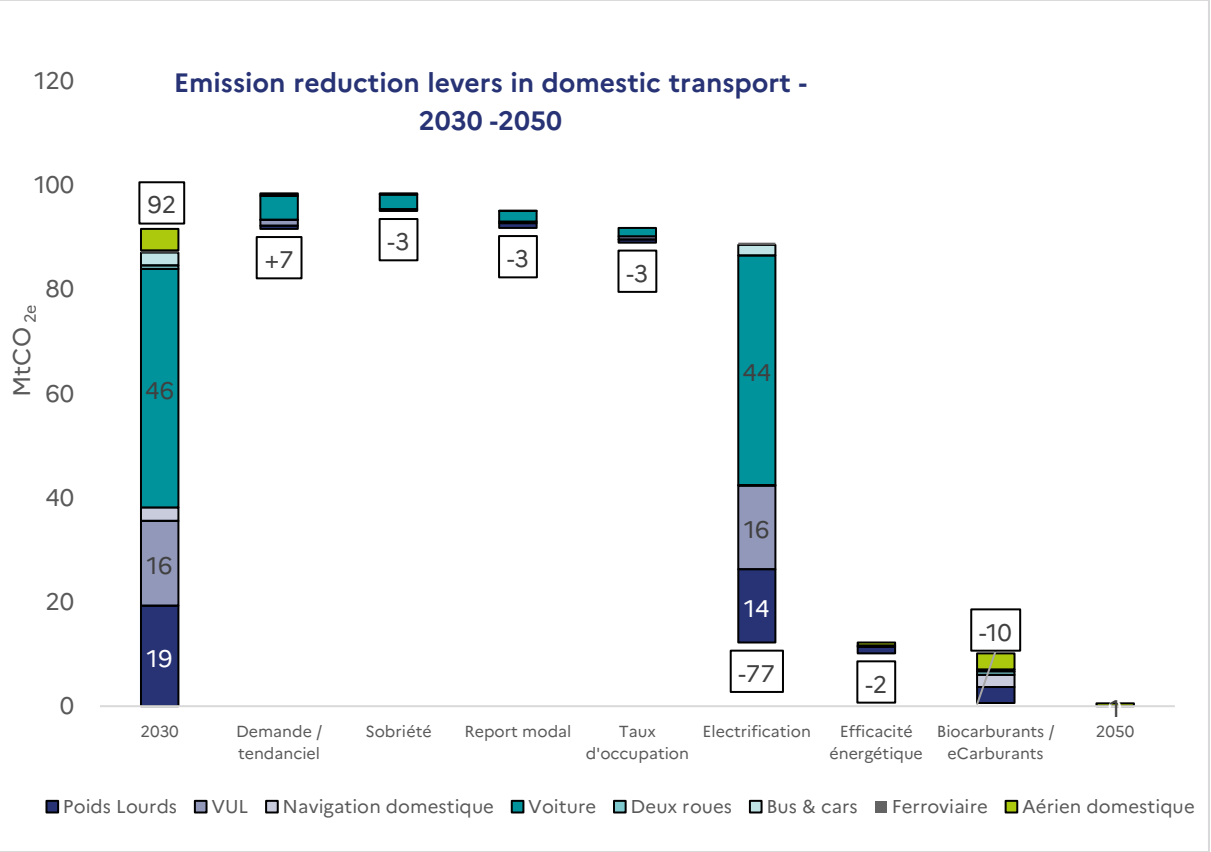


Figure: 29 *Indicative decomposition by lever (LMDI method) of the reduction of greenhouse gas emissions from domestic transport between 2030 and 2050 based on modelling work (Sources: DGEC modelling)*

The Strategy for the Development of Clean Mobility (SDMP) specifies the orientations of the land transport sector in the horizons of the MEP (2030 and 2035) in order to respect the targets and commitments of France in favor of the fight against global warming and the reduction of energy consumption. It is annexed to MEP 3 and operationally reflects SNBC's mobility targets.

2- International transport

As with domestic transport, **reducing emissions from international transport requires action on all levers:** demand management, improving the energy performance of aircraft and ships, optimising operations and developing sustainable alternative fuels. SNBC 3 aims to reduce emissions, reaching 21 Mt CO_{2e} in 2030 (almost stable compared to 2023) and 2 Mt CO_{2e} in 2050.

In line with the recommendations of the High Climate Council (HCC), France will strive, as far as possible, **to achieve climate neutrality by including emissions attributable to France from international air and maritime transport** (reported outside the total in the national GHG inventory). This approach appears to be consistent with the targets set by the main international organisations in the sector (ICAO and IMO). ICAO (International Civil Aviation Organisation) set itself in 2022 the target of achieving net-zero emissions by 2050, including carbon offsetting mechanisms. The IMO (International Maritime Organisation) has also set a net-zero emissions target for 2050. In 2025, the IMO also set itself the target of establishing a

global standard requiring ships to gradually reduce the GHG intensity of their fuels, as well as a global emissions pricing mechanism.

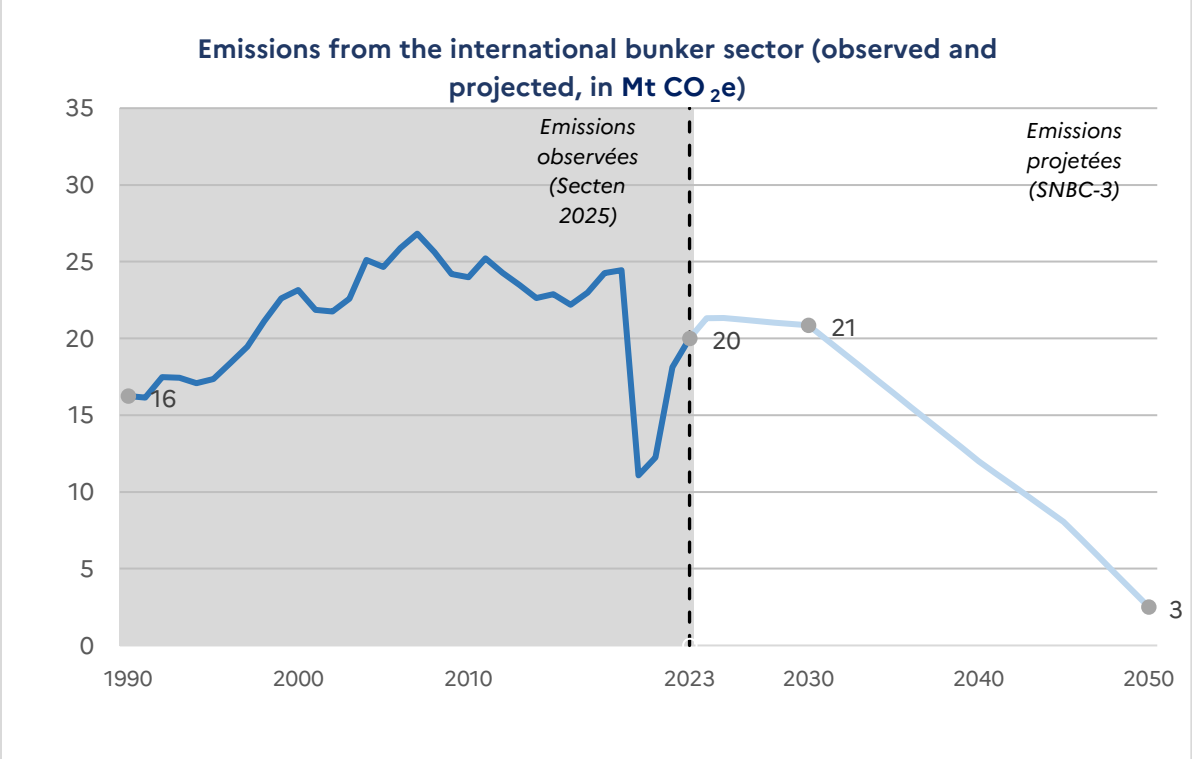


Figure: 30 *Emission trends (historical and projected) of international air and maritime bunkers in Mt CO2e between 1990 and 2050 (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC modelling)*

NB - *Method of accounting for GHGs: By convention, biogenic emissions from the combustion of synthetic fuels made from biogenic CO2 are counted at 0 (as are removals of biogenic CO2 in the emitting sector – energy or industry). When synthetic fuels are manubilld by reusing fossil CO2, the capture of this fossil CO2 is counted at 0 in the emitting sector (energy or industry) and in emissions during the combustion of e-fuels. Efuels must be manubilld from biogenic CO2 starting in 2041. In this scenario it is considered that efuels will be manubilld from biogenic CO2 or captured in air along the entire trajectory.*[121]

The GHG emission reductions achieved by levers are described in the following figure[122].

[121] *In the reference scenario, it was considered to simplify that all efuels will be made from biogenic CO2. This assumption does not exclude the implementation of fossil CO2 projects by 2041.*

[122] *For the transport sector, the reductions are calculated from 2019, taking into account the atypical nature of 2021 due to Covid.*

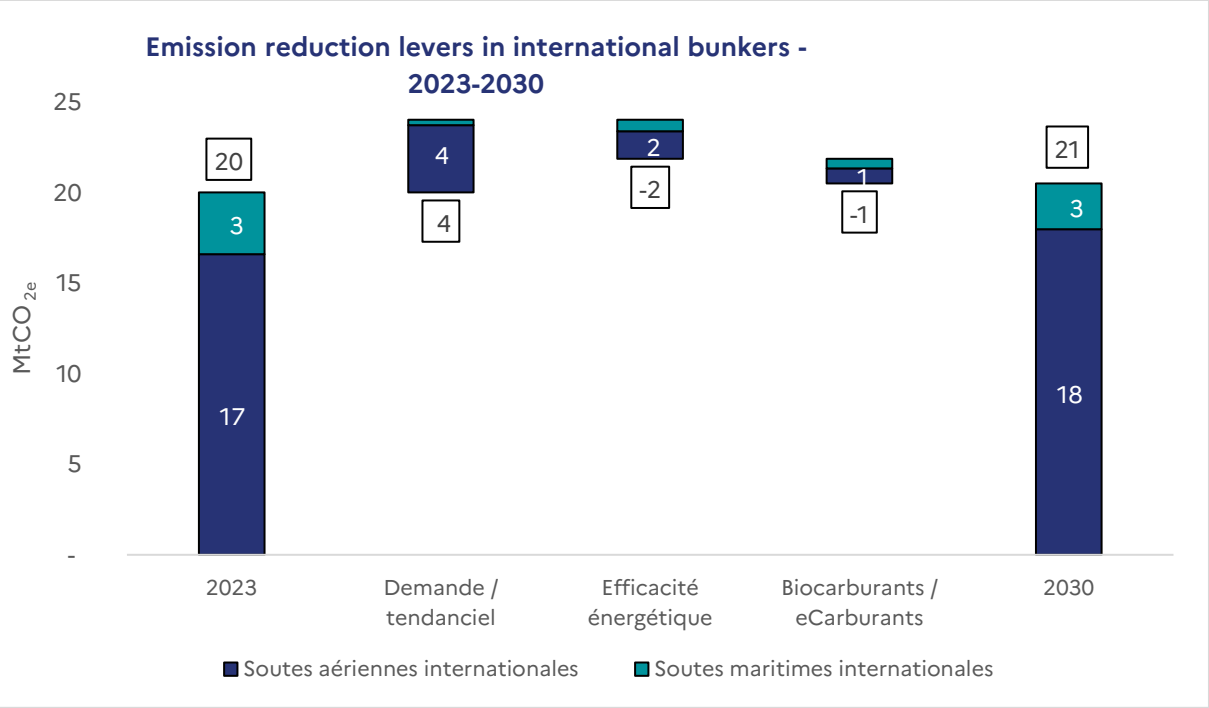


Figure: 31 *Indicative decomposition by lever (LMDI method) of the reduction of greenhouse gas emissions between 2023 and 2030 based on modelling work (Source: DGEC modelling)*

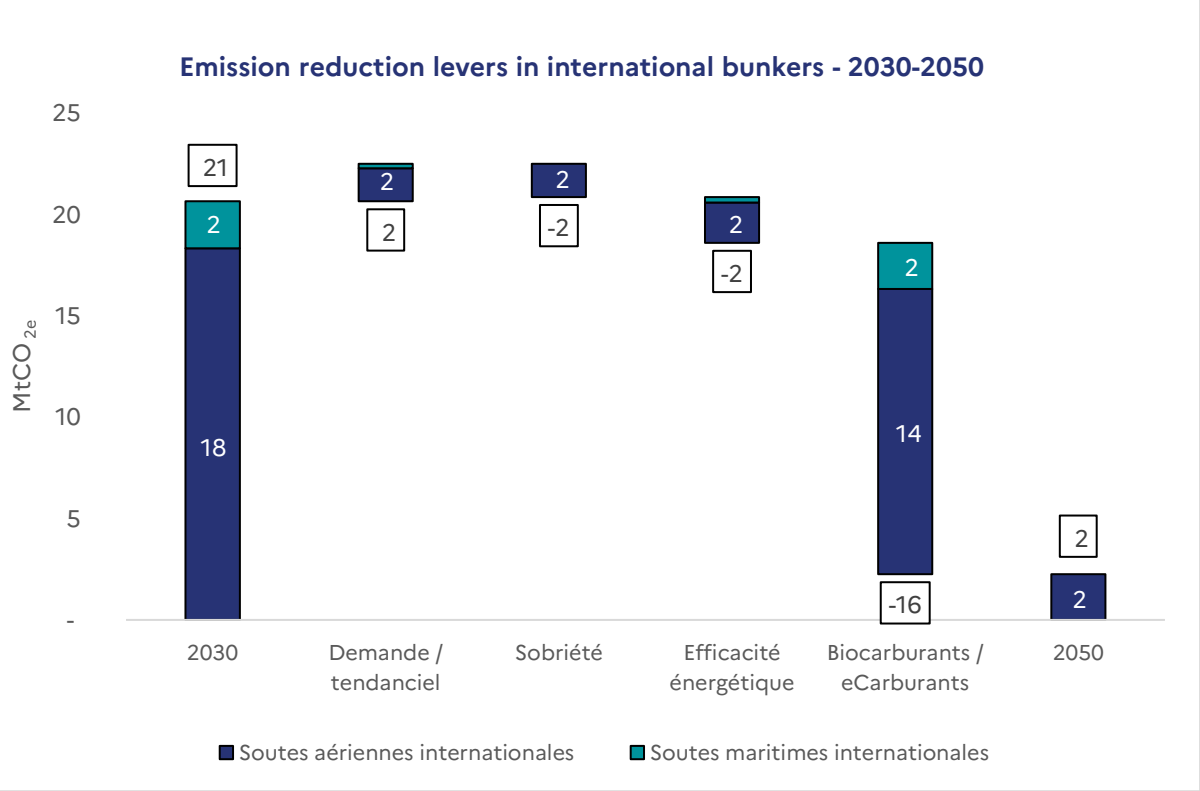


Figure: 32 *Indicative decomposition by lever (LMDI method) of the reduction of greenhouse gas emissions between 2030 and 2050 on the basis of modelling work (Source: DGEC modelling)*

b. Main targets of the transport sector

Decarbonisation of domestic transport	Greenhouse gas emissions	-26% emissions in 2030 compared to 1990 Complete decarbonisation in 2050
Decarbonisation of domestic passenger transport	Electrification of passenger cars	Reaching 66% of new cars and 15% of the fleet in 2030 electric, and 1 million new electric vehicles produced in France in 2030. Multiplying by five the number of recharging points for light electric vehicles on the national road network by 2035 (electrification plan).
	Electrification of buses and coaches	Achieving 90% electric buses in new vehicle sales in 2030 and 100% in 2035. Achieving 30% electric coaches in new vehicle sales in 2030.
	Vehicle energy efficiency	Reducing the consumption of thermal vehicles.
	Modal shift for travellers	Promoting the modal shift from cars to collective or active modes of transport (tripling cycling mobility between 2019 and 2030 and multiplying it by 8 by 2050)
	Vehicle occupancy rate	Tripling the number of car-pooled journeys between 2019 and 2027 (the average number of people per car increases from 1.43 to 1.51 by 2030 for short-distance journeys)
Decarbonisation of domestic freight transport	Electrification of light commercial vehicles	Achieving 51% of new electric light commercial vehicles in 2030 (12% of the fleet)
	Electrification of heavy goods vehicles	Achieving 50% electric trucks in new vehicle sales by 2030 (10% of the fleet).
	Cargo modal shift	Doubling the modal share of rail freight and increasing the modal share of inland waterways by 50% by 2030 compared to 2019
	Loading rate of heavy goods vehicles	Increasing the loading rate of heavy goods vehicles
	Biofuels	Reducing by 14.5% the carbon intensity of energy used in the transport sector in 2030 compared to the reference of 94 g CO_2/MJ, in line with the Renewable Energy Directive, through the use of electrification, the increase in the rate of incorporation of biofuels in land transport by focusing on the development of sustainable fuels and the development of sustainable fuels in the air and maritime sectors.

Decarbonisation of international bunkers	Greenhouse gas emissions	Broadly decarbonising international bunkers by 2050 (via the FuelEU Maritime and ReFuel EU Aviation Regulations) through the development of sustainable fuels, energy efficiency and demand management measures. Providing for the evolution of the post-2035 Carbon Offsetting and Reduction Scheme for International Civil Aviation (CORSIA) and adapt it to the 2050 climate neutrality target adopted at ICAO.
	Giving incentive price signals on the most emitting routes	Strengthening the European carbon trading system, including aviation, and include the maritime sector. Gradually increase the taxation of air tickets. Encouraging changes in usage (development of videoconferencing for business trips).

c. Main orientations of public policies

1- Passenger transport

The guidance presented below is detailed and broken down into operational levers in the Strategy for Clean Mobility for inland passenger and freight transport.

➨ Guideline for passenger transport 1: Limiting urban sprawl and reducing commuting

In connection with the 'Zero net artificialisation' target for 2050, **cities will be densified** by optimising and reusing already built-up areas, encouraging the elevation of already existing buildings, limiting the size of land for single-family homes, mobilising land already artificialised and de-artificialising and renaturating unused areas, in particular brownfield sites, and favouring collective housing over single-family homes. The uses will be diversified to allow greater accessibility to jobs and services.

This densification will encourage the modal shift of the car towards:

- Public transport, provided **that this densification is concentrated around stations and multimodal hubs and,** more broadly, the most efficient public transport stops, current or future (transport-oriented urban planning)
- Active modes for daily commuting (to shops, services, equipment and employment areas), developing the **'city of short distances'** and improving the sharing of roads between the different modes.

Furthermore, by mobilising employers in favour of teleworking, re-assignment as close as possible to places of residence for multi-site businesses, and more accessible and/or better-served locations, part of the greenhouse gas emissions of people who use carbon-based travel means of transport to get to their workplace could be avoided. However, it will be necessary

to monitor the rebound effect of teleworking (i.e. the impact on travel of the relocation of teleworkers moving away from their place of work).[123]

- **Guideline for passenger transport 2: Reducing the most emitting journeys**

Employers will be encouraged to favour videoconferencing, **in order to avoid long-distance travel,** in particular business travel by plane, and, failing that, to choose meeting places that are easily accessible by train.

Carbon **pricing for air transport will be gradually increased** (extinguishing free ETS allowances in 2026, etc.). Compulsory compensation for emissions from domestic flights has also been introduced under the Climate and Resilience Act.

The **regulation of advertising** for internal combustion engines vehicles, with in particular a reform of the CO_2 label and the ban on advertising for the most polluting cars provided for by the Climate and Resilience Law for 2028, **increased transparency on GHG emissions from air transport,** the **promotion of local tourism, the creation and promotion of a new travel imagination and improved access to information to encourage tourists to use low-carbon mobility will allow the public to** better take into account its impact on global warming and to control the increase in demand for mobility.

- **Guideline for passenger transport 3: Deploying and improving cycling and pedestrian infrastructure**

The realization by the local authorities of safe and continuous bike lanes will allow to develop the practice of cycling. By 2030, the ambition is to double the network compared to 2019 to 100 000 kilometres of cycling infrastructure. Infrastructure growth will have to be maintained after 2030 to underpin the momentum. Accessibility by cycling and walking will be facilitated.

- **Guideline for passenger transport 4: Developing rail transport, public transport and multimodality**

The rail mode offers a safe, fast and low-carbon alternative to the car. Together with SNCF-Réseau, the European Union and local and regional authorities, the State wishes to make a major effort to put an end to the ageing of the network by stepping up regeneration efforts, and investing in the modernisation and development of the rail network. Modernisation is based in particular on the deployment of centralised network control (CCR) and the European signalling system ERTMS, and will result in increased reliability, improved journey times and supply for users. The development of the network will increase its capacity and will include the continuation of new railway projects and the development of everyday transport through the commissioning of improved Metropolitan Regional Express Services (SERM). The conclusions of

[123] *See for example: ADEME (2025). Characterisation of the rebound effects of teleworking*

the Ambition France Transports conference were delivered on 9 July 2025, which was an opportunity for the Minister responsible for transport:

- To confirm the ambition of prioritising the regeneration and modernisation of the rail network with an increase in additional effort of EUR 1.5 billion by 2028;
- To announce a re-prioritisation of transport infrastructure development projects with a referral to the Infrastructure Guidance Board (IOC).

In addition to the rail network issues, which are essential for the modal shift to this mode, rail services improvements will also facilitate the modal shift of passengers: standardising the distribution of travelcards and supporting new market entrants. Finally, the renewal of rolling stock on the "balancing" day and night trainlines of the territory should make it possible to improve services.

Massification of peri-urban transport may also take the form, where there is no railway infrastructure, **of express road services, benefiting, where possible, from reserved lanes to avoid congestion at the entrance to agglomerations** – some of these lanes may also accommodate carpooling.

The expected modal shift in daily commutes **to limit the use of single-cars can only be achieved at the cost of strengthening the offer and quality of service of public transport,** by improving its reliability, hourly range, frequencies and commercial speed, by improving the user experience, in particular by means of multimodal digital services for journey search, booking and payment, and by means of appropriate pricing policies. Local and regional authorities and their associations, which organise mobility, will have a key role to play in the development of public transport. The 2025 Finance Law establishes a regional and rural mobility payment that finances the mobility expenditure of the regional mobility organising authority. In addition, the Ambition France Transports mobility financing conference held from May to July 2025 highlighted the challenge of strengthening and diversifying the AOMs' business model by activating several levers, in particular the optimisation of expenditure and the diversification of revenue, in particular those resulting from the contribution of users and local taxation.

Local and regional AOMs, as well as road managers, will have to cooperate (for example by relying on the operational mobility contracts provided for by the Mobility Orientation Law, the SRU joint unions,[124] or the expertise of CEREMA) in order to organise seamless **intermodality** offering users a sustainable alternative that is as efficient and easy to use as cars, including in connection with trains and coaches for the 'last mile'.

In addition, the **deployment of micro-electric cars and other intermediate vehicles** (quadricycles, cars without permits, etc.) for daily journeys will diversify individual modes of transport and increase energy efficiency.

[124] *Joint unions set up by the Solidarity and Urban Renewal Act to promote cooperation between transport organising authorities of different levels*

➨ Guideline for passenger transport 5: Encouraging the use of shared modes (carpooling, car-sharing)

Focus – the roll-out of Metropolitan Regional Express Services (SERM)

Metropolitan regional express services consist of a multi-modal offer of services (including strengthening the rail offer, setting up high-level road transport services) to better serve peri-urban areas with more frequent and reliable services. SERMs have two main targets:

- Reducing dependence on cars, by promoting the modal shift towards public transport, aimed in particular at people who live in peri-urban areas and have their activities in the heart of the metropolis (work, studies, shops, leisure activities, etc.). This modal shift makes it possible to reduce greenhouse gas emissions, limit congestion on the main roads and improve the quality of life in urban areas;
- To be a tool for rebalancing the territory, favouring the densification of station districts and limiting urban sprawl, thus correcting the negative effects that metropolisation may have generated.

The framework for the deployment of SERMs is provided by Law No 2023-1269 of 27 December 2023. It provides for projects to be led by regional and local AOMs. It provides for SERM status to be granted by ministerial order, prior to the mobilisation of financial and organisational tools capable of speeding up their implementation. It sets the target of deploying at least 10 SERMs within 10 years of the enactment of the law.

Unveiled in December 2022, the new carpooling plan aims to multiply by three daily commutes, carpooled by 2027. Concrete **solutions** (reserved lanes, employers' commitment to offering the Sustainable Mobility Package to their agents, local authorities drawing up a local strategy and action plan with, for example, carpooling lines, carpooling areas, communication, etc.) will make it possible **to develop these practices and continue the momentum beyond 2027.**

Carpooling should be encouraged with the establishment by local authorities of infrastructure facilitating use (areas, lines, reserved lanes) and animation and financial incentives. In particular, the aim is to:

- Achieve national coverage by departmental car-pooling schemes, increase the number of car-pooling areas (+ 10 to 15 areas per department);
- Develop carpooling lines (at least one structuring line per department) in particular in the context of metropolitan regional express service projects;
- Support for and accelerate experiments on reserved lanes (in particular those provided for under the Climate and Resilience Law);
- Set up and strengthen animation campaigns or even financial incentive campaigns.

At the same time, the **development of car-sharing will contribute** to limiting the number of cars in circulation. Modal shift, carpooling, car-sharing are essential elements of the scenario as they reduce the need for resources for battery manufacturing as well as electricity consumption.

Guideline for passenger transport 6: Supporting the production and procurement of affordable and light electric vehicles

The State is committed to the French automotive sector as a whole to enable and **accelerate the electrification of the ecosystem** (automotive manufacturers, subcontractors, and suppliers) via the France 2030 schemes to support electrification projects with a production target of 1 million electrified vehicles per year by 2030 set by the electrification plan published in April 2026. In 2035, the share of electric vehicles in sales of new light vehicles is expected to approach 100% in line with the European guidelines.

As regards demand, incentives, such as the ecological bonus integrated since July 2025 into the energy savings certificate (EEC) scheme, are expected to evolve over time, in particular in order to maintain or strengthen their environmental and social dimensions. This was achieved on the green bonus with its focus on electric passenger cars achieving a minimum environmental score, and the introduction of a more favourable scale for modest households. An eco-efficient **electric car rental scheme** to facilitate the equipment of low-income households with electric vehicles by providing access to affordable rental offers was put in place in 2024 and has since been renewed as an Energy Savings Certificate program.

The Decree on the sixth period of the Energy Savings Certificate scheme, which started on 1 January 2026, published in the Official Journal on 4 November 2025, lays down the annual energy savings obligations to be met by electricity, gas, heating and cooling suppliers, as well as fuel and heating oil suppliers, for the years 2026 to 2030. It reinforces the role of energy savings certificates in achieving national energy and climate targets by setting a total energy savings obligation of 1,050 TWh cumac per year, an increase of 27% compared to 2023-2025.

Focus – Electrification Plan measures to support the uptake of electric vehicles

As part of the electrification plan published in April 2026,[125] a new edition of the social rental scheme ('leasing') is committed to 50 000 vehicles for 2026. Aid increases are planned for cars, batteries and engines produced in Europe. The scheme targets working modest households in the first five income deciles.

The electrification plan also provides for an increase in the amount of the ecological bonus to support the purchase of electric cars by households who are dependent on their vehicle for their professional activity, cover long distances, and cannot benefit from the social

[125] *https://www.ecologie.gouv.fr/press/plan-delectrification-energy-less-research-more-sovereign-more-sustainable*

leasing, with the target of triggering the purchase of an additional 50 000 electric vehicles by the end of 2026.

- **Guideline for passenger transport 7: Encouraging the purchase of less emitting and less material-consuming vehicles through maluses and promoting eco-driving**

The acquisition of light passenger vehicles, which are less resource-intensive than heavier alternatives and **have low CO2 emissions,** is encouraged through a gradual increase in vehicle taxation for vehicles registered for the first time in France, which are the most emitting and the heaviest (malus on CO2 emissions and malus on the mass of the vehicle). In addition to the arrival of new, fuel-efficient vehicles, **changes in driving patterns such as eco-driving will be** encouraged.

Focus: the trajectory of reinforcing the malus on the most emitting and material-consuming vehicles

The malus on CO2 emissions and the malus on the mass of vehicles have been reinforced in the framework of multiannual trajectories defined in finance laws.

Thus, the threshold for triggering the malus on CO2 emissions was lowered by 5 g CO_2/km from 1 March 2025, then by 5 g CO_2/km on 1 January 2026 to reach 108 g CO_2/km. The threshold for triggering the tax will be lowered by 5 gCO2/km in 2027.

The threshold for triggering the mass malus was lowered from 100 kg to 1500 kg on 1 January 2026. The exemption for non-eco-scored electric passenger cars is abolished as of July 2026, with a reduction for these vehicles of 600 kg. Discounts for plug-in hybrid vehicles (200 kg) and non-plug-in hybrid vehicles with an electric motor of 30 kW (100 kg) or more shall be maintained.

- **Guideline for passenger transport 8: Deploying a more low-carbon and low-carbon job mobility**

The tax framework **for company cars and fleets will be gradually revised** to encourage the use of carpooling, car-sharing, active modes, public transport modes and 100% electric vehicles.

Employers will be mobilized to ensure the implementation of employer mobility plans, mobility credit and the Sustainable Mobility Package.

Every year, companies are responsible for more than half of new passenger car registrations and professional vehicles drive on average twice as much as private vehicles. In addition, cars acquired by companies are on average owned for less time than those acquired by private individuals, and thus come to supply the second-hand car market with recent models. Fiscal and financial incentives as well as greening obligations for fleets will be reassessed to allow for a rapid increase in the share of electric cars acquired by companies.

Through the management of their public fleets, local and regional authorities and the State will also play a key role in decarbonising the vehicle fleet. The electrification plan published in April 2026 provides that 100% of the vehicles acquired during the annual renewals of the State fleet will be electric as soon as the operating conditions allow it.

In line with the initial 2025 Finance Law, corporate taxation should evolve to better take into account the environmental impact of vehicles. Since [1] February 2025, the assessment of the benefit in kind of passenger cars made available to a company employee thus provides for a distinction between electric passenger cars with a minimum environmental score. The accounting depreciation of vehicles should also be reviewed.

Focus: greening quotas for large corporate fleets

Measures to ensure that legal persons with a large fleet of vehicles comply with their greening obligations under the Mobility Guidance Act are being developed. Under the 2025 Finance Law, an incentive tax was introduced for fleets of companies with more than 100 vehicles, in order to increase the number of companies effectively greening their fleet. If fleets do not reach a multi-annual greening target trajectory, they pay a tax taking into account the number of missing vehicles compared to the target, weighted by the renewal rate. The target is gradually increasing from 15% in 2025 to 48% in 2030 on average on vehicles purchased in the current year and the previous three. Through this four-year trajectory, the target is to achieve a 70% incorporation rate for acquisitions in 2030, in line with the target of 66% of electric vehicles sold in 2030 on all sales.

Guideline for passenger transport 9: Electrifying buses and coaches

Electrification will also increase in public transport vehicles, driven by fleet renewal obligations with clean vehicles, the gradual reduction of the cost of purchasing electric vehicles, as well as European regulations setting CO2 emission standards for new trucks.

In parallel with the development of the electric bus and coach industry, the State will be able to use various levers (budgetary, energy-saving certificates, tax and regulatory) to encourage passenger transport companies to favour electric engines over internal combustion engines.

Support for the installation of depot charging stations will be reinforced in parallel with a policy to support high-power charging installations while roaming in order to ensure energy accessibility at all points in the territory at homogeneous and economically acceptable costs for actors.

Guideline for passenger transport 10: Completing the deployment of charging stations

The number of charging stations now reaches 2.8 million charging stations in the territory, including more than 185 000 in public spaces. The public authority will continue its efforts, with

the target of developing around 400 000 public charging stations accessible in 2030 (of which around 50 000 are fast-charging, and around 9 GW of cumulative power on all publicly accessible charging stations), to enable users of electric vehicles to charge their vehicles as soon as necessary, on the road for normal charging, and near major roads for high-power charging, in addition to deployment in individual and collective residential. Monitoring will be encouraged and facilitated to have the least possible impact on the distribution network.

Regulation (EU) 2023/1805 on alternative fuels infrastructure adopted in 2023 sets a dual target of covering motorway networks with high-power stations and installing cumulative power proportional to the number of electric vehicles in circulation at national level.

The calls for projects launched from 2021 onwards supported recharging operators to ensure the coverage of the national road network with high-power recharging stations. These stations allow electric vehicles to take up several hundred kilometers of range over the typical duration of a break in the service area and open long-distance journeys to the motorists concerned.

In order to allow real-time consultation and monitoring of the availability of these stations, operators must ensure the availability of open data on the status of terminals. These data make it possible to identify possible saturations of charging stations and inform on the fluidity of movements in electric vehicles.

The master plan for the deployment of recharging infrastructure for electric vehicles along the national road network foresees a fivefold increase in the number of recharging points for light electric vehicles on the national road network by 2035 with an estimated need for around 22 000 charging points across approximately 900 areas.

The deployment of private charging stations (co-ownerships, homes, companies) will also continue to be supported.

- **Guideline for passenger transport 11: Deploying sustainable fuels, especially in the aviation sector**

The **obligations on fuel distributors to incorporate alternative fuels and electricity into transport** will be progressively strengthened. In order to promote the biofuels with the highest greenhouse gas emission reduction rate, a new mechanism (IRICC) will set the obligations in the form of a reduction in the 'well to wheel' carbon content of the energy used in the transport sector. The development of biofuels will be accompanied by increased sustainability and monitoring under the EU Renewable Energy Directive (RED III). For road transport, the use of biofuels will be targeted towards uses that are difficult to electrify.

The State **continues to support the installation of plants for the production of advanced biofuels produced from residues** and waste and from sustainable synthetic fuels (hydrogen, methanol, e-methane, etc.) for the aviation and maritime sectors, as recently under the 'CarbAéro' call for projects.

Biofuels will also be developed in rail, where a need of 1 TWh is identified, as well as in waterways, for which a need of 0.5 TWh is identified.

Aviation and maritime will increase their use of sustainable alternative fuels, in line with European targets. In order to limit emissions at berth and recharge the batteries of electric-

powered or hybrid-powered vessels, electric hook-up and charging stations will be deployed in commercial ports and waterway docks.

The State will pay attention to the deployment of low-carbon passenger ships dedicated to routes falling within the scope of a public service mission (island service, river crossings, amphidrome ferries). In addition to seeking energy efficiency, these vessels will have to deploy technologies adapted to the distance travelled and use energy (sustainable fuels, electricity) adapted to the port infrastructure concerned. The Boating and Recreation Roadmap published in 2025[126] sets out a set of actions to promote the energy and environmental transition of boating and pleasure craft, including promoting the development of electric powertrains where relevant and access to alternative fuels in marinas.

2- Freight transport

- **Guideline for freight transport 1: Controlling freight demand and optimizing logistics flows**

Freight transport activities are carried out on behalf of the economic activities that order the transport services necessary for their activity. The reduction of GHG emissions from freight transport is therefore largely dependent on the production organisation choices of the sectors of activity.

Logistical issues must be integrated into territorial planning, and **in particular better take into account the link with the location of logistic land, the supervision of fast and/or offered delivery** (responsibility of shippers, consumer information, etc.) or the evolution of industrial processes with just-in-time flows. Transformations in the construction and industrial sectors will reduce certain freight needs, which can sometimes be offset by an increased need linked to a reindustrialisation logic.

The State will endeavour to **promote a sector-by-sector approach** in order to identify the brakes and levers specific to each type of goods. In terms of stakes, of the 30 Mt CO_{2e} represented by heavy goods vehicle emissions in 2019, the respective contributions of the main sectors of activity are 7 Mt CO_{2e} for the construction sector, 9 Mt CO_{2e} for the agri-food sector and 11 Mt CO_{2e} for the transport of miscellaneous goods. It is proposed to explore with the sectors possible ways to reduce the number of movements of goods and the mileage travelled.

- **Guideline for freight transport 2: Increasing the average weight of heavy goods vehicles**

In addition, **logics for pooling and massifying logistics flows will be put in place** to optimise the loading rate and the distances covered by heavy goods vehicles: digital solutions to identify and anticipate future flows, optimization of delivery frequencies of professionals, tools for

[126] *https://www.ecologie.gouv.fr/press/launch-feuille-route-du-nautisme-plaisance-2025-2030*

sharing flows between sectors, use of a double floor, development of logistics hubs on the outskirts of cities, etc.

In the same way as for the optimisation and reduction of flows, one line of work per sector will have to be adopted.

- **Guideline for freight transport 3: Developing rail and inland waterway freight**

Published at the end **of 2021, the national strategy for the development of rail freight**[127] identifies 72 concrete measures to double the modal share of rail freight by 2030 (national master plan for combined transport, stepping up 'services & infrastructures' platforms, etc.), addressing four major challenges: ensure the viability of services and the sustainability of the business model of rail freight operators, improve the quality of service provided by SNCF Réseau, strengthen the performance of infrastructure enabling the development of rail freight, develop coordination with harbours and waterways. Better pricing of the externalities of the different modes of transport (in particular road freight) would help to promote this modal shift. In addition, the regeneration and modernisation of the network mentioned in the previous section on passenger transport will also increase the capacity of the network for freight transport.

Signed in April 2020, the target and performance contract for Voies navigables de France (French Waterways) gives priority to the regeneration and modernisation of the network and the development of the Seine-Escaut network. The sector's commitments to green growth include support for the greening of the fleet through the renewed plan for modernisation and innovation for the period 2023-2027.

In addition, the Mediterranean-Rhône-Saône axis project aims to multiply by 2.5 the number of containers transported by waterway and by 2 the share of rail freight by 2030.

- **Guideline for freight transport 4: Support the acquisition of electric trucks, and encourage the use of decarbonised commercial modes of transport**

In order to speed up the electrification of freight transport, in addition to developing the industrial offer of electric heavy goods vehicles, the State will be able to use various financial levers, relating to energy savings certificates, tax and regulatory incentives for freight transport companies to favour electric motors over internal combustion engine motors, electric motors being able to benefit from more advantageous schemes to compensate for the current competitive gap between motors. The electrification plan unveiled by the Government in April 2026 sets targets and amounts of aid for the purchase of electric goods transport vehicles.

Clients **will also be supported** to shift their transport demand towards less emitting modes (modal shift, use of decarbonised road vehicles) by incentives or obligations. In particular,

[127] *https://www.ecologie.gouv.fr/public-policies/national-freight-rail strategy*

incentives for contractors to green and electrify transport demands would make it possible not to place liability exclusively on fleet owners.

For **last-mile deliveries in urban areas,** cargo bikes and **intermediate transport** vehicles (between bicycles and commercial vehicles) may be an additional option in their area of relevance.

Although already widely practised, eco-driving will be further encouraged, in order to reduce consumption.

- **Guideline for freight transport 5: Strengthening distribution networks and the deployment of charging stations**

In addition to the network of charging stations for lightweight vehicles, **charging stations for trucks will be deployed at the** depot of carriers, but also of high-power stations, while roaming and at destination, in logistics bases, urban nodes, freight areas, on major roads in consultation with the operators of road networks or logistics sites (motorway concession companies, the State, local authorities, ports, etc.), as well as with the operators of the electricity network to ensure the development and strengthening of distribution networks in line with needs, in particular in terms of power demand.

The master plan for the deployment of charging infrastructure for electric vehicles along the national road network plans to increase the number of heavy-duty charging points to around 8000 mixing ultra-fast charging for short breaks with slower charging for night breaks.

Support and financial support for the installation of public charging stations, on deposit, on the areas of the national road network and at destination on the main logistics or industrial centers will be developed to ensure accessibility to energy in the territories, at homogeneous costs and economically acceptable to the actors.

- **Guideline for freight transport 6: Deploy and use sustainable fuels for maritime transport**

The use of energy efficiency solutions, from assistance to velic propulsion, as well as the use of sustainable alternative fuels (biofuels, synthetic fuels) reduce emissions from the maritime sector, for both cargo and passenger ships. The targets, regulations and carbon pricing tools of the European Union (notably the FuelEU Maritime Regulation) and the International Maritime Organisation (IMO) support this strategy.

The European texts (target for the minimum incorporation of 1.2% renewable fuels of non-biogenic origin in the maritime sector in line with RED III[128] and for the reduction of the carbon intensity of energy used by ships by 6% in 2030 in the FuelEU Maritime Regulation, equivalent to around 9% biofuel incorporation rate) support the target of 11% biofuel incorporation rate and 5% e-fuels of the 2030 scenario. By 2050, the Fuel Maritime Regulation provides for a

[128] *European Renewable Energy Directive ("RED III")*

reduction in the carbon intensity of fuels of 80%, which implies a quasi-decarbonisation of the sector.

In addition, the government announced in May 2025, at the last Interministerial Committee for the Sea (Cimer), that the State would mobilise the revenues of the European carbon market (EU ETS) from the maritime sector, as well as any penalties applicable in the FuelEU system, for the decarbonisation of maritime transport. A call for projects was launched in 2026 to support the decarbonisation of ships (acquisition aid, industrial investments, investments in port infrastructure).

d. Main elements of the SNBC 3 scenario:

Passenger transport

- **Control of transport demand:** Stabilization (or slight growth) of the number of kilometres travelled per year per person in all modes (excluding international transport), while this increases in trend.
- **Modal shift:** increase in the use of public transport (bus, coach, train) by 25% by 2030, and by 55% by 2050. Strong increase in bicycle use (from 5.5 billion to 19 billion voy-km from 2019 to 2030; 8-fold increase by 2050).
- **Carpooling:** the average number of people per car for short-distance journeys (journeys of less than 100 km) increases from 1.43 to 1.51 by 2030, which corresponds to a tripling of the number of car-pooled journeys between 2019 and 2027 and a continuation of the trajectory until 2030. In total, all types of journeys combined, the number of people per car rises from 1.65 in 2019 to 1.72 in 2030 and to 1.82 in 2050.
- **Traffic trends:** car-kilometre traffic decreases by 7.5% between 2019 and 2030 and by 13% between 2019 and 2050
- **Electrification of lightweight vehicles:** the share of electric passenger cars in new vehicle sales grows rapidly, reaching 66% in 2030, bringing the share of electric cars in the fleet to 15%. As early as 2035, the sale of new light internal combustion engine vehicles, including plug-in hybrids and hybrids, ceases, leading to full electrification of the fleet by 2050.
- **Electrification of buses and coaches:** the share of electric buses and coaches is increasing rapidly: 90% of new buses in 2030 are electric and 30% of new coaches in 2030 are electric. From 2035, 100% of new buses are electric, in line with the European target. By 2050, 85% of new coaches are electric and 5% run on hydrogen.
- **Improving the energy efficiency of lightweight vehicles:** the average consumption of new internal combustion engine passenger cars decreases by 9% by 2030 compared to 2023, supported by a shift towards lighter, less-consuming vehicles, eco-innovations and eco-driving, and remains stable thereafter until 2035. New electric cars efficiency is also improving.
- **Use of biofuels and synthetic fuels and achievement of the targets of the Renewable Energy Directive:** the use of sustainable fuels in air and maritime transport, the development of electricity in road transport (predominant) and short sea shipping (island ports and waterways), the increase in the rate of incorporation of biofuels in land transport, relying primarily on the development of sustainable fuels, achieves a target of

a 14.5% reduction in the carbon intensity of the energy used in the transport sector in 2030, compared to the benchmark of 94 g CO_2/MJ.

- **Control of demand for air transport:** demand for air transport increases in the central scenario by 2030, differentiated by segment, with a decrease of 24% on domestic mainland flights compared to 2019, a growth of 16% for flights towards overseas French territories and a 17% growth for international traffic. By 2050, traffic decreases by 38% compared to 2019 on routes within France in a modal shift to the train; increases by 22% on flights to DROMs (French overseas territories) and by 20% on international flights. By comparison, in a scenario "with existing measures on 1 January 2025" the growth of international traffic by 2050 is 45% in 2050 compared to 2019.
- **Improving the energy efficiency of aircrafts:** the development of more efficient aircraft to replace current fleets, combined with an increase in average take-up, reduces unit consumption (per passenger-km) by 14% by 2030 and by 33% by 2050 compared to 2019.
- **Use of sustainable aviation fuels:** the use of sustainable alternative fuels (including sustainable biofuels and synthetic fuels made from low-carbon hydrogen) or long-term low-carbon hydrogen in air is increasing to 6% in 2030 and 20% in 2035, in line with the European RefuelEU Regulation, and then goes beyond 2050 with an incorporation rate of 85% against 70% in Refuel, in line with the 'acceleration' scenario presented in the air decarbonisation roadmap[129] and in a scenario logic 'with additional measures'. Part of the synthetic fuels is imported according to the production capacity on the national territory and the availability of decarbonized electricity.
- **Improving the energy efficiency of ferries and cruise ships:** slower speeds, the integration of equipment improving energy performance, the increase in the load factor of ships, make it possible to reduce unit consumption (per passenger.km). On some routes, in particular to islands, the modal shift from aviation to maritime transport can reduce the impact of transport. In particular, the AFIR Regulation provides for the obligation to connect at berth for passenger ships of more than 5 000 UMS from 2030.
- **Use of sustainable maritime fuels:** Passenger ships over 5,000 UMS calling at European ports are subject to the EU-ETS Maritime and FuelEu Maritime, which imposes a 6% reduction in the greenhouse gas intensity of fuels used in 2030 and up to 80% by 2050. RED III[130] sets a target for the minimum incorporation of 1.2% renewable fuels of non-biogenic origin in maritime transport in 2030.

[129] https://www.ecologie.gouv.fr/sites/default/files/documents/Proposition%20de%20feuille%20de%20route%20d%C3%A9carbonation%20transport%20a%C3%A9rien.pdf

[130] *European Renewable Energy Directive ("RED III")*

Sensitivity test 1. Relaxation of vehicle regulations

On 16 December 2025, the European Commission presented a proposal for a revision of the EU Regulation on VPs and LCVs, which proposes certain flexibilities in achieving the 2030 emission reduction targets for new cars and light commercial vehicles, as well as replacing the 2035 end-of-sale target for thermal vehicles with a target to reduce emissions from new cars and light commercial vehicles by -90% by that time. These flexibilities compared to current regulations would result in additional emissions of 6.4 Mt CO2e in 2050.

Sensitivity test 2 – Traffic variant in the aviation sector by 2050: 40% increase in traffic over the period 2019-2050

The level of air traffic by 2050 is subject to high uncertainties, which impacts the amount of residual emissions in 2050 and the amount of electricity consumption required for the manufacturing of low-carbon synthetic fuels. In the context of the construction of the central reference scenario of SNBC 3, **a variant was considered on the development of international air traffic.** At a rate of incorporation of sustainable aviation fuels identical to the central scenario (i.e. 50% e-fuels and 35% sustainable biofuels, compared to 15% fossil kerosene), a 40% increase in international air traffic between 2019 and 2050 would imply an increase of 9 TWh in the electricity consumption needed to produce the additional e-fuels, an increase of 3.5 TWh in the consumption of biofuels, which could require additional imports and emissions of 0.4 Mt CO_2e/year in 2050.

Sensitivity test 3 – Variant rate of incorporation of sustainable fuels in the aviation sector by 2050

The incorporation of sustainable aviation fuels (SAF) in air cargo is a key assumption for the decarbonisation of the aviation sector. The EU ReFuel Regulation sets targets for the incorporation of SAF, including a target of 70% by 2050. The SNBC 3 scenario chooses to go beyond this rate by 2050, in line with the ambition set out in the 'acceleration' scenario of the sector roadmap and in the spirit of a strategy based on the adoption of measures additional to existing measures (e.g. the upward revision of the ReFuel EU Regulation in the coming years), in particular for the long term.

If the incorporation targets in 2050 were ultimately close to the targets currently set by ReFuel EU, this would result in constant traffic:

- the emission of additional greenhouse gases by the aviation sector via fossil kerosene consumption (approximately 2 Mt/year);
- A decrease in the consumption of electricity or biomass (approximately 20 TWh of primary electricity or 10 TWh of biofuels) needed for the manufacturing of sustainable fuels, whether carried out in France or abroad for exports to France.

Freight transport

- **Demand control:** increase in total freight transport demand by 3.5% in 2030 compared to 2019, lower than in a trend scenario (7.5%), thanks in particular to the transformations of industry (downturn in fossil fuel-dependent industries, electric vehicle industry requiring fewer parts and therefore less freight than that of the thermal vehicle, recycling, re-use, etc.) and buildings (decrease in new construction). In 2050, the increase is 11% compared to 2019.
- **Optimisation of the loading rate of lorries:** The average load grows in projection.
- **Modal shift:** the modal share of rail freight doubles between 2019 and 2030 to 18% and then increases to 25% by 2050, in line with the national rail freight strategy.[131] The modal share of inland waterways is increasing from 2% currently to 3% in 2030 and 4% in 2050.
- **Traffic:** HGV traffic in terms of vehicle-kilometres decreased by 10% between 2019 and 2030 and by 19% between 2019 and 2050.
- **Vehicle electrification:** the share of electric trucks (HGVs) in new registrations is increasing rapidly to 50% in 2030, in line with the announcements of the main manufacturers as part of the revision of the European Regulation on CO2 emissions from new trucks (Regulation (EU) 2019/1242 revised in 2024), bringing the share of electric trucks to 10% of the rolling stock in 2030. By 2050, 85% of new trucks are electric, 5% of new trucks run on hydrogen and 10% run on liquid biofuels. The share of battery electric light commercial vehicles (LCVs) in new registrations is also growing rapidly, from 7.8% in 2023 to 51% in 2030. In 2050, all new LCVs are electric (which may include hydrogen fuel cell vehicles).
- **Energy efficiency:** consumption of new diesel LCVs decreases by 10% by 2030 compared to 2023. The consumption of new diesel PLs decreases by 9% by 2030 compared to 2019. As regards maritime transport, significant energy efficiency gains are projected as a result of three new EU and IMO regulations entering into force between 2023 and 2027, resulting in lower ship speeds (-12% by 2030), the use of wind power for propulsion and the development of more energy-efficient ships.[132]
- **Sustainable liquid fuels:** liquid sustainable fuels from first generation raw materials (1G) are gradually being oriented towards modes with the fewest alternatives, such as inland waterway transport, heavy construction machinery and agricultural machinery. The rate of incorporation of biofuels in road transport is increasing, relying primarily on the development of sustainable fuels, contributing to the decarbonisation of the sector in the transition phase. Beyond 2030, the increase in electric powertrains and the concomitant decrease in thermal vehicles allows an increase in the rate of biofuels in liquid fuels. As regards maritime transport, the use of non-1G sustainable liquid and gaseous fuels is widespread, achieving a 12% reduction in the carbon intensity of energy used on board ships in 2030 (according to a more ambitious target than that of the European FuelEU Maritime Regulation of 6%). The adoption of sustainable fuels is done in conjunction with the deployment of innovative technologies with low GHG emissions

[131] *https://www.ecologie.gouv.fr/public-policies/national-freight-rail strategy*
[132] *These assumptions do not include the new agreement adopted at the IMO in April 2025*

(electric or hybrid propulsion, fuel cells, innovative thrusters, efficient hulls, etc.). By 2050, the maritime sector is completely decarbonised.

- **NGV:** The (bio-)GNV represents 3% of the truck fleet and 12% of the bus and coach fleet in 2030, but then decreases, given the development of electrification. BioLNG is one of the fuels mobilised for the decarbonisation of the maritime sector.
- **Demand management for maritime transport:** maritime traffic increases by 1.5% per year between 2023 and 2035 and then stabilises with a goal of developing sustainable fuel bunkering in France, according to the trajectory of the maritime roadmap.

Sensitivity test 1: Lower electrification of heavy goods vehicles by 2050

By 2050, lower electrification by 20 percentage points of the trucks fleet would result in a reduction in electricity consumption of 6 TWh and an increase in greenhouse gas emissions of around 4 Mt $CO_{2e,}$ which could be offset by:

- An increase in biofuel consumption of around 14 TWh, which would require imports in case of stress on the resource
- Or more sufficiency in the consumption of freight transport

Sensitivity test 2: Lower modal share of rail freight by 2030

A modal share of rail freight of 14% instead of 18% in 2030 would lead to an increase in greenhouse gas emissions of 1 Mt $CO_{2e,}$ which could be offset by:

- an increase in the consumption of biofuels of 4 TWh; this increase requires a point of vigilance given the high tension existing on the biomass
- Or a consumption increase of 1.7 TWh of electricity
- Or an increase in the average weight of heavy goods vehicles from 8.9 to 9.4 tonnes/PL.

Sensitivity test 3: Carbon intensity of sustainable maritime fuels by 2030

By 2030, achieving a 12% reduction in the carbon intensity of energy used on board ships in 2030 is a more ambitious target than the EU FuelEU Maritime Regulation of 6%. A strict application of the 6% target would lead to a higher emission of 0.25 Mt CO2e in international maritime bunkers.

B. AGRICULTURE

ACCOMPANYING THE EVOLUTION OF AGRICULTURAL PRACTICES

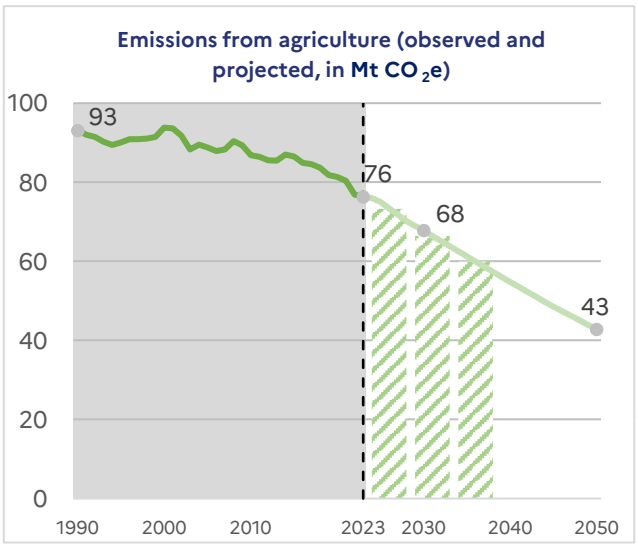
Appropriations: Stephanos Mangriotis / Popsu

ACCOMPANYING THE EVOLUTION OF AGRICULTURAL PRACTICES

1) The **agriculture sector** emitted 76 Mt CO_{2e} in 2023, representing **20% of France's gross emissions.**

2) These emissions will have to be reduced by 27% in 2030 and 54% in 2050 compared to their 1990 level.

3) The decrease in emissions will mainly be based on lower emissions from livestock farming, lower emissions from crops through the lower use of mineral fertilisers, as well as the decarbonisation of energy consumption from agricultural machinery and buildings, while seeking to preserve the environment and resources.



The main public policy guidelines:

Evolution of diets

- Implement the National Strategy for Food, Nutrition and Climate
- Pursue the guidelines of the PNNS and strengthen public policies to promote French production to consume sustainable and quality products, including organic, local and seasonal
- Combating food waste

Cultures

- Deploy emission reduction levers on farms, in particular to reduce the consumption of mineral nitrogen fertilisers
- Developing agricultural systems and pathways for GHG mitigation, adaptation of agriculture, fisheries and aquaculture to climate change and food sovereignty
- Encouraging the dynamics of agro-ecological transition at territorial level by involving all the links in the food system

Breeding

- Accompanying the evolution of the herds
- Changing livestock systems, including by developing agro-ecological practices and improving livestock management
- Better management and recovery of livestock manure

Carbon storage in soils and agricultural biomass

- Preserving existing stocks and developing carbon storage levers on farms
- In particular, sustainably develop the storage potential of hedges and intra-plot agroforestry

Bioenergy production

- Supporting the agricultural methanisation of livestock manure or crop residues that are not otherwise utilised
- Sustainable management and enhancement of hedges and agroforestry

On-farm energy consumption

- Gradually moving away from fossil fuels and deploying less energy-consuming crop routes
- Improving energy efficiency and decarbonising equipment and buildings (including greenhouses)

1. State of play and challenges

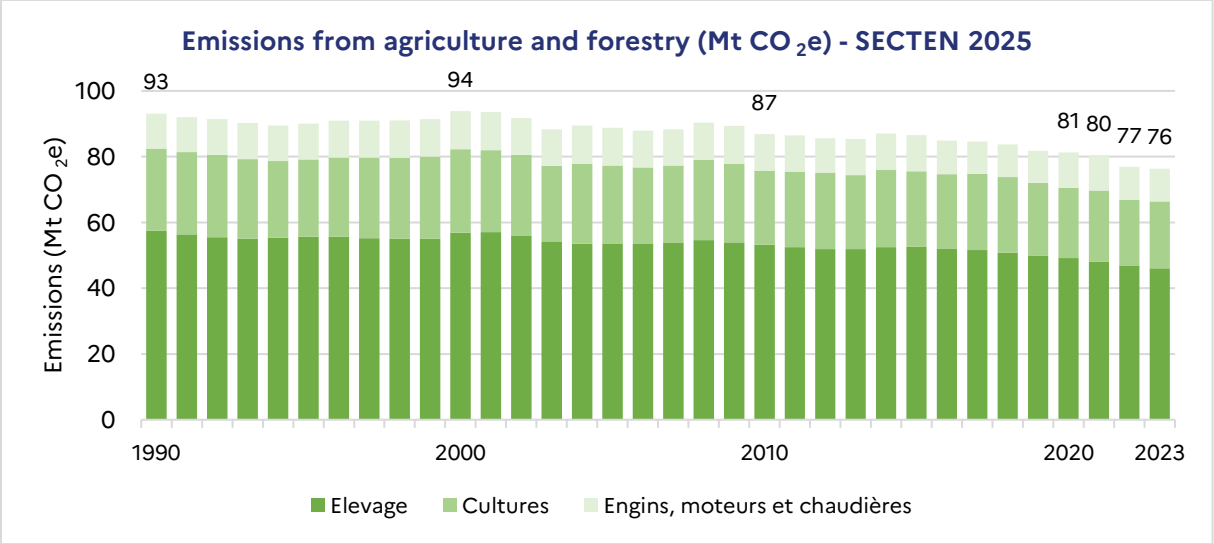


Figure: 33 *Evolution of emissions from the agriculture and forestry sector, Mt CO 2e (Source: National Inventory of Greenhouse Gas Emissions, Citepa, Secten 2025)*

Territorial emissions from the agriculture sector amounted to 76 Mt CO_{2e} in 2023, representing 20% of France's gross emissions. **Agricultural GHG emissions differ from other sectors in their origin (mainly non-energy) and nature (mainly non-CO2 GHGs). 87% of these emissions are due to biological and therefore partly incompressible processes, which are inherent** in livestock farming (for 60%, mainly methane from enteric fermentation)[133] and crops (for 27%, mainly nitrous oxide from fertilisation),[134] while CO2 emissions from the use of fossil fuels in **agricultural machinery, engines and boilers** account for only **13%** of emissions in the sector. At the same time, the sector can sequester carbon in soils (in particular permanent grassland)[135] and agroforestry systems, or destock it, which is accounted for in the LULUCF (Land use, land use change and forestry) sector.

Emissions from the sector have been declining slowly since the early 2000s, due to a combination of declining livestock numbers and lower consumption of mineral fertilisers. In 2023, the decrease in emissions from agriculture is 18% compared to 1990.

SNBC 2 projected an average carbon budget of 81 Mt CO_2e/year for the agriculture sector over the period 2019-2023.[136] **This carbon budget is respected,** with a margin of 9.3 Mt CO_{2e} over the

[133] *Enteric fermentation allows ruminants to transform ingested food into energy. One of the by-products of this digestive process is methane, which, when not directly absorbed by the animal, is released into the atmosphere, being the main source of GHG emissions from livestock.*

[134] *Following the addition of nitrogen fertilisers (both mineral and organic) to the soil and the action of micro-organisms, the biological processes of nitrification and denitrification lead to the production of nitrous oxide (N_2O).*

[135] Permanent *meadows include productive natural meadows, temporary meadows sown for more than 6 years and less productive meadows (pathways, moors, alpine pastures, etc.). They are intended for animal feed and may be mown and/or grazed (Source: Agreste).*

[136] *Technically adjusted carbon budgets in 2025 in accordance with the Environmental Code (Article D. 222-1-B).*

whole period. These emission reductions can be explained in particular by the decrease in emissions from livestock, which amounted to -8% between 2019 and 2023. A 10% decrease in crop emissions between 2019 and 2023 also took place, partly as a result of the decrease in the use of mineral fertilisers,[137] amid a sharp increase in fertiliser prices, first linked to the Covid crisis and then accentuated by soaring energy prices following the war in Ukraine. On the other hand, these reductions in emissions are not observed in energy consumption: they grew slightly between 2019 and 2020 before returning in 2023 to their 2019 level.

The latest version of the 'With Existing Measures' scenario (WEM 2024)[138] shows that, as a result of the context and the policies and measures adopted until 31 December 2023, emissions are expected to fall by 21% between 1990 and 2030 and by 31% between 1990 and 2050.

[137] *It is only emissions of nitrous oxide from agricultural soils, emissions from the manubill of mineral fertilisers are not counted in the agricultural sector but in the industrial sector.*
[138] *MEA 2024 report: https://www.ecologie.gouv.fr/politiques-publiques/scenarios-prospectifs-energie-climat-air*

2. The Strategy

a. Presentation of the strategy

The **agricultural sector is facing many challenges in the context of the green transition:** ensuring the country's long-term food sovereignty while adapting to climate change and reducing GHG emissions, making agricultural soils a net carbon sink when they are now a source, preserving biodiversity and water resources and producing bio-based energy and materials for the decarbonisation of the French economy. In addition, **the green transition of agriculture is linked to socio-economic challenges such** as renewing agricultural generations and ensuring a sustainable and fair income.

Thus, climate change mitigation in agriculture is not addressed in isolation, but in **coherence with a variety of interrelated issues.**

To address these multiple and interdependent challenges, **the proposed strategy for the agricultural sector is based on the development of agroecological systems**[139] **and the deployment of precision farming techniques,**[140] **favouring an integrated and systemic approach** to French production systems. This aims to promote less GHG-emitting agricultural systems, promoting carbon storage in soils and the bioeconomy. In addition to improving the environmental performance of the sector, it is also about increasing value creation and ensuring a greater return of value to farmers.

Consistent with the construction of SNBC around a consumption-based emissions logic and the target of food sovereignty, **the strategy aims to proactively reduce imports, in particular of beef meat,** in order to avoid carbon leakage.

The trajectory is also based on assumptions about the evolution of diets. Since SNBC is not intended to be prescriptive as regards food practices, those assumptions were chosen on the basis of existing public policies and are intended to maintain and develop a competitive, sustainable and resilient food system. The trajectory is thus based on the dietary evolution assumptions of the National Health Nutrition Programme (PNNS), in accordance with the National Strategy for Food, Nutrition and Climate (SNANC), and on a rapid reversal of import dynamics to reduce the consumption-based emissions of French food.

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[139] *Agroecological systems are characterised by systemic changes in agricultural practices, such as longer rotations and crop diversification, in particular through the introduction of more legumes, the strengthening of the protein and forage autonomy of farms (in particular by developing grazing systems), sufficiency in inputs, the development of agroecological infrastructure, or the increase of soil carbon storage through practices that preserve and increase their organic matter content (establishment of intermediate crops, development of hedges and within the plotar agroforestry, preservation of permanent grassland, etc.).*

[140] *Precision farming techniques shall aim at optimising practices and in particular at improving their efficiency to reduce resource use, in particular the use of mineral nitrogen, water and plant protection products. Examples include the development of decision support tools, nitrogen dose adjustment, the use of less emissive spreading practices and materials and fertiliser forms, varietal selection, etc.*

By 2030, **the sector's** emissions in the SNBC 3 scenario are 68 Mt CO_{2e} (excluding land-use change flows), a decrease of 27% since 1990 (or 11% since 2023). This decrease is mainly due to lower emissions from livestock farming, as well as lower emissions from crops due to the lower use of mineral fertilisers.

In 2050, the sector's emissions in the SNBC 3 scenario are 43 Mt CO_{2e} (excluding land-use change flows), a decrease of 54% since 1990 (or 44% since 2023). Emissions from agriculture therefore remain at a relatively high level in 2050 compared to other sectors (see **Figure 9**). This is due to the partly incompressible nature of emissions from the sector, in particular those related to the biology of ruminants (enteric fermentation) and the biogeochemical cycle of nitrogen (fertilisation).[141] The level of emissions reached in 2050 is thus due to the maintenance of a strong production capacity for livestock and crops, compatible with the preservation of the country's food sovereignty. Energy consumption, on the other hand, is completely decarbonised by 2050.

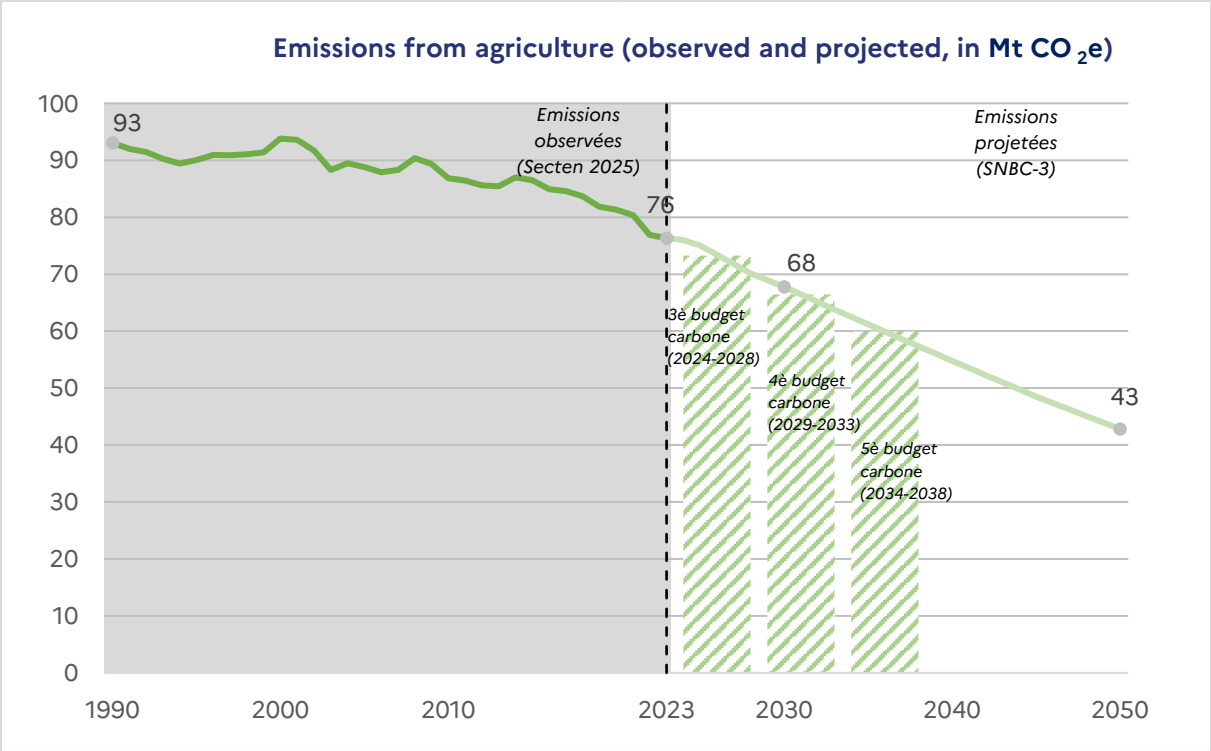

Figure: 34 *Evolution of emissions (historical and projected) of the agriculture sector in Mt CO2e between 1990 and 2050 (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC modelling)*

[141] *Even if emissions from these two items can be reduced by processes of optimisation or evolution of practices (herd management, animal feeding, reduction of mineral nitrogen needs, evolution of fertiliser application practices, etc.), GHG emissions are inherent in the processes themselves and cannot be fully reduced.*

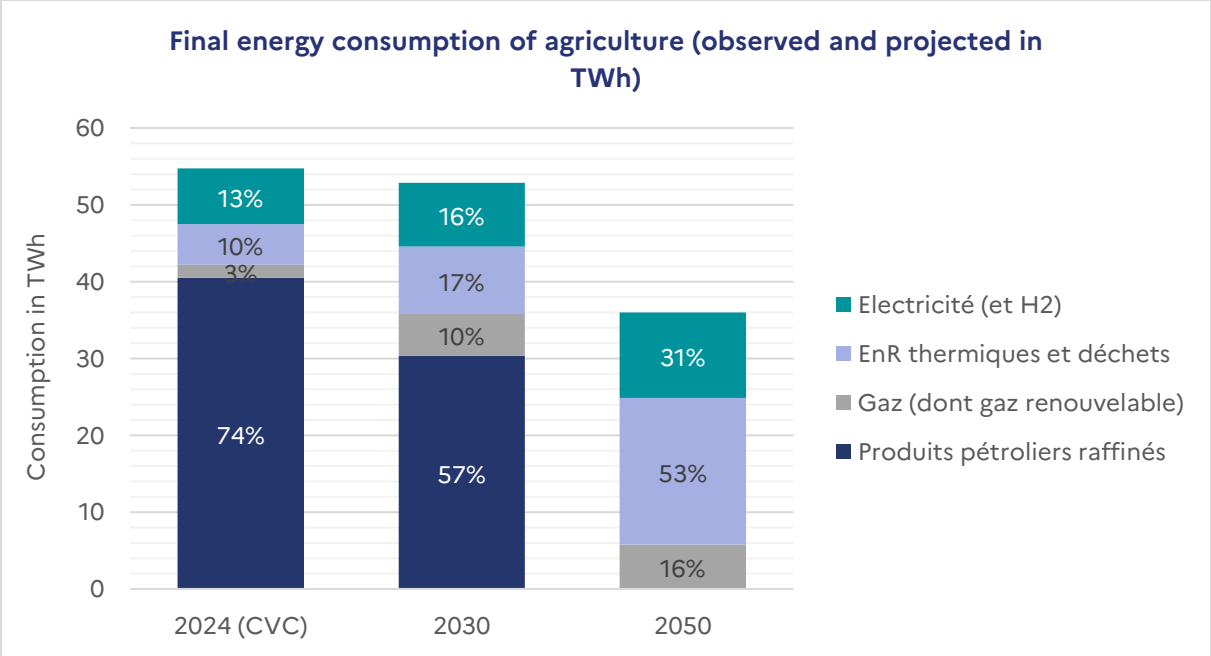

Figure: 35 *Final energy consumption of agriculture (history and projections) (Sources: France's energy balance sheet, SDES, 2025 edition; DGEC modelling)*

Energy consumption in the agriculture sector is gradually decarbonising as a result of the decarbonisation of the farm machinery fleet, through energy gains and the use of biofuels and electrification, as well as energy efficiency and the deployment of alternative heating systems for agricultural equipment and buildings (including greenhouses).

The GHG emission reductions obtained by specific levers are described in the following figures.

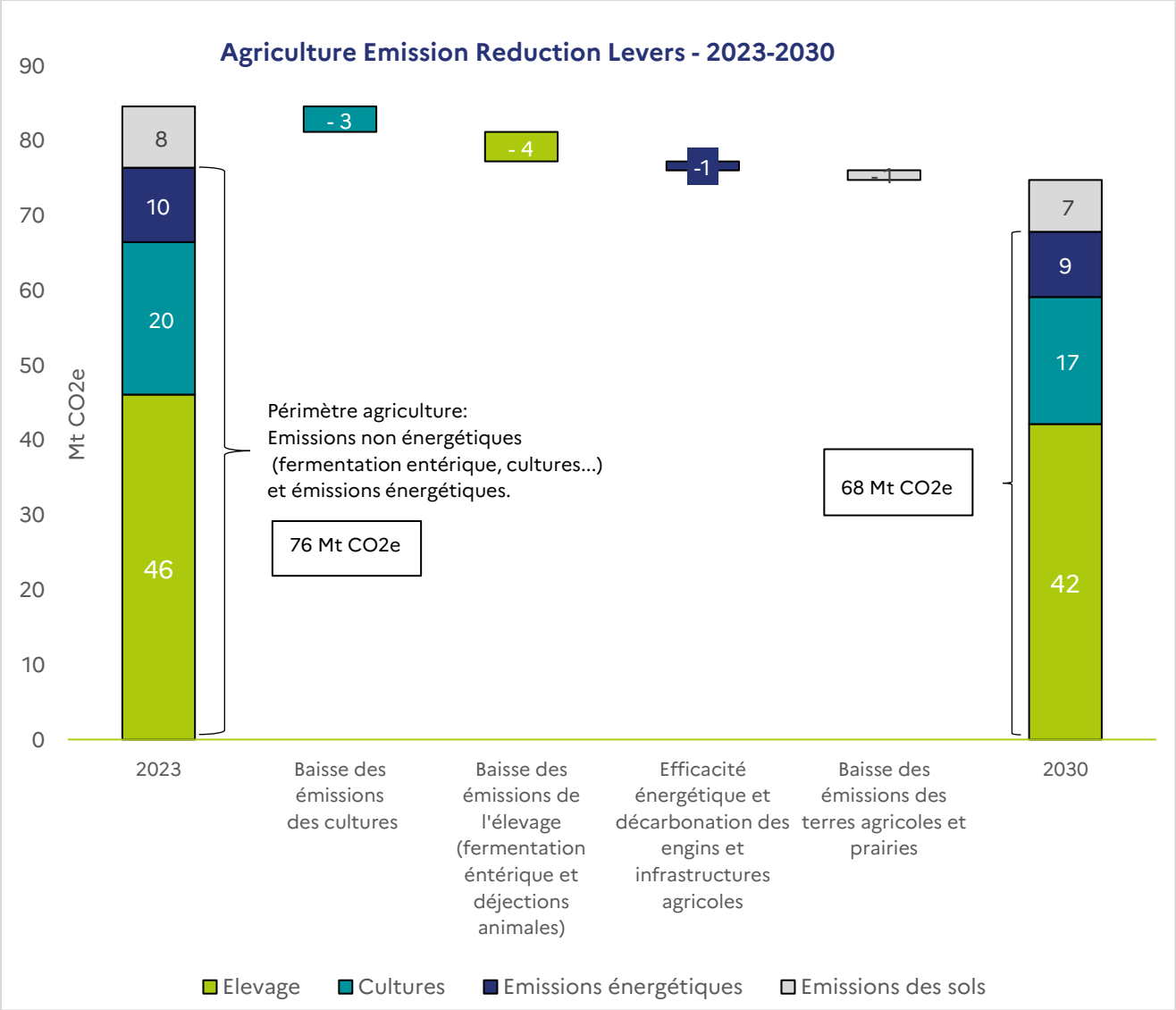

Figure: 36 *Indicative decomposition by lever of the reduction of greenhouse gas emissions from agriculture between 2023 and 2030 based on modelling work (Sources: DGEC modelling)*

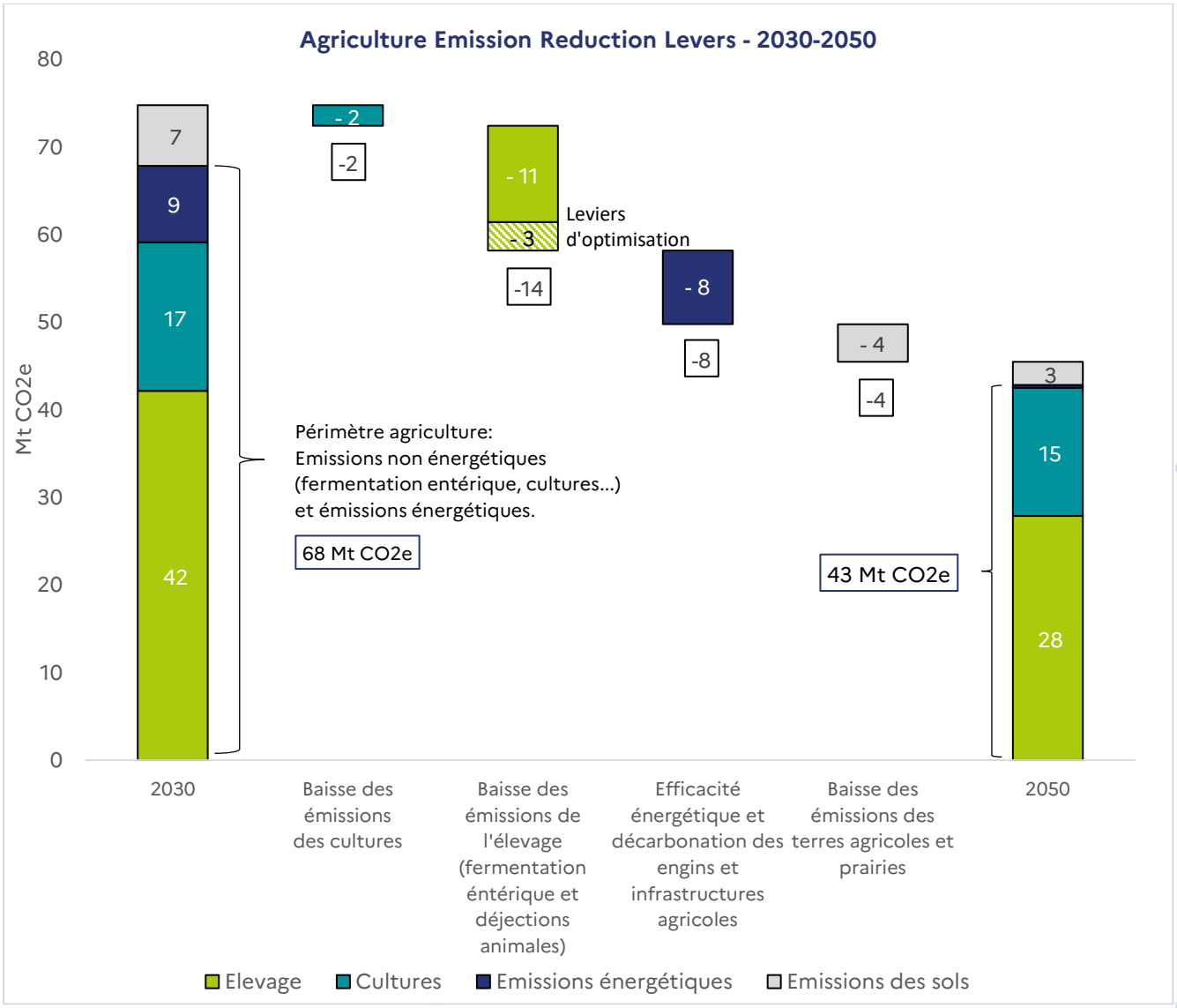

Figure: 37 *Indicative decomposition by lever of the reduction of greenhouse gas emissions from agriculture between 2030 and 2050 based on modelling work (Sources: DGEC modelling)*

b. Main targets of the agriculture sector

Reducing greenhouse gas emissions		-27% emissions in 2030 compared to 1990. -54 % emissions in 2050 compared to 1990.
Assumptions of dietary changes *SNBC is not intended to set targets for the development of diets. Given the strong impact of diets on domestic and imported emissions, and the trends in these diets over recent years, it takes into account assumptions about the evolution of these diets.* *These hypotheses follow the guidelines of the National Health Nutrition Programme (PNNS).* *They do not constitute additional public policy guidance to these existing texts.*		Progressive move towards diets in line with the benchmarks of the National Health Nutrition Programme, i.e. in particular an increase in the consumption of fruit and vegetables, legumes, nuts and whole grains; sufficient and limited consumption of fish and dairy products and limited consumption of meat and cold cuts and reduced consumption of imported meat. To avoid carbon leakage, public policies will have to focus on reducing meat imports. Increase in per capita consumption of fruits and vegetables: +10% by 2030 and +23% by 2050, compared to 2020. A 2-fold increase in legumes consumption by 2030 and a 4-fold increase by 2050, compared to 2020.
Reducing food waste and waste		Reduce food waste by 50% by 2030 compared to 2015. Reduce food waste by 30% (distribution, catering and households) and 10% (food industry) by 2030, compared to the 2021-2023 average.
Cultures	Changing field crop production systems	Develop agroecological systems on about 36% of areas in 2030 and 50% in 2050, compared to 7.8% in 2020. In particular, develop organic farming on about 21% of land in 2030 and 25% in 2050, compared to 5.8% in 2020. Deploy precision farming techniques on an additional 15% in 2030 and 25% in 2050 (5% in 2020[142]).

[142] *Agroecological systems can also use precision farming techniques. In total, 51% of areas in 2030 and 75% in 2050 are affected by the development of agro-ecological systems and the deployment of precision farming techniques.*

	Developing legumes	Achieve 10% of legumes in the annual agriculture surface (SAA) by 2030.
	Reducing the consumption of mineral nitrogen fertilisers	Reduce the consumption of mineral nitrogen fertilisers by 30% in 2030 and 54% in 2050, compared to 2020, including through better targeting.
breeding	Reinforcing the protein autonomy of farms	Reduce soybean imports by 50% by 2030 compared to 2020. Achievement of national protein autonomy in 2050.
	Increase grazing	Evolution of the dominant grazing dairy cattle systems from 28% in 2020 to 45% in 2030 and continue this evolution by 2050, in order to preserve permanent grassland, in particular productive ones.
	Reducing the carbon intensity of livestock farming	Generalize the coverage of slurry pits and develop the methanization of effluents. Reduce emissions per head of enteric fermentation (adjustment of rations, optimisation of livestock management, genetic selection).
Agricultural machinery and buildings	Decarbonising energy consumption	In the short term, as part of the national electrification plan, support 150 electric agricultural machinery made in Europe and reach 400 ha of vegetable and horticultural greenhouses equipped with heat pumps by 2030.
Carbon storage in agricultural soils	Developing hedges and agroforestry	Implement the Hedge Pact: +50 000 net linear kilometres (kml) of hedges by 2030 compared to 2020; further momentum towards 2050. Achieve 100 kha of arable land and grassland areas with intra-parcel agroforestry in 2030, and 300 kha in 2050, distributed equitably between arable land and grassland.

c. Main orientations of public policies

1- Evolution of diets

- **Agri Guideline. Diets 1 - Implementing the National Strategy for Food, Nutrition and Climate**

The **National Strategy for Food, Nutrition and Climate (SNANC)** was adopted in February 2026 following a public consultation in early April 2025. **It determines,** as provided for in the Climate and Resilience Law, **the guidelines for sustainable and health-friendly food and nutrition policy by 2030,** drawing in particular on the National Food Programme (PNA), the National Health Nutrition Programme (PNNS) and the SNBC. This strategy aims to be systemic and to cover the different dimensions of healthy and sustainable food and nutrition (health-promoting food, environmentally friendly food, promoting social justice, promoting food sovereignty, meeting societal expectations). It is also part of the food component of ecological planning or the Solidarity Pact. The SNANC **provides guidance on both the food environment and consumer behaviour.**

- **Agri Guideline. Diets 2 – Pursue the PNNS guidelines and strengthen public policies to promote French production to consume sustainable and quality products, including organic, local and seasonal**

Dietary changes towards the diversification of protein sources will be accompanied in coherence with the National Strategy for Food, Nutrition and Climate (SNANC), with guidelines for an increase in the consumption of fruits, vegetables, legumes, nuts and whole grains, a limitation of the consumption of meat and cold cuts and a reduction in the consumption of imported meat.

In addition, the **consumption of sustainable and quality products** (as defined in the EGalim law), **seasonal, from short supply chains and from agriculture based on the principles of agroecology,** in particular organic farming (AB), **will be encouraged within** the framework of the SNANC, by strengthening the legislative framework, structuring incentives and awareness-raising. **To this end, a first lever for action concerns raising awareness and informing consumers about healthy, sustainable and high-quality food,** as well as the impacts on the health, production method, **origin and seasonality of products,** *in particular through* voluntary nutritional and environmental labelling, education about food from an early age and reducing the exposure of children and adolescents to advertisements and sponsorships for products that are too fatty, sweet, salty, on the various media.

Food environments are a second key lever. Out-of-home **catering, particularly collective catering, will be a lever for access to healthy, sustainable and high-quality food.** In particular, the EGalim law provides for 50% of "sustainable and quality" products, including at least 20% of organic products, in public and private catering. Managers of collective restaurants (> 200 seats) are also required to submit a multi-annual protein diversification plan, and all school collective restaurants must offer a vegetarian menu at least once a week. Finally, state catering services, public establishments and national public companies must offer a daily vegetarian menu (in case of multiple choices). In addition, the Climate and Resilience Law supplemented

these provisions with the obligation of 60% of sustainable and quality products for meat and fish, this rate being set at 100% for collective catering. Similarly, the nutritional recommendations in collective catering and the associated regulations will be brought into line with the recommendations of the PNNS for school catering and crèches. To mobilise the other sectors, SNANC's flagship action is to impose in the law the transparency of the percentages of purchases of 'sustainable and high-quality' products in the annual purchases of distributors and commercial catering.

Agri Guideline. Diets 3 - Fighting Food Waste

Greenhouse gas emissions from food waste are estimated by ADEME at 16.8 Mt CO2e in 2022, representing 4% of this[143] year's total national emissions. The anti-waste law for a circular economy (AGEC) sets national waste reduction targets of 50% by 2025 compared to 2015 in the areas of food distribution and collective catering, and by 2030 in the areas of consumption, production, processing and commercial catering. **All levers will be mobilised to combat food waste:** legislative (law Garot, law EGalim, law AGEC, etc.), but also regulatory and voluntary, including the national anti-food waste label, the mobilisation of collective and commercial catering, agri-food industries and distributors, as well as the territorial approach via the regional networks to combat food waste (REGAL) and the Territorial Food Projects (PAT).

2- Cultures

Agri Guideline. Crop 1 - Deploy emission reduction levers on farms, in particular to reduce the consumption of mineral nitrogen fertilisers

The **development of on-farm emission reduction levers is encouraged:**

- ***Through* the National Strategic Plan 2023-2027** (PSN) in particular, thanks to the following measures: the increase in coupled aid for legumes, the 'practice path' of the eco-scheme encouraging crop diversification, the agri-environment-climate measures (MAEC) relating to soil quality and protection, the fight against climate change and the maintenance of agro-ecological infrastructure storing carbon, as well as the flat-rate MAEC 'Transition of practices' and investment aid for the modernisation of spreading equipment. In view of the increased French climate targets for 2030, the **National Strategic Plan as currently drafted will be assessed** (in the light of the results of the first years) in particular on its contribution to these targets.
- ***Through* agricultural education, promoting agroecological practices in training.** In addition to the continuation of the 'Teaching to produce differently for agroecology and transitions' (EPA) plan, this target was reaffirmed in the form of a sixth mission entrusted to agricultural education by the 2025 Agricultural Guidance Law:[144] strengthen knowledge and skills related to the climate and environmental transitions. This mission is reflected in particular in **the**

[143] *Evaluation carried out in 2016 as part of the work of the ADEME 'States of the Masses of Food Gaspillage in France'.*
[144] *By Act No. 2025-268 of 24 March 2025 on guidelines for food sovereignty and generational renewal in agriculture.*

systematic integration of the environmental impact in the repositories of the renovated diplomas. Students are thus trained and assessed on their ability to make appropriate technical choices within a production system, defining actions to preserve or improve the state of resources in an agroecosystem. As part of this sixth mission, farms in technical agricultural education will also be able to play a role as demonstrators of emission reduction levers;

- ***Through*** **the implementation of farm-level ecological transition pathways** and farm climate resilience diagnostics. They will allow the **implementation of an action plan and monitoring of farms,** aimed at **facilitating engagement in the agroecological transition** and mobilisation in the fight against climate change;
- ***Through*** **the animation of collectives of farmers in agroecological transition,** in particular within economic and environmental interest groups (GIEE). This scheme enables voluntary farmers' collectives to **draw up an action plan to promote an agro-ecological transition that reconciles economic, environmental and social performance.** Recognised by the State,[145] the GIEEs benefit from technical support and priority access to certain aid. More than 30 000 farmers have participated in this scheme since 2015;
- ***Through*** **schemes enabling the endorsement to encourage and remunerate farmers' sustainability efforts,** in particular the **Low Carbon Label (Label Bas-Carbone), sector premiums or** the introduction by any public or private actor of **payments for environmental services (PSE),** the costs of[146] which are *ultimately* partly passed on to the consumer. The development of new Low Carbon Label methods for changing production patterns will also be supported.

In addition to these transversal measures, specific measures for certain levers are also provided for, in particular:

- Measures to develop intermediate crops, allowing the storage of nitrogen and organic matter in soils, and favourable to biodiversity (cf. section 'Carbon storage in soils and agricultural biomass');
- Support for methanisation, making it possible, on the one hand, to valorise more methanisation digestates and thus contribute to the closure of the nitrogen cycle and, on the other hand, to reduce GHG emissions (less open-air emissions of effluents while resulting in a substitution of the fossil gas consumed) (see section entitled 'Production of bioenergy');
- Support for innovation in agriculture and food in the context of France 2030 (with €2.3 billion dedicated) and in particular the development of smart, automated or connected equipment with the aim of reducing the use of inputs.

[145] *The GIEEs are recognized by the Prefect of the Region, after consulting the President of the Regional Council.*
[146] *In particular, the national experimental scheme (2024-2027) deployed by the Ministry of Ecology remunerating the maintenance or improvement of environmental services provided by agricultural holdings, in particular through the management of nitrogen quantities and the introduction of legumes.*

Agri Guideline. Crop 2 - Developing agricultural systems and sectors for GHG mitigation, adaptation of agriculture, fisheries and aquaculture to climate change and food sovereignty

Agro-ecological **systems and pathways that are less GHG emitting and more broadly reduce pressures on the environment and resources will be supported.** They are part of a broader green transition approach to agriculture than climate change mitigation alone.

- **Support for plant protein sectors:** the allocation for coupled 'protein' aid has been scaled up under the CAP national strategic plan to double by 2027 compared to 2023 and has been supplemented by a system of operational programmes supporting the structuring of sectors for the cultivation of species rich in plant proteins. National support has also been put in place to support investment needs, research and development, and the collective dynamics of sectors or territories needed under the recovery plan, France 2030 and ecological planning. Other support complements these main tools, notably the research component of the Special Allocation Account for Agricultural Development and Research (CASDAR). The evaluation of deployed devices is also one of the axes of the plant protein strategy and will contribute to their improvement.
- **Development of organic farming:** In particular, organic farming improves soil health, has many advantages in terms of human health and has a positive effect on the diversity of species, plants and pollinators. Launched in April 2024, the Ambition Bio 2027 programme is the State's operational roadmap for the development of organic farming.[147] It provides for 27 actions divided into three axes: stimulating demand and strengthening consumer confidence, structuring resilient and regionally-based sectors, and supporting stakeholders in dealing with environmental and societal challenges. For the 2026 and 2027 marketing years and subject to the validation of the revision of the national strategic plan by the European Commission, EUR 96.3 million will be redeployed to the level dedicated to the organic certification of the eco-scheme and will increase the amounts received by organic farms.
- **Support for the fruits and vegetables sectors:** the sovereignty plan for the fruits and vegetables sector (PSFL), adopted in 2023, supports the renewal and development of areas of resilient orchards, adapted to climatic and health hazards, in connection with changes in diets (see section 'E evolution of diets'). The measures in this plan also include support for the decarbonisation of market garden greenhouses, the decarbonisation of the downstream sector and awareness-raising on the consumption of fruit and vegetables. The support schemes implemented under this plan complement the current coupled aid to the sector and operational programmes for the fruit and vegetable sectors, financed by the CAP under the National Strategic Plan.

[147] https://agriculture.gouv.fr/une-ambition-reaffirmee-pour-lagriculture-biologique-avec-ladoption-du-programme-ambition-bio-2027

- **Establish a forward-looking vision of decarbonised fisheries and aquaculture,** compatible with the challenges of preserving marine ecosystems by 2030 and 2050 and in line with the targets of the Future Aquaculture Plan.

➨ **Agri Guideline. Crop 3 - Encouraging the dynamics of agro-ecological transition at territorial level, involving all the links in the food system**

The **territorialisation of ecological planning** for agriculture and forestry will make it possible to **build shared agroecological transition projects** that cross approaches by sector and territory.

In this context, **the creation of the fund for food sovereignty and transitions** aims to support the **development and transformation of resilient and sustainable agricultural sectors** by supporting projects focused on the agroecological transition, as part of collective approaches and involving several links in the food chain. Indeed, beyond farm-level action, **the climate transition in agriculture requires the emergence of shared agro-ecological processing projects within each production basin.**

Finally, and coherently, **the Territorial Food Projects (PAT),** defined in Article L. 111-2-2 of the Rural and Maritime Fisheries Code, are identified as a central lever of ecological planning to accompany the transition **to healthy and sustainable food for all.** They are **an essential tool to federate the actors of the various links in the food chain at the level of a territory, through a diagnosis of the economic, social, environmental and health challenges of the food system, shared between all the stakeholders of the territory, resulting in an action plan implemented by open governance.** On 1 January 2025, 453 PATs were recognised by the Ministry of Agriculture. The SNANC sets the target of reaching 80% of the territory covered by PATs with reinforced criteria on the various dimensions of sustainable and health-friendly food. **Territories will therefore continue to be encouraged and supported to define and implement operational PATs** in order to support local transitions and food sovereignty, in conjunction with regional variations of food and nutrition-related programmes.

Finally, beyond the eco-scheme already deployed since 2023 under the Common Agricultural Policy (CAP), reflections will continue on the remuneration of environmental services provided by farms in the context of the negotiations that are starting on the future regulation of the CAP for the 2028-2034 programming.

3- Breeding

➨ **Agri Guideline. Breeding 1 – Supporting the evolution of herds**

These developments, taking into account the renewal and installation dynamics of livestock farmers, will be **accompanied, in particular through the reinforced government plan to regain our sovereignty over livestock farming**[148], in order to structure the sectors in line with the

148 *https://agriculture.gouv.fr/sia2024-launch-of-government-plan-reconquest-strengthening-of-our-sovereignty-on-levage*

needs and consumption patterns in compliance with the PNNS, to reduce our dependence on imports of animal feed, in particular on cakes, and to preserve permanent grassland and associated biodiversity and carbon stocks. This support will thus make it possible to place livestock farming at the heart of the agricultural system, maximising its ecosystem benefits (maintenance of landscapes, maintenance of biodiversity, sources of natural fertilisers, etc.), by promoting local, sustainable and – for ruminants – grazing models.

Great vigilance will be exercised in public policies with regard to territorial impacts and food sovereignty, **giving priority to the consumption of local and sustainable meat.** Indeed, the priority is to reduce imports and their negative environmental impacts. Additional public policies will be needed to ensure rapid declines in imports and avoid carbon leakage.

- **Agri Guidance. Breeding 2 – Changing livestock systems, in particular by developing agroecological practices and improving livestock management**

The development of agroecological practices in livestock farming is supported under the national strategic plan[149] and will be strengthened in the coming years. This includes encouraging **greater use of grazing** to **preserve permanent grassland for** its ecosystem services to livestock and society.[150] It is also a question of **strengthening the protein autonomy of farms** *by* increasing the production of legumes, and of promoting the **closure of cycles between crops and livestock at** farm and territorial level.

Among the **polyculture-livestock systems, the most efficient in terms of GHG emissions**[151] **will be encouraged, in particular** *through* diagnostics and the support of the Low Carbon Label (label bas-carbone).

The **management of herds will be optimised,** in particular by supporting R&D projects and knowledge transfer approaches aimed at reducing unproductive periods for animals, working on their longevity, food efficiency, particularly in grazing, their ability to valorise a diversity of forage resources (particularly herbaceous and woody) and to improve their performance *through* genetic selection.

The evolution of livestock farming systems is also supported by the cross-cutting measures (agricultural education, support for farmers, animation, MAEC and PSE) referred to in the Agri Guidance. Cultures 1.

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[149] *Through cross-compliance, the eco-scheme, agri-environment-climate measures (MAECs), investments, the reinforcement of coupled aid for legumes or the ceilings of the ICHN and coupled beef aid, which take account of the forage area, which is overwhelmingly grassland in our country.*

[150] *Indeed, grazing livestock maintain permanent grasslands, which are home to high biodiversity and high carbon stocks, which encourages not to convert these grasslands into crops, storing less carbon in their soils.*

[151] *The best-performing systems make it possible to limit the supply of external nutrients by valuing manure as a crop fertiliser and plant products as feed (closing nutrient cycles). Examples of mixed farming systems include pre-greens (grazing animals will disrupt the cycles of certain pests by feeding on fallen fruit), the association of sheep or cattle farms and viticulture (mechanical weeding is replaced by grazing).*

Agri Guidance. Breeding 3 – Better management and recovery of livestock manure

Slurry **pit cover will be widespread in the** long term, including methane recovery systems and **improved spreading practices and equipment to** limit ammonia volatilisation and enhance the value of organic fertilisers.

4- Carbon storage in soils and agricultural biomass

Agri Guidance. Carbon storage 1 – Preserving existing stocks and developing carbon storage levers on farms

The[152] **current national strategic plan (2023-2027) encourages carbon storage primarily *through* the maintenance of permanent grassland through livestock farming** (cross-compliance, coupled bovine aid, eco-scheme, MAEC[153], ICHN[154]), **but also through the preservation and creation of agro-ecological infrastructure, in particular hedgerows, through the eco-scheme** and their sustainable management through the bonus of the eco-scheme and certain MAECs, and finally through the coverage of soils by cross-compliance or MAECs **for soil quality and protections, etc. These levers will be strengthened,** in particular by protecting agricultural land, protecting the stock of carbon-rich grassland through the enhancement of grazing livestock farming, and the massification of virtuous agronomic practices adapted to local climatic contexts.

In addition, the European Nature Restoration Regulation includes targets based on maintaining and restoring grassland areas and calls, in particular, on the Member States to deploy measures to:

- Improving pollinator diversity and reversing the decline of pollinator populations by 2030 at the latest (Article 10);
- Obtain an upward trend in key indicators of agricultural biodiversity (Article 11);
- Gradually restore pastoral habitats of Community interest (Article 4).

In this context, priority should be given to maintaining grasslands with a higher biodiversity interest, with a particular focus on grasslands with habitats of community interest, both nationally and at the farm level.

The **development of intermediate cover is supported** on the one hand by the conditionality of CAP aid[155] which imposes a minimum soil cover during sensitive periods, this requirement being

[152] *NHP: National Strategic Plan*
[153] *MAEC: Agri-environment-climate measures*
[154] *ICHN: Compensatory allowance for natural handicaps*
[155] *GAEC 6 (Good Agricultural and Environmental Conditions) requires post-harvest cover for any parcel declared as arable land and long intercropping for a period of six weeks between 1 September and 30 November. Intermediate crops can enable holdings to meet these obligations.*

reinforced in vulnerable areas covered by the Nitrates Directive[156] (coverages also make it possible to limit the risks of nitrate leaching). On the other hand, that support is expressed in the eco-scheme which requires the inter-ranging of perennial crops to be covered and the MAECs[157] which make it possible, on a voluntary basis, to remunerate land cover practices.[158]

Diagnostics of carbon storage and GHG emission reductions will also be encouraged, in order to carry out a farm-wide assessment and identify margins for progress. These diagnoses may in some cases allow access to remuneration for additional carbon storage and emission reduction through the setting up of projects to obtain the **Low Carbon Label, for example,** opening up access to private financing.

Changes in production patterns and tillage (less reversal, longer rotations…) **and the eventual tripling of intermediate cover** will increase carbon storage in agricultural soils. The development of organic farming will also allow more carbon to be stored in soils.[159] Private financing will also be mobilised to strengthen the demand for low-GHG projects, including those promoting soil storage.

The development of carbon storage levers on farms is also supported by the cross-cutting measures (agricultural education, support for farmers, animation, MAEC and PES) referred to in the Agri Guideline. Cultures 1.

- **Agri Guideline. Carbon storage 2 – In particular, sustainably develop the storage potential of hedges and intra-plot agroforestry**

The Hedge Pact will continue the momentum generated by the 'planting hedges' measure of the recovery plan, with the ambition of multiplying the effort initiated to achieve the target of a net gain of +50 000 km of hedges by 2030. This ambition will be pursued by 2050. **One of the main levers for increasing the carbon storage of existing hedges is firstly to stop their degradation and** secondly **to support the development of the hedge line through the implementation of sustainable management practices and the structuring of sectors allowing** the economic valorisation of hedge products. These levers are developed, on the one hand, thanks to the evolution of the regulations and their application, with the implementation of a single scheme for any destruction of hedges and the systematic replanting of a line at least equal to that destroyed. On the other hand, these levers are activated through support for the production of seedlings, planting, labelling under sustainable management, technical support,

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[156] *One of the measures of the national and regional nitrate action programmes requires the presence of cover during interculture periods, whether long or short. In particular in long intercropping, farmers are required to maintain cover at least for eight weeks.*

[157] *These measures are financed by the European Agricultural Fund for Rural Development and a counterpart of national appropriations.*

[158] *The soil cover must be of a minimum duration of 10 or 11 months, with remuneration between €204 and €450 per hectare depending on the level of requirement of the product specification and the type of main crop.*

[159] *Organic farming allows a higher carbon accumulation in soils, between +11% and +35% compared to conventional farming according to the studies. See the report "Quantification of the externalities of organic farming", https://itab.bio/thematic-in-brief/mitigation-of-change-climate-quantification-of-externalities-of*

training and processing tools, nurseries and monitoring, with the establishment of a national observatory for hedgerows and their management.

Intra-plot agroforestry will also be developed on both grassland and arable land, increasing the carbon storage potential of the agricultural sector and mobilising non-forest biomass in the economy. It will be supported by material (maintenance equipment, etc.) and intangible funding (facilitation of awareness-raising networks, acquisition of technical and economic benchmarks, etc.).

5- Bioenergy production

Agri Guideline. Bioenergy 1 - Supporting the agricultural methanisation of livestock manure or crop residues that are not otherwise utilised

The development of methanisation contributes to the added value of farms and the decarbonisation of other sectors (transport, industry, energy, buildings, etc.) while allowing organic matter to be returned to the ground via digestate. **It will be encouraged** through the support of the **purchase tariff** for biomethane injected into gas networks for small installations (less than 25 GWh PCS/year), the establishment of an incorporation trajectory based on **biogas production certificates (CPBs)** and the deployment of **Biomethane *Purchase Agreements* (BPAs),** which are direct OTC contracts between a biomethane producer and a gas consumer. The development of biogas production can be encouraged to meet the energy consumption of farms when the available biomass is too far from the gas grid connection sites. **Methanisation will contribute to the reduction of greenhouse gas emissions for livestock** farming and **to renewable energy production targets.** In addition, operators of biomethane plants producing more than 19.5 GWh PCS/year are required to be certified by a regulatory body recognised by the European Commission and to submit to the administration a **declaration of inputs, sustainability and reduction of greenhouse gas emissions pursuant to** the European Renewable Energy Directive (RED). These **reinforced controls encourage** farmers to comply with the **maximum threshold of 15% of main crops in gross tonnage of the methaniser's inputs, which favours,** to a certain extent, the development of CIVEs (intermediate crops for energy purposes) and the methanisation of livestock manure.

Agri Guidance. Bioenergy 2 - Sustainable management and enhancement of hedges and agroforestry

The Hedge Pact, presented in September 2023, **provides for a sustainable valorisation of hedge products and services, in particular through the wood-energy sector.** Driven by a rapid growth in biomass needs, this heritage and economic approach aims to change the view of owners and managers on the value of their hedges. Concretely, **it will be a question of structuring value chains for hedgerow products while ensuring their sustainable management,** both for the preservation of biodiversity and the securing of a long-term supply of quantity and quality. In particular, it is a question of reversing the trend of grubbing up hedges in order to aim for a net increase in the linear.

At the same time, the law now lays down minimum management criteria such as the balance of biomass harvesting or the management of harvesting, which must be guaranteed by any

sustainable management and recovery certification seeking official recognition. This will make it possible, in particular, to direct public funding and public procurement towards practices that comply with the environmental and agricultural requirements defined by the State.

In this context, approaches to the labelling of sustainable hedge management and the sustainable distribution of wood (from sustainably managed hedges) will be encouraged.

6- On-farm energy consumption

- **Agri Guideline. Energy consumption 1 - Gradually phase out fossil fuels for agricultural machinery and deploy less energy-consuming crop routes**

The replacement and renewal of tractors and the desire to eventually reduce the use of agricultural non-road diesel **will gradually be in favour of biofuels and replacement by electric motors, or even biomethane and hydrogen depending on the use.**

A working group was launched at the end of 2023 on the decarbonisation of agricultural and forestry machinery, bringing together representatives of public administration, industry and distribution, energy companies, biofuel industries, research and individual and collective users.

European constructors are mobilised through calls **for innovation projects to build a supply of low GHG emission machinery and a regulatory framework facilitating retrofitting of agricultural machinery will be envisaged.** The Electrification Plan published in April 2026 aims to support 150 electric agricultural machinery made in Europe as part of the Electrification Plan.

Structures allowing **the pooling of agricultural machinery may allow investment in decarbonised equipment.**

In addition, **the technical farming routes will evolve to have the lowest possible energy consumption.**

- **Agri Guideline. Energy Conso 2 - Improving energy efficiency and decarbonising equipment and buildings (including greenhouses)**

Financial support, such as from the Heat Fund or the Energy Saving Certificate (CEE) scheme, **will be continued or put in place to facilitate the thermal renovation and construction of energy-efficient and decarbonised agricultural buildings and equipment, including geothermal or waste heat.** In particular with regard to CEEs, the Decree on the sixth period of the scheme,[160] which began on 1 January 2026, reinforces the role of CEEs in achieving national energy and climate targets, particularly in the agriculture sector, by defining an energy savings obligation

[160] *This decree, published in the Official Journal on 4 November 2025, sets out the annual energy savings obligations to be met by electricity, gas, heating and cooling suppliers, as well as fuel and heating oil distributors for the years 2026 to 2030.*

for all sectors of 1 050 TWh cumac per year, an increase of 27% compared to the years 2023 to 2025.

The electrification plan thus aims to mobilise CEEs to reach the target of 400 ha of vegetable and horticultural greenhouses equipped with heat pumps by 2030 (20% of the identified potential).

The Fruit and Vegetables Sovereignty Plan also aims to **support energy efficiency gains and the decarbonisation of greenhouses.**

d. Main elements of the SNBC 3 scenario

Evolution of diets

- **Diets:** increased consumption of fruit and vegetables and legumes, as well as whole grains. Limiting the consumption of meat and cold cuts and reducing the consumption of imported meat, by gradually moving towards diets in line with the nutritional benchmarks of the National Health Nutrition Programme (PNNS).[161]
- Evolution of demand towards sustainable and quality products,[162] including organic, local and seasonal, in line with the targets of mitigating climate change and reducing pressures on the environment and resources.
- Reduction of food waste, in line with the targets of the AGEC law and those resulting from the revision of the Waste Framework Directive.

Cultures

- Evolution of production methods through the development of agroecological systems and the deployment of precision farming techniques, allowing diversification and optimisation of nitrogen inputs and thus reducing the use of mineral nitrogen fertilisers (- 30% in 2030 and -54% in 2050, compared to 2020). Agroecological systems (including organic farming) are growing from 7.8% of areas in 2020 to 36% in 2030 and 50% in 2050. Precision farming techniques are deployed on an additional 15% in 2030 and 25% in 2050 (5% in 2020163).

  These include:
- Extend rotations and diversify crops, in particular to develop legumes (2 Mha of legumes in 2030 and 2.7 Mha in 2050 compared to 1 Mha in 2020);
- **Developing intermediate crops,**[164] including green fertilisers (1.8 Mha of green fertilisers in 2030 and 4.3 Mha in 2050 compared to 1 Mha in 2020, see section 'Carbon storage in soils and agricultural biomass');
- **Mobilise new organic resources** (effluents, methanisation digestates[165] and all fertilising materials of waste origin (MAFOR));

[161] *National Health Nutrition Programme 5, https://sante.gouv.fr/IMG/pdf/pnns_5_2026-2030.pdf*
[162] *These are products with quality and origin identification signs (QOIS), including organic, and other product categories defined at legislative level: Level 2 environmental certification (until 31 December 2026) and certification 'from a holding with high environmental value' (HVE), 'sustainable fisheries' eco-label, fair trade, etc.*
[163] *Agroecological systems can also use precision farming techniques. In total, 51% of areas in 2030 and 75% in 2050 are affected by the development of agro-ecological systems and the deployment of precision farming techniques.*
[164] *Intermediate crops are planted between two main crops. There are several types, such as Nitrate Traps (CIPAN), "green fertilizers" (returning nitrogen to the next crop), and intermediate energy crops (CIVE) used mainly for methanization purposes.*
[165] *Methanization is a process of degradation of animal organic matter allowing the production of biogas, a source of energy, and a digestate, an organic residue that can play the role of fertilizer.*

- **Optimize the nitrogen dose** (decision support tools, adaptation of inputs to crop needs, selection of low-input varieties, improved application practices and equipment, etc.);[166]
- **Limit nitrogen leakage** (management of effluent in buildings and storage, more efficient spreading practices and equipment, and taking into account topographic and meteorological conditions, etc.);
- **Develop organic farming** (21% of arable land in 2030 and 25% in 2050 compared to 5.6% in 2024).[167]
- **Develop practices to preserve soil structure,** such as direct sowing: reached 1.9 Mha in 2030 and 4.3 Mha in 2050 compared to 0.4 Mha in 2020.
- **Development of agroecological infrastructure to** increase soil carbon storage (hedges, agroforestry, intermediate cover, etc.). These elements will be developed in the section "Carbon storage in soils and agricultural biomass".

Breeding

- **Emissions from livestock farming:** Emissions from livestock fall by 11 Mt CO2e between 2030 and 2050.[168]
- **Optimising the management of cattle herds,** [169]thereby increasing productivity and thus reducing emissions per head by 5%.
- **Evolution of production methods towards more grazing livestock systems and enhanced protein autonomy:**
    - The share of dairy cattle farms in the dominant grazing system increased from 28% in 2020 to 45% in 2030 and 64% in 2050; red label chickens and organic farming (AB) ranged from 32% in 2020 to 39% in 2030 and 60% in 2050; Red label and organic pigs change from 4% in 2020 to 7% in 2030 and 16% in 2050.
    - The protein autonomy of herds is enhanced through increased use of cattle grazing and increased production of protein crops and fodder legumes,[170] in order to reduce soybean imports by 50% in 2030 and to continue these reductions by 2050.
- Optimisation of manure and herd management practices:

[166] *Work has shown that some aspects of this lever (in particular the adaptation of inputs to crop needs and the use of decision support tools) are already cost-effective, leading to the view that the limits to its implementation are linked to constraints other than their profitability. See DG Trésor's January 2025 report 'The economic challenges of the transition to climate neutrality', SPAFTE 2025 and the Criqui Commission report on agriculture (forthcoming), based on INRA (2013), 'What contribution does French agriculture make to reducing greenhouse gas emissions?'*

[167] *The Bio Agency, https://www.Agencebio.org/bio-national production observatory/*

[168] *Without taking into account optimisation levers.*

[169] *In the case of dairy cattle, this is reflected in particular in the lengthening of the animals' quarry and the lowering of the age of first calving. It is therefore a question of reducing the periods during which animals are unproductive, which translates – in addition to emission gains – into productivity gains for farmers.*

[170] *Forage protein crops and legumes, such as fodder peas, fern, lupine, alfalfa or clover, are sources of vegetable protein and help to balance animal feed rations, with the term 'fodder' referring to crops intended for animal feed.*

- **Better management and recovery of animal effluent:** maintaining the fertilising value of effluents by limiting nitrogen leakage (generalisation of slurry pit covers, improvement of spreading practices (see 'Crops' section)) and methanisation of effluents (increasing share of mobile methanised animal waste to 22% in 2030 and 80% in 2050); see section 'Production of bioenergy');

- Further reduction of enteric fermentation emissions:
  - Adjust feed for bovine animals: The substitution of 3.5% of carbohydrates with unsaturated fats in the rations (e.g. with intakes of flaxseed, rapeseed or sunflower seeds or oils incorporated in concentrates) reduces the emissions from enteric fermentation by 14%.[171] 25% of cattle benefit from this adjustment of rations during building periods in 2030 and 82% in 2050 (compared to a proportion close to 0% in 2020), enabling an additional 5% overall annual reduction in enteric fermentation per head to be achieved by 2050.
  - Guide genetic selection to reduce methane emissions, so as to reduce enteric fermentation emissions per capita by an additional 5% in 2050.

Carbon storage in soils and agricultural biomass

- **Development of intermediate energy crops,** nitrate traps and green fertilisers (4.8 Mha in 2030 and 8.7 Mha in 2050 compared to around 2.9 Mha in 2020);
- **Development of agro-ecological infrastructure:**
  - **Reconstitute hedges:** whereas today hedges are declining six times faster than they can be reconstructed, the reference scenario reverses this trend as quickly as possible, and targets +50 000 kml net of hedges planted between 2020 and 2030, before continuing the pace to reach +100 000 kml net of hedges planted between 2030 and 2050;
  - **Develop intra-parcel agroforestry,** significantly increasing areas by 2030 to 100 kha in 2030 and 300 kha in 2050, equally distributed between grassland and arable land.
  - **Preservation of permanent grassland, particularly productive grassland:** in 2020, the area under permanent grassland (productive and unproductive) was 9.6 Mha[172]. This number reached 9.1 Mha in 2030 and 8.6 Mha in 2050, with a maintenance of productive permanent grassland at 7.2 Mha, and a slight decline in non-productive permanent grassland in favour of wooded areas. This puts an end to the overturning of permanent grassland into crops, which is a major emitter of GHGs.

[171] *Pellerin et al, "What contribution of French agriculture to the reduction of greenhouse gas emissions", INRA, 2013, p.*

[172] *It should be noted that a methodological change has been incorporated into the annual agricultural statistics, which have not been included in the modelling: grassland is considered permanent if it has been grassland for more than 5 years, whereas the 6-year threshold is considered in the SNBC 3 modelling.*

Bioenergy production

- **Methanisation:** the share of energy-oriented intermediate crops (CIVEs) in intermediate crops is increasing, from around 4% in 2020 to 19% in 2030, before reaching 30% in 2050. The production of biomethane from CIVEs reaches 17 TWh PCS in 2030 and about 49 TWh PCS in 2050. In addition, an increasing share of mobilizable animal ejections is methanized to reach 22% in 2030 and 80% in 2050. Finally, an increasing mobilisation of crop yields, fodder crops and bio-waste makes it possible to increase the total production of biomethane.
- **Wood energy:** the development of agro-ecological infrastructure is promoted (see section 'Carbon storage in soils and agricultural biomass') with the cessation of grubbing-up, the development of sustainable hedge management, the increase in hedgelines and within the plotal agroforestry areas, and makes it possible to increase non-forest wood-energy production.
- **Biofuels:** around +3 TWh of liquid biofuels production in 2030 compared to 2020, and around +21 TWh by 2050, to ensure the development of advanced biofuels (crop residues and lignocellulosic crops).

On-farm energy consumption

- **Decarbonisation of agricultural machinery:** the share of agricultural machinery running on non-fossil energy (HVO100, electricity, H2, BioGNV) increases from around 0% of the fleet in 2020 to 10% by 2030, then 51% by 2040, before gradually reaching 100% by 2050.
- **Energy efficiency of equipment, greenhouses and buildings:** increasing the energy efficiency of installations, and deploying alternative heating systems (heat pumps, geothermal, waste heat, biomass, etc.).

C. INDUSTRY

REINDUSTRIALISE BY DECARBONING PRODUCTION

Appropriations: Thierry Degen / Terra

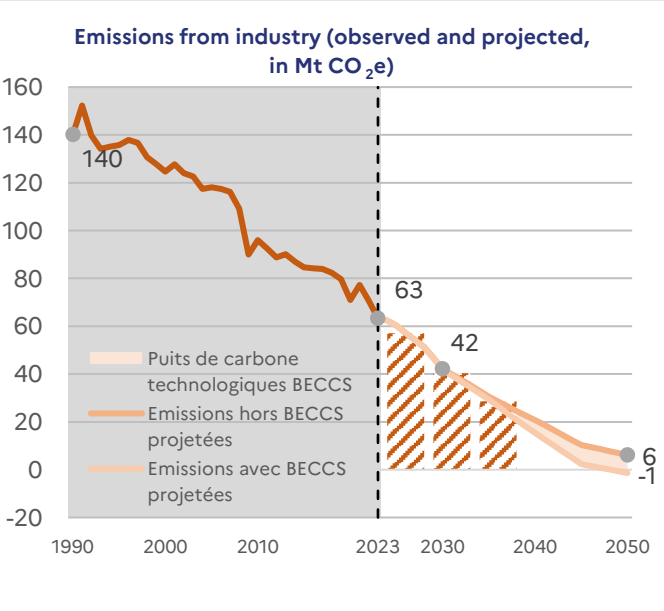
REINDUSTRIALIZE BY DECARBONING PRODUCTION

1) The **industry sector** emitted 63 Mt CO_{2e} in 2023, representing **17% of France's gross emissions.**

2) These emissions will have to be reduced by 70% in 2030 and 96% in 2050 compared to their 1990 level (non-BECCS emissions).

3) In addition, the industry sector will develop **technology sinks** (capture and storage of biogenic emissions) to contribute to achieving climate neutrality.

4) The reduction in emissions will mainly be based on the **decarbonisation of the energy mix**, in particular through the electrification of uses, as well as on the **decarbonisation of processes**.



The main public policy guidelines:

- Reducing France's consumption-based emissions through green reindustrialisation and promoting European preference
- Reinforcing incentives to improve energy efficiency
- Strengthening and adapting the electricity grid to increased low-carbon electricity generation
- Ensuring a competitive price for decarbonised electricity compared to fossil-based solutions
- Strengthening pricing, regulatory and support tools for industry decarbonisation
- Financially support the use of low-carbon hydrogen to decarbonise processes
- Develop solutions for CO2 capture, transport and geological storage
- Supporting industrial transformations, particularly in terms of jobs
- Mobilising the circular economy as a decarbonisation lever

1. State of play and challenges

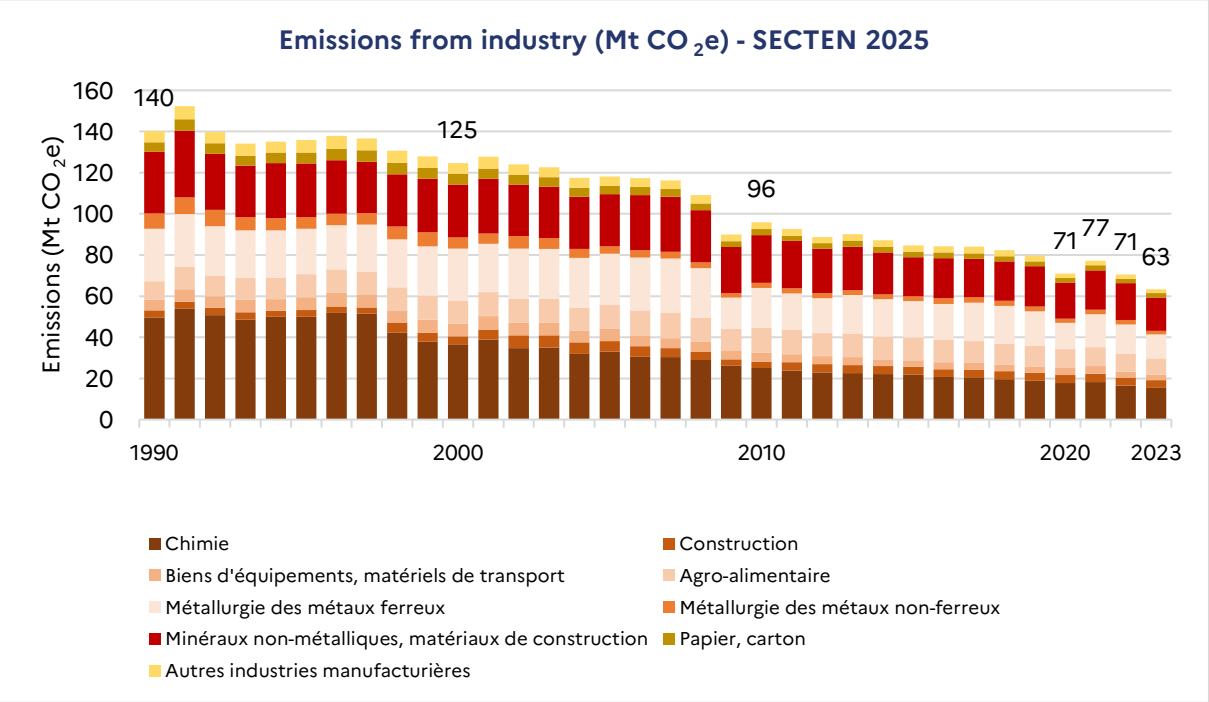


Figure: 38 *Evolution of emissions from the manufacturing sector, in Mt CO 2e (Source: National Inventory of Greenhouse Gas Emissions, Citepa, Secten 2025)*

Emissions from industry amounted to 63 Mt CO 2e in 2023, representing around 17% of national emissions. Three sectors account for 71% of industry emissions: metallurgy (14 Mt CO 2e), chemistry (15 Mt CO 2e), non-metallic minerals and building materials (16 Mt CO 2e) (Citepa, Secten 2025). In addition, the 50 most emitting industrial sites account for 55% of the sector's emissions. **Emissions from industry have been decreasing since the 1990s (-55% in 2023), mainly due to technological improvements and energy efficiency gains.** However, the decline in direct emissions has been accompanied by an increase in import-related emissions, although a reduction in the consumption-based emissions has now been observed for several years.

SNBC 2 projected an average carbon budget of 75 Mt CO 2e/year for the industry sector over the period 2019-2023.[173] **This carbon budget is respected,** with a margin of around 3 Mt CO 2e/year, in particular as a result of energy gains made by industry.

The 'With Existing Measures' (WEM 2024) scenario[174] shows that, as a result of policies and measures adopted until 31 December 2023, emissions are projected to fall by 56% between 1990 and 2030. This development is mainly due to the EU ETS market, the calls for decarbonisation projects of France 2030 (decarbonisation of energy mixes, increased energy efficiency or process changes) and the beginnings of technological capture (CCUS). From 2030

[173] *Technically adjusted carbon budgets in 2024 in accordance with the Environmental Code (Article D. 222-1-B).*
[174] *MEA 2024 report: https://www.ecologie.gouv.fr/politiques-publiques/scenarios-prospectifs-energie-climat-air*

to 2050, emissions continue to decrease slowly before increasing significantly in the last 5 years and finally slightly exceed in 2050 the emissions of 2030, linked to the very strong increase by 2050 in the production of H2 to produce synthetic fuels (which is done in WEM 2024 at 50% by methane vaporeforming).

2. The Strategy

a. Presentation of the strategy

Reducing emissions from industry requires a profound transformation of this sector through the mobilisation of various technological levers, including energy efficiency, the substitution of low-carbon (electricity or heat of nuclear origin) or renewable (biomethane or wood-energy) energies for fossil fuels, the decarbonisation of production processes (use of decarbonised hydrogen, carbon capture and storage, abatement of fluorinated gases or nitrous oxide), the modification of inputs in industry (increased recycling, substitution of fossil inputs, etc.) or sufficiency (lower consumption of plastic, etc.).

The challenge of decarbonising industry is also economic: the deployment of decarbonised production processes on an industrial scale is a key factor of competitiveness for the France of tomorrow, particularly with a view to strengthening the carbon price. Indeed, in parallel with the reduction of the emissions cap on the EU ETS market, around half of the emissions of European industry will be affected by the phasing out of free allowances, scheduled between 2026 and 2034 and associated with the implementation of the Carbon Border Adjustment Mechanism (CBAM). This scheme, which applies a carbon price to imported products, aims to limit carbon leakage by subjecting non-European producers of certain emission-intensive products to the same level of carbon pricing as European producers. With this in mind, putting our industry at the forefront at European and global level in its decarbonisation is a key challenge for the most emitting sectors.

Our climate targets require industry **to continue its efforts to decarbonise:** by 2050, the decarbonisation of industry means keeping only incompressible emissions, and in particular limiting the use of fossil inputs to material use for manufacturing processes for which there are currently no decarbonised alternatives. To reduce residual emissions from these processes, industry will use carbon capture to store the emitted fossil carbon (CCS). Carbon capture will also be deployed for processes that consume biomass and therefore cause biogenic emissions. The volume of biogenic carbon captured will then be partly used (Bioenergy with Carbon Capture and Usage - BECCU) for the production of synthetic fuels and e-methane, in order to contribute in particular to the decarbonisation of the air and maritime sectors. The rest of the biogenic carbon captured will be stored, allowing industry to contribute to CO2 (Bioenergy with Carbon Capture and Storage - BECCS) removals, which are referred to as negative emissions.

By 2030, the sector's **gross emissions** in the SNBC 3 scenario (excluding technology sinks) are 42 Mt CO2e, a 70% decrease since 1990 (or 33% since 2023). Industry is no longer consuming coal for energy purposes, and the share of fossil gas and petroleum product consumption is

falling sharply, notably to the benefit of electrification, solid biomass, waste and other thermal renewables. Technological carbon capture is also beginning to unfold.

In 2050, the sector's gross emissions in the SNBC 3 scenario are 6 Mt CO_{2e} (excluding technology sinks), a decrease of 96% since 1990 (or 90% since 2023). Electricity has the highest share in the energy mix, residual gas consumption is entirely from low-carbon gases and petroleum products for energy use have not been consumed since 2045. Electrolytic hydrogen is also deployed, in particular for certain non-energy uses (direct reduction of steel, production of ammonia, etc.). Residual emissions are mostly captured and technological sinks up to 8 Mt CO_2e/year are allowed thanks to the capture of biogenic emissions during the combustion of biomass or biomethane.

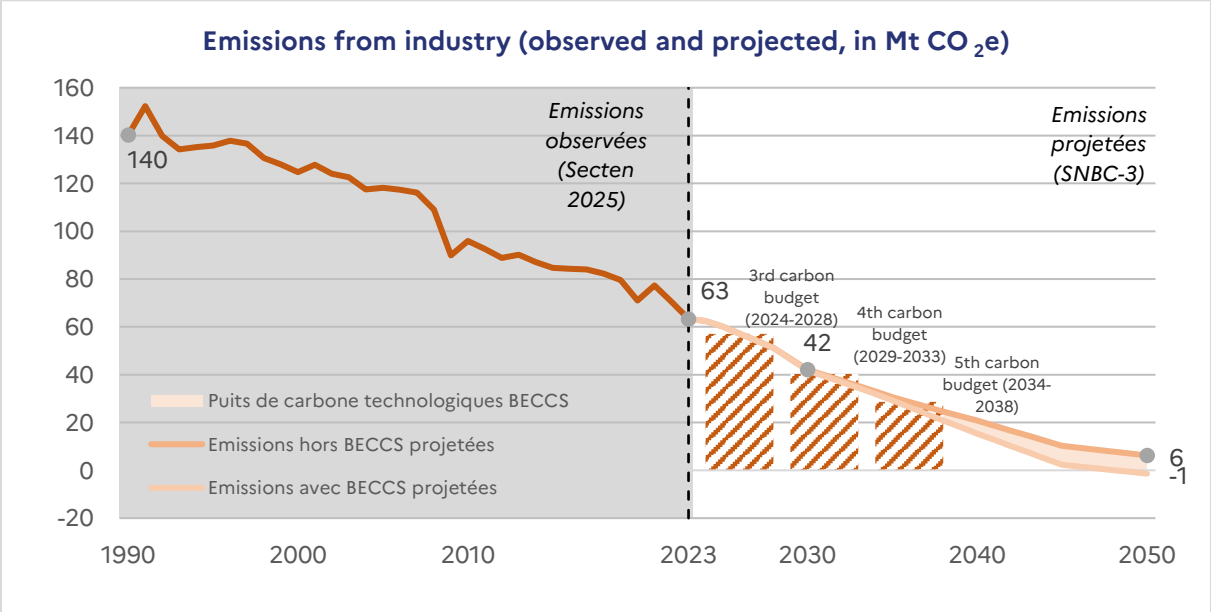


Figure: 39 *Evolution of emissions (historical and projected) of the industrial sector in Mt CO_{2e} (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC modelling)*

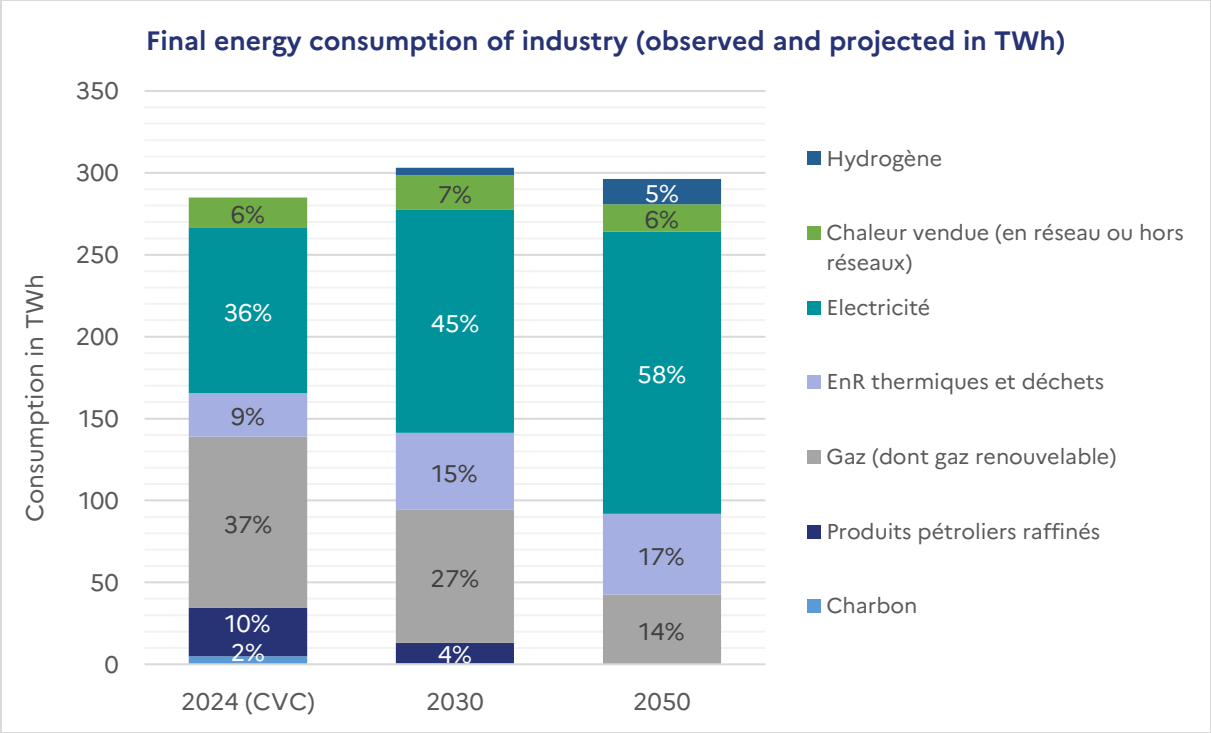


Figure: 40 *Final energy consumption of industry (history and projections)*
(Sources: France's energy balance sheet, SDES, 2025 edition; DGEC modelling)

Industry's energy consumption is gradually decarbonising by 2030 through an exit from coal and a drastic reduction in its consumption of refined petroleum products. The electrification of uses is also largely deployed as early as 2030 and continues in the long term, coupled with the development of electrolytic H2, the gradual substitution of fossil gas by biomethane and synthetic gas and the exit from energy consumption of refined petroleum products in 2045. Nuclear heat could, where appropriate, also contribute to the decarbonisation of industry. After an increase in total energy consumption by 2030 due to reindustrialisation, overall consumption decreases from 2030 to 2050 despite continued strong reindustrialisation, driven by energy efficiency gains and sufficiency.

The emission reductions obtained by levers are described in the following figures.

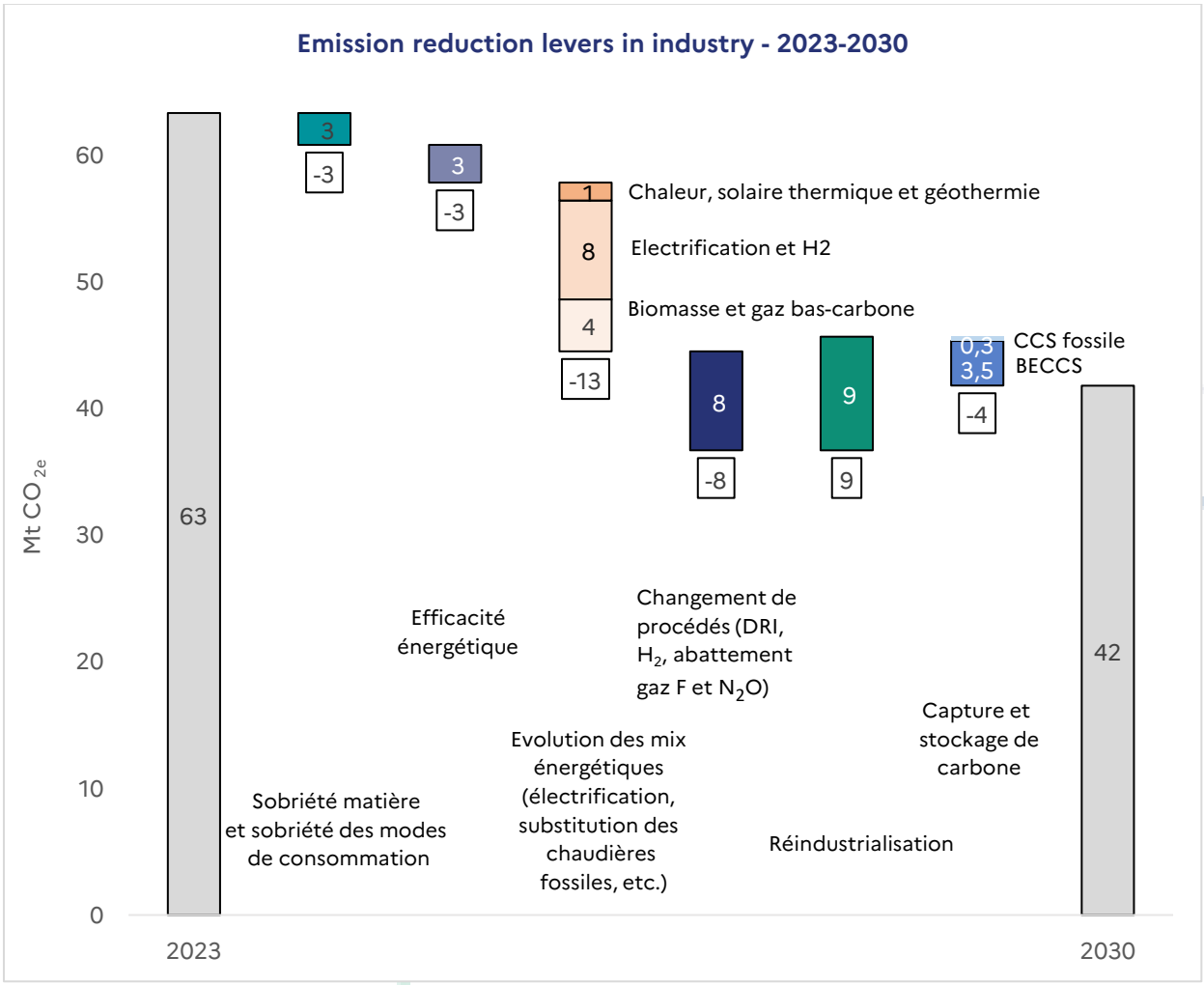


Figure: 41 *Indicative decomposition by lever (LMDI method) of the reduction of greenhouse gas emissions by industry between 2023 and 2030 based on modelling work (Source: DGEC modelling). The 'Carbon Capture and Storage' block includes CO2 emission storage (CCS) and biogenic emissions (BECCS), but does not display carbon capture for use (CCU, BECCU).*

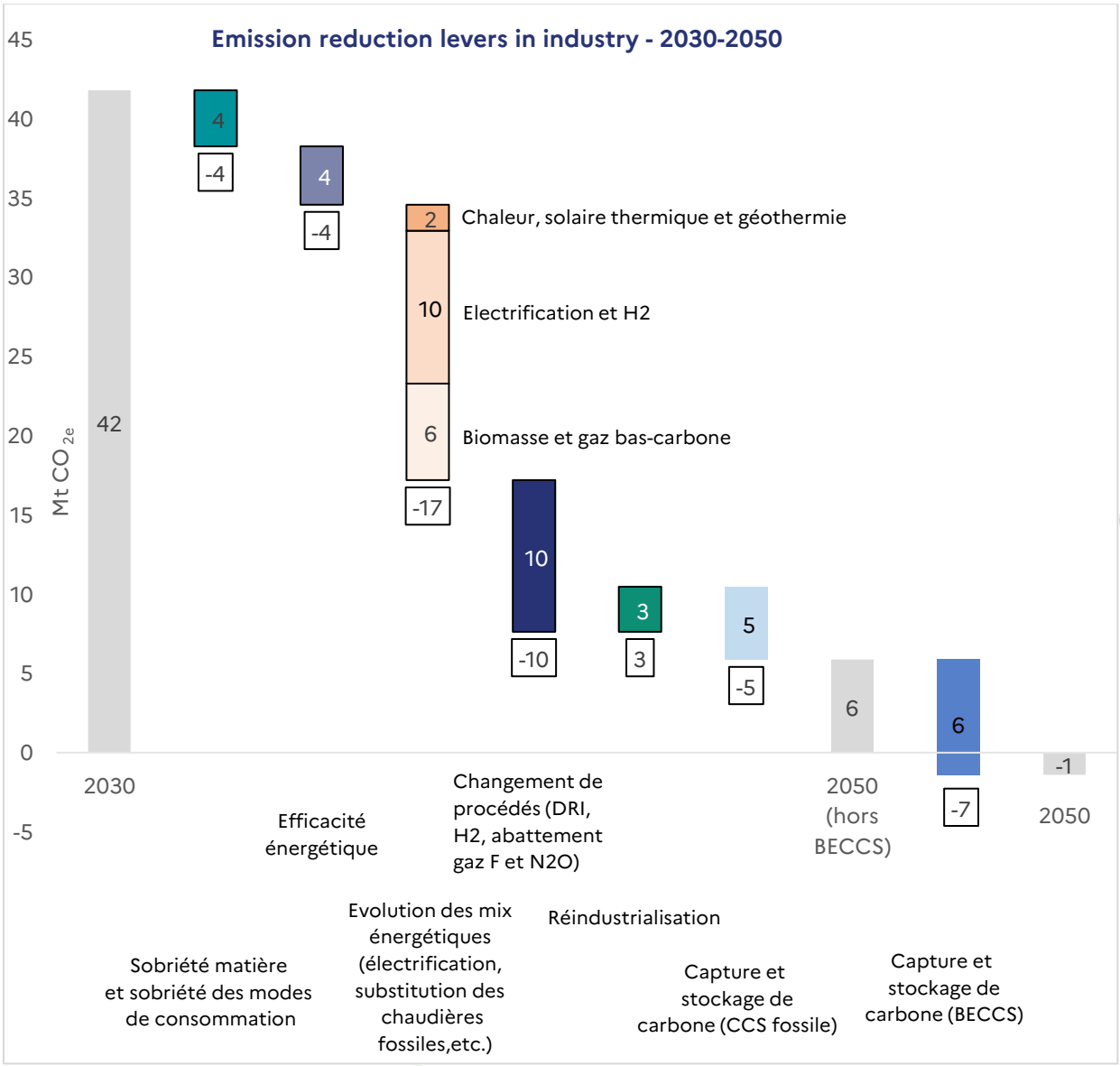


Figure: 42 *Indicative decomposition by lever (LMDI method) of the reduction of greenhouse gas emissions by industry between 2030 and 2050 based on modelling work (Source: DGEC modelling). The 'Carbon Capture and Storage' blocks include CO2 emission storage (CCS) and biogenic emissions (BECCS), but do not display carbon capture for use (CCU, BECCU).*

b. Main targets of the industry sector

Greenhouse gas emissions		Achieve -70% emissions in 2030 compared to 1990. Achieve a net carbon sink in 2050 through the capture and storage of biogenic emissions.
Sufficiency of matter and sufficiency of consumption patterns		Changing consumption patterns to reduce the production needs of carbon intensive processes and reduce the material content of industrial productions with measures of material sufficiency.
Energy efficiency		Increase the energy efficiency of industrial sites.
Reindustrialisation		Improve the trade balances of all industrial sectors, from 2030 onwards and with a continued effort until 2050.
Evolution of the energy mix	Share of electricity in the energy mix	Achieve a share of electricity in the energy mix of industry of at least 55% by 2050.
	RNEs increase in the energy mix	Increase the share of ENR in industry energy consumption by 1.6 points per year between 2021 and 2030, in line with RED III.
	Solid Recovery Fuels (SRC)	Achieve the target of the MEP 3 of 10 TWh of heat produced by CSRs in 2030, replacing coal, petroleum products and fossil gas.
	Solid biomass	Significantly increase the consumption of solid biomass compared to 2023, replacing coal, petroleum products and fossil gas, for industrial uses in line with the prioritisation of biomass uses.
Process changes		Achieve around 5 TWh of electrolytic H2 consumption (energy and non-energy) by 2030 in industry, and around 20 TWh by 2050. Reach 6 Mt of steel produced by direct reduction of iron ore (DRI) in 2050.

	Decarbonising other processes: reduce clinker share in cement, reduce emissions of fluorinated gases and nitrous oxide, etc.
Carbon Capture (CCUS) *(consistent with the targets of the CCUS strategy)*[175]	Capture 4-8 Mt CO2e per year in industry by 2030. Capture between 20 and 30 Mt CO2e per year in industry by 2050, of which around 50% is biogenic.

c. Main orientations of public policies

Industry Guideline 1 - Reducing France's consumption-based emissions through green reindustrialisation and promoting European preference

The decarbonisation of French industry is based on green reindustrialisation, i.e. the development of a reception policy favourable to green industrial development, creating the conditions for attractiveness and competitiveness to host low-carbon projects and green innovation. In particular, France supports the relocation of production from strategic sectors essential for the decarbonisation of industry and the economy as a whole. This reindustrialisation takes advantage of the particularly decarbonised French electricity mix, making it possible to reduce the French consumption-based emissions of the consumption of industrial goods.

In this context, France relies on the ambitious measures to promote the development of its green industry, adopted at national level (France 2030, Green Industry Act, Green Industry Investment Tax Credit) and at European level (Clean Industrial Deal, Net Zero Industry Act). **France also supports the introduction of a principle of 'European preference' for industrial sectors, particularly in the context of the European Commission's proposal on accelerating the decarbonisation of industry (Industrial Accelerator Act), in order to support strategic European green sectors,** such as the production of electric vehicles, heat pumps or renewables.

Industry Guideline 2 - Reinforcing incentives to improve energy efficiency

The financing provided by the Energy Economy Certificates (CEE) **applicable in industry will be mobilised to accelerate investments leading to energy efficiency gains, in line with existing support.** The Decree on the sixth period of the Energy Savings Certificates (CEE) scheme, which started on 1 January 2026, published in the Official Journal on 4 November 2025, lays down the annual energy savings obligations to be met by electricity, gas, heat and cooling suppliers, as

[175] *For 2030, this is the target set out in the CCUS strategy entitled 'State of play and prospects for the deployment of the CCUS in France' published in July 2024. For 2050, the low bound has been retained in a conservative approach, with slight adjustments related to the update of the scenario.*

well as fuel and heating oil customers for the years 2026 to 2030. It reinforces the role of CEEs in achieving national energy and climate targets by setting a total energy savings obligation of 1,050 TWh cumac per year, an increase of 27% compared to 2023-2025.

In particular, the electrification plan published in April 2026 aims to enable the acquisition of at least 1,000 electrical construction equipment made in Europe, mobilising support of €50 million in energy-saving certificates.

The ETS 1 carbon market reform adopted in 2023 (as part of the Fit for 55 package) strengthens incentives for energy savings and decarbonisation: the price of allowances is expected to increase with the reduction of the ceilings of the European Emissions Trading System (ETS 1); free allocation will be conditional on compliance with requirements such as energy efficiency from 2026 onwards (implementation of investments with a return time of less than 3 years).

- **Industry Guideline 3 – Strengthening and adapting the electricity grid to increased low-carbon electricity generation**

Demand for electricity in industry will increase significantly to replace fossil fuels, regardless of industrial technological choices (direct electrification, use of low-carbon hydrogen, setting up carbon capture and storage devices, etc.). The substantial and rapid development of decarbonised electricity production capacity will aim to ensure the availability of this resource, which is necessary for the decarbonisation of the sector and the reindustrialisation of the country (see Part SNBC - III. E. Energy production and transformation). Due to the concentration of energy-intensive industrial sites around a few areas and the isolation of many lower-power industrial sites, the **electricity transmission and distribution network will be adapted.** Connection times will be reduced, in line with the electrification plan published in April 2026 and pursuant to the Renewable Energy Acceleration law. In congested areas and pending the development of the necessary network infrastructure, the connection of projects may be prioritised according to their impact on emission reductions or their level of maturity.

It is also a question of implementing priority areas for the electrical connection of large electricity consumers in order to meet future needs linked to the reindustrialisation and decarbonisation of industry, in connection with RTE's 10-year network development plan (SDDR). In particular, port areas will be given particular attention as a catalyst for industries.

- **Industry Guideline 4 - Ensuring a competitive price for decarbonised electricity compared to fossil-based solutions**

Competitive **electricity prices** are a prerequisite for the implementation of electrification-based decarbonisation projects. Thus, after **ARENH,** which ended on 31 December 2025, **succeeds a new system for regulating the existing nuclear power plant.** This is linked to the development of medium and long-term maturities of products sold on the electricity market and via over-the-counter contracts, in particular through EDF's commercial policy, making it possible to facilitate the electrification of French industry. **Different schemes can reduce the price of electricity to promote electrification,** such as reduced rates or exemptions from excise duty on electricity for large electricity-consuming businesses and discounts on the tariff for the use of public electricity networks (TURPE) depending on the consumption profile. **In particular,**

the compensation scheme for indirect electricity costs facilitates electrification by offsetting part of the additional cost of the ETS carbon market for electro-intensive industries highly exposed to international competition. It also helps to prevent carbon leakage through the competitiveness channel, i.e. business relocations to places where greenhouse gas emissions regulation and carbon pricing are weaker or non-existent. **These different devices will be maintained over time. Finally, incentives for the use of fossil fuels will be reduced to promote electrification.**

- **Industry Guideline 5 - Strengthening pricing, regulatory and support tools for industry decarbonisation**

The majority of investments to decarbonise industry are more expensive than investments with fossil-based technologies. **Public intervention makes it possible to provide the necessary complement to trigger investments, in particular by filling the profitability gap of certain decarbonised solutions,** while preventing deadweight effects. The needs for 2030 are substantial and the resources provided tend to meet them: €1.2 billion with France Relance, €4.5 billion with "France 2030" to which are added €1.6 billion provided for by the Finance Act for 2025 and €0.5 billion for 2026. More specifically, the electrification of industrial processes, as well as process adaptations for the use of alternative inputs, or carbon capture and storage are supported in particular. The call for tenders for major industrial decarbonisation projects launched at the end of 2024 also makes it possible to support very large-scale projects for the deep decarbonisation of the most emitting industrial sites. The first succession, the results of which were announced in February 2026, will eventually electrify up to 2 TWh per year.[176] The electrification of craft enterprises is also supported under the electrification plan published in April 2026, with the launch of a dedicated session of the DECARB FLASH call for projects, for a total envelope of €16 million.

The French Heat Fund, European funds, in particular the Innovation Fund and a possible new European decarbonisation bank proposed by France **will complement this funding and contribute to achieving the target of reducing emissions by 68% between 1990 and 2030.**

It will also be necessary to continue the work of planning the decarbonisation of industry undertaken by government departments, industrial sectors and **the 140 most emitting sites.** For this, it will be necessary to clarify, via the various support devices, the desirable technological choices in order to build a coherent vision of the trajectories (infrastructure, innovations, energy mix, etc.).

- **Industry Guideline 6 - Financially support the use of low-carbon hydrogen to decarbonise processes**

The use of hydrogen is supported by investment or operating aid, in particular under the important hydrogen projects of common European interest (IPCEIs) and the call for tenders to

[176] *A second rotation is also launched, the winners will be nominated by the end of 2026.*

support the production of decarbonised electrolytic hydrogen: this will make it possible to cope with the significant additional costs associated with initial investments and the use of electricity in order to initiate the market. This support will be conditional on the priority uses of hydrogen, given the large volume of electricity mobilised by electrolysis production. In accordance with the H_2 National Strategy, the use of carbon capture and storage to decarbonise existing production of H_2 by methane vaporeforming may also be supported, where the industrial sites concerned allow access to CO_2 storage infrastructure.

- **Industry Guideline 7 - Developing CO2 capture, transport and geological storage solutions**

Despite the rising cost of the carbon quota, CO2 capture technologies, which are still emerging, are not profitable without public support in the short term. Thus, the call for tenders for major industrial decarbonisation projects was launched at the end of 2024, in order to **support, inter alia, the installation of CO2 capture units at sites without decarbonisation alternatives.**

In June 2025, Parliament approved the bill ratifying the 2009 amendment to the London Protocol, aimed at enabling the transboundary exchange of captured CO2 for secure geological storage in the marine subsoil. Two bilateral agreements have already been concluded with Denmark and Norway for the export of CO2, so as to ensure outlets for French industrial sites. The State will also encourage the planning and development of CO2 transport networks and investigations into storage on national territory.

As regards the recovery of part of the carbon captured for the production of e-fuels, the aim is to anticipate the end of fossil CO2 recognition by 2041, leading to the prioritisation of biogenic CO2 (BECCU). The national incentive framework could be adapted to further promote biogenic CO2, while meeting the methodological challenges related to traceability (the challenge of tracing the amount of biogenic CO2 injected into the different modes of transport of CO2, such as pipelines, boats, etc.).

It is also a matter of adopting a regulatory framework for transport and storage infrastructure to ensure transparent and non-discriminatory access for issuers. On the other hand, for issues of sovereignty, optimisation of energy costs linked to CO2 transport and difficulties for certain emitters in accessing future export hubs, **France also wishes to develop its own CO2 storage capacity.** Exploration campaigns and injection tests can thus be supported, in order to speed up the implementation of onshore geological storage in France while ensuring the control and safety of storage operations, via the launch of a call for projects.

- **Industry Guideline 8 - Supporting industrial transformations, particularly in terms of jobs**

Industrial developments in terms of jobs and skills by sector of activity will be anticipated in order to allow the emergence of alternative activities in areas possibly affected by the disappearance of economic activities, to maintain local economic dynamism and to give visibility to individuals on their jobs (see Part-Supplements - I.H. Jobs and skills). In particular, nearly 600 000 employees in France work in industries that can be mobilised for the electrification plan (published in April 2026), in at least 50 factories throughout France, not to mention a vast network of subcontractors.

Industry Guideline 9 - Mobilising the circular economy as a decarbonisation lever

The green transition is leading to the emergence of new activities and value chains in France (PV, wind, batteries, electric vehicles, etc.), the **recycling and reparability of** which **are anticipated as of today** (see Part IV. Consumption-based emissions).

In addition, the incorporation of recycled raw materials in place of virgin raw materials is a decarbonisation lever for many industrial sectors. The setting of obligations for the incorporation of recycled materials at European level for plastics (Packaging and Packaging Waste Regulation, Regulation under discussion on vehicle design and end-of-life vehicle management) and certain critical raw materials (Battery Regulation) provides a strong incentive to develop industrial recycling pathways. France will take care to defend, at European level, the implementation of measures allowing European producers to benefit from the European market for recycled materials created by these new obligations. At national level, the ongoing work to introduce a premium for the incorporation of recycled plastics into several extended producer responsibility schemes also contributes to this target, as do several calls for projects targeting both research and innovation and industrialisation.

Beyond recycling, reducing material consumption is a particularly powerful lever for reducing greenhouse gas emissions (see Part IV. Orientation Consumption-based emissions 11). The adoption of the European Ecodesign Regulation should not only contribute to strengthening recycling but also to saving resources by prohibiting the destruction of unsold goods, extending the lifespan of products and promoting product reparability and recyclability. At national level, increased mobilisation of extended producer responsibility schemes on eco-design, re-use and repair should lead to longer product lifetimes and avoid greenhouse gas emissions associated with the production of new products and equipment (see Part IV. Guidelines Consumption-based emissions 7, 8 and 9). In addition, the use of sufficiency of purchase and use and changes in the consumption patterns of industrial goods are important levers for reducing emissions and the consumption-based emissions of industry (see Part IV. Guidelines Consumption-based emissions 2, 4 and 5).

d. Main elements of the SNBC 3 scenario

- **Reduction of energy and resource consumption:**
- **Sufficiency:** industry is adapting to meet society's needs with greater sufficiency, offering products that consume less energy and natural resources, particularly fossil fuels. For example, when it comes to packaging, the aim is to move towards the release of single-use plastics.
- **Energy efficiency:** energy efficiency gains already achieved in recent years continue. They vary widely across industrial sectors, with an average gain of 8% in 2030 per industry compared to 2023, and 19% in 2050. Almost all waste heat is reused on site, for example for preheating, and then to power industrial or residential heat networks. Energy efficiency reduces emissions by 3 Mt CO_{2e} for industry by 2030 and by 7 Mt CO_{2e} by 2050, compared to 2023.
- **Inputs for alternative materials and recycling:** Incorporation rates of recycled raw materials in the steel, aluminium, petrochemical, glass and paper sectors increase on average by 13 percentage points per industry in 2030 and by 19 points in 2050 (compared to 2021). The rate of clinker per ton of cement produced is reduced by 5% from 2019 to 2030 and by 9% by 2050.
- **Decrease in the French consumption-based emissions & green reindustrialisation:** (see Part IV. Consumption-based emissions) reindustrialisation in France meets targets to reduce the consumption-based emissions, when domestic production replaces imports. It is decarbonised to limit its impact on territorial emissions. Reindustrialisation includes the production of technologies essential for the decarbonisation of industry and the economy as a whole. While these policies are key to driving the transition, they can lead in the short term to a relative increase in domestic emissions compared to a no-reindustrialisation scenario, offset in the medium term by a larger decline in imported emissions. Trade balances are improved, resulting in an increase in the production/consumption ratios of energy-intensive industries.[177] These have an average increase of 11% by 2050. Output in the diffuse industry is increasing, with an increase of 7% from 2021 to 2030 (excluding construction), and of 17% by 2050.
- **Evolution of the energy mix:**
- **Electrification of the sector (with low-carbon electricity):** the sector undertakes electrification work, in particular through the installation of heat pumps (for low temperatures), electric boilers (e.g. for chemistry or food to produce heat) or electric furnaces (e.g. for metallurgy and glass). The electricity used is decarbonised.178 This electrification also allows energy efficiency gains in many cases (notably with the installation of heat pumps or the use of mechanical steam recompression). The share of

[177] For each ECGI (such as steel, glass, etc.), the ratio of its production tonnage in France to the tonnage of the French consumption of the manubilld good in question can be calculated. For example, for the steel industry, this will be the ratio between French steel production and steel consumption in France, for a given year.

[178] To ensure that indirect emissions from electricity production are much lower than emissions from fossil technologies (including gas-fired heat production).

electricity in the energy mix of industry thus increases from 36% in 2023 to 45% in 2030 and 58% in 2050.

- **Energy use of biomass and CSRs**[179]**:** in industry, biomass resulting in particular from sustainable forest management is primarily[180] geared towards high-temperature uses, which are difficult to electrify. An additional 11 TWh of solid biomass is mobilised by 2030 in the reference scenario (compared to 2023), based both on the evolution highlighted in the roadmaps of the 50 most emitting industrial sites and on the calls for projects France Relance and France 2030 initiated by the State to finance biomass boilers for industrialists. The gas is gradually decarbonised through the injection of biomethane (see Part III.E. energy production and processing sector). CSRs, whose mobilisation allows the reuse of non-recyclable waste for energy purposes with optimised efficiency, are used in the cement sector as an alternative to fossil fuels or for heat production in other sectors. In general, they replace fossil fuels when the biomass deposit is limited. The SNBC 3 scenario reaches a total volume of around 10 TWh of CSR mobilised in industry in 2030, in line with the target set out in the draft MEP 3 (compared to 4 TWh in 2023).

Implementation of alternative processes and capture of residual carbon:

- **Low-carbon hydrogen:** decarbonised hydrogen produced by water electrolysis shall be used as a substitute for fossil inputs and as a substitute for fossil fuels, where no alternative is possible. In chemistry, it is gradually being used as a substitute for hydrogen produced by methane vaporeforming (particularly in the ammonia and petrochemical sectors). In the steel industry, blast furnaces are gradually being replaced by plants for the direct reduction of iron ore using hydrogen or, initially, natural gas, coupled with electric arc furnaces. Energy and non-energy electrolytic H2 consumption reaches 5 TWh in 2030 and 21 TWh in 2050 (compared to < 1 TWh in 2023).
- **Reduction of fluorinated gases and nitrous oxide emissions:** the industry continues its efforts in F-gas abatement (especially in agri-food) and nitrous oxide abatement (especially in chemistry) by adapting its production processes (e.g. the use of non-fluorinated refrigerants or the use of catalysts for N2O). The reduction of these high global warming gases avoids 1.1 Mt CO_{2e} by 2030 and 1.7 Mt CO_{2e} by 2050, compared to 2023.
- **Carbon capture, storage or recovery:** Carbon capture and storage or recovery (CCUS) aims in particular to reduce residual emissions, i.e. those that cannot otherwise be reduced to acceptable costs, in particular process emissions (e.g.: capture emissions from the decarbonisation of limestone for the production of lime or cement). The CCUS starts to develop in the central reference scenario to 2030, with a total volume captured per year in industry of 4.4 Mt CO2e. This volume is divided into 3.5 Mt CO2e of fossil emissions captured and stored in geological formations (fossil CCS), 0.3 Mt CO2e of stored biogenic carbon (BECCS, or absorbed emissions) and approximately 0.5 Mt CO2e of biogenic carbon recovered for the production of synthetic fuels (intended for international air and

[179] *Solid recovery fuels.*

[180] *The biomass resource is by definition limited and its use needs to be sustainable, i.e. compatible with resource renewal and the preservation of the carbon sink, soil fertility and biodiversity in particular.*

maritime bunkers).[181] By 2050, the captured volume reaches about 21 Mt CO_2e. It is divided into 8 Mt CO_2e of fossil CCS, 8 Mt CO_2e of BECCS and 5 Mt CO_2e of BECCU, valued in the production of e-fuels for aviation,[182] maritime and petrochemicals, as well as for the production of synthetic gas. The 8 Mt CO_{2e} of BECCS represent negative emissions, allowing industry to become a net carbon sink sector in 2050. These volumes are close to the low scenario envisaged in the CCUS deployment prospects in France, published in July 2024; a high variant is also envisaged (see Part II.B.2).

Sensitivity test 1 – Process electrification

If the increase in industrial process electrification is only half the target in the SNBC 3 scenario, electricity consumption in industry in 2030 would be reduced by 17 TWh (compared to the central scenario). In 2050, the decrease in consumption would be 35 TWh, which could lead to additional and residual consumption (at constant energy consumption volume) compared to the central scenario of around 21 TWh of natural gas, 2 TWh of coal and 12 TWh of petroleum products. This would generate 8.5 Mt CO_2e/year of additional emissions in 2050, or would have to be schematically compensated by 35 TWh of additional biomass consumption (solid and gaseous), which would lead to an imbalance in relation to the available supply.

Sensitivity test 2 – Less reindustrialisation

A conservative production scenario (stable production/consumption ratios by 2030 vs +21% compared to 2023 in the central scenario, stable diffuse industry production vs +7% from 2021 to 2030 excluding construction) would imply the following developments:

- The relative stabilisation of production would avoid the (also compensated) effect of increased territorial emissions in the central scenario (around 9 Mt CO2e by 2030 compared to 2023). However, this effect could be partially offset by a lower deployment of decarbonisation levers while increasing the French consumption-based emissions (at unchanged consumption levels) if these relative declines in production are replaced by imports from countries with more emissive industries.
- Industry's energy consumption could be reduced in 2030 by around 43 TWh compared to the central scenario. In particular, electricity consumption could be reduced by 15 TWh, fossil energy consumption by 17 TWh and biomass consumption (mostly solid) by 5 TWh.

[181] *The volume of biogenic CO2 captured is preferentially oriented towards a BECCU recovery in order to cover all the needs for the production of synthetic fuels on the French territory. The surplus biogenic CO2 is then stored (BECCS), so as to allow negative emissions.*

[182] *This can lead to the co-production of e-naphtha, a synthetic fuel that can be used for plastic production.*

D. BATIMENTS

RENEWING THE STOCK OF BUILDINGS TO REDUCE EMISSIONS, IMPROVE THE COMFORT OF OCCUPANTS AND REDUCE ENERGY BILLS

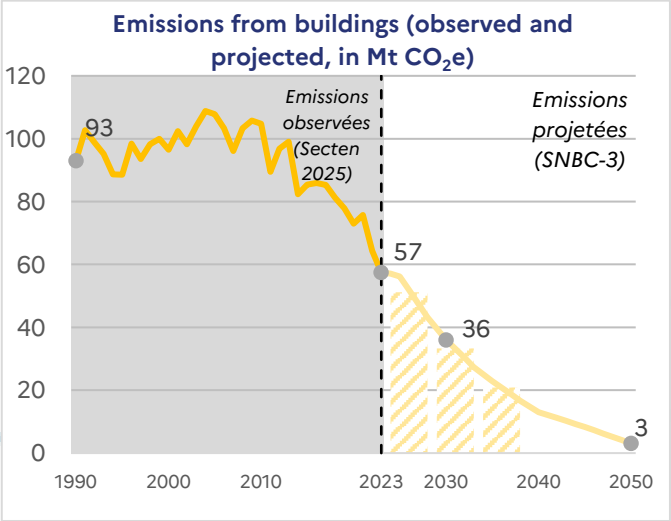
Credit: Arnaud Bouissou / Terra

RENEWING THE BATIMENT PARK TO REDUCE EMISSIONS, IMPROVE THE COMFORT OF OCCUPANTS AND REDUCE ENERGY BILLS

1) The **buildings sector** emitted **57 Mt CO_2e** in 2023, representing 15% of France's gross emissions.

2) These emissions will have to be reduced by **61%** in 2030 and **by 97%** in 2050 compared to their 1990 level.

3) The reduction of emissions will mainly be based on the shift away from fossil fuels (transition to decarbonised heating systems) and the reduction of energy consumption (via energy renovations, energy efficiency, sufficiency).



The main public policy guidelines:

Residential

- Ensuring consistency of renovation support schemes in order to achieve energy renovation targets
- Encourage renovation at key moments in the life of housing, i.e. at the change of lease or at the time of the transfer
- Renovating the social stock
- Structuring the sector in terms of overall and efficient energy renovations
- Exit from oil-fired boilers by 2035
- Gradually replacing gas boilers in the residential stock with decarbonised solutions
- Developing decarbonised solutions in the residential sector: massively install heat pumps, structure the sector in France and extend heat networks
- Building new low-carbon housing in line with housing needs
- Continue energy sufficiency efforts

Tertiary

- Developing decarbonised solutions in the tertiary sector: massively install heat pumps, structure the sector in France and extend heat networks
- Significantly reduce energy consumption in the sector, in particular in line with the tertiary eco-energy scheme, including through piloting (BACS, etc.)
- Support investments in improving the energy efficiency of tertiary buildings and in decarbonising heating and process modes
- Continue energy sufficiency efforts
- Controlling the increase in data center power consumption

1. State of play and challenges

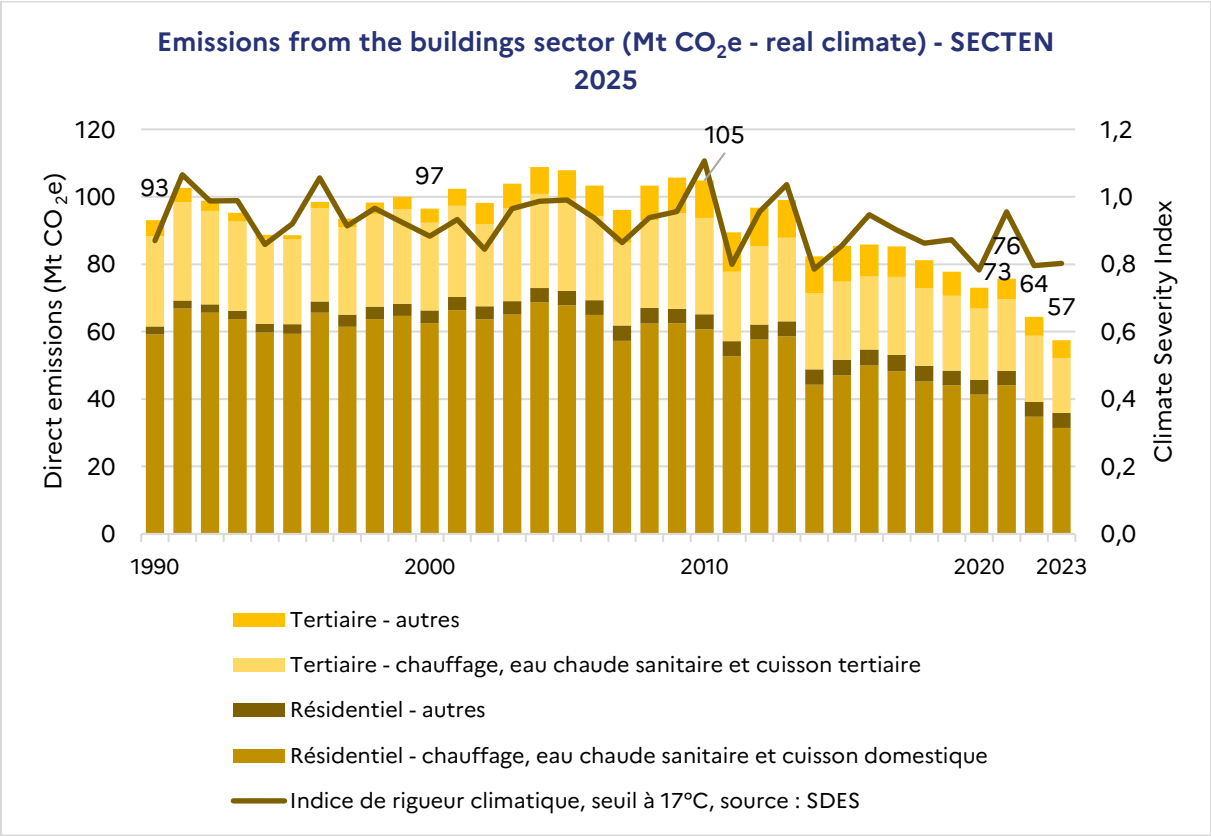


Figure: 43 *Evolution of direct emissions from the buildings sector in Mt CO_2e at real climate (Source: national inventory of greenhouse gas emissions, Citepa, Secten 2025); climate severity index[183] (threshold 17°C).*

The building operations sector [184] emitted 57 Mt CO_2e in 2023, representing 15% of France's gross emissions. These emissions started to decrease from 2010 onwards. The two subsectors are residential, i.e. housing (including social housing), responsible for 62% of the sector's emissions, **and tertiary,** comprising offices, commercial or institutional space owned by public (including state and local authority buildings) and private actors, responsible for around 38% of emissions (Citepa, Secten 2024). Energy consumption for heating, domestic hot water and

[183] *The Climate Severity Index measures the severity of winter conditions: an index above 1 corresponds to a year colder than normal, while an index below 1 indicates a milder year.*

[184] *The building operation sector should not be exactly assimilated to what can be called, in other communications, 'the building sector'. The residential sector includes the use of residential buildings as well as various domestic activities, such as heating, domestic hot water, cooking, air conditioning, domestic cold, the use of domestic products (e.g. paints), machinery (leisure and gardening), waste management and other specific activities. The tertiary sector includes heating, domestic hot water, cooking, air conditioning, refrigeration in shops, the use of certain products, as well as various activities such as fireworks or cremation. See the definition of the Citepa Secten format.*

cooking is responsible for 88% of emissions from the residential sector and 75% of emissions from the tertiary sector, respectively.

In the Secten accounting, only direct emissions are accounted for in this sector, with emissions related to electricity generation being accounted for in energy production and processing, emissions related to building materials in industry and those related to land take in the land sector (LULUCF). These indirect emissions account for about half of direct emissions.

For this sector, SNBC 2 provided for a carbon budget of 390 Mt CO_2e for the period 2019-2023 (i.e. 78 Mt CO_2e/year). The carbon budget is respected with a margin of 42 Mt CO_2e for the period (8 Mt CO_2e/year, or 11% of the carbon budget), due to record reductions in GHG emissions in the building sector: emissions reach 57 Mt CO_2e in 2023, representing a decrease of around 26% in GHG emissions between 2019 and 2023. This decrease is explained by cyclical effects (e.g. mild weather, high energy prices) and structural effects (e.g. banning the installation of oil boilers, a sufficiency plan, aid for energy renovation of housing, generally warmer winters due to global warming, etc.).

The **buildings sector** is particularly **heat-sensitive:** Consumption largely depends on climatic variations. Thus, in order to assess the role of other components in the evolution of energy consumption and GHG emissions (e.g. public policies or behavioural changes), it is necessary to consider climate-adjusted data (CVC). Over the period 2019-2023, relatively mild winters (with the exception of 2021) contributed to a reduction in energy consumption and, consequently, resulted in a reduction in GHG emissions. Over the period 2019-2023, the climate component contributes to reducing emissions by 4%[185] out of the 26% total reduction, all other things being equal. This factor does not affect compliance with the second carbon budget. However, when the margin is 8 Mt/year with the actual data, it is only 5 Mt/year with the CVC data.

The latest version of the 'With Existing Measures' scenario (AME 2024)[186] shows that, as a result of the measures adopted up to 2023, emissions are expected to fall by 53% in 2030 and 68% in 2050 compared to 1990, mainly as a result of regulations that reduce fossil energy consumption: energy decency schedule for the private and social rental stock, tertiary eco-energy scheme and BACS decree, ban on the installation of new oil boilers, environmental regulations for new RE2020 buildings.

2. The Strategy

[185] *Source: Secten 2025 Climate-adjusted emissions, Citepa. In the 'additional data' file*
[186] *WEM report 2024 https://www.ecologie.gouv.fr/politics-public/scenarios-prospectives-energie-climat-air*

a. Presentation of the strategy

Achieving the targets of reducing direct emissions from the buildings sector requires moving away from fossil fuels and reducing energy consumption. To this end, the building sector's decarbonisation strategy is based on the following pillars: energy renovation of buildings, including energy efficiency and electrification of uses, sufficiency and decarbonisation of heating vectors, and in particular gas through the incorporation of low-carbon gas into networks. Finally, the decrease in global warming powers of refrigerants[187] used in air conditioning, refrigeration or heat pump systems, as well as the continued adoption of good practices (such as equipment maintenance) contribute to reducing emissions from the sector.

In the residential sector, the reduction of energy consumption includes major renovations (at least two DPE class jumps and two treated insulation stations)[188] and **changes to heating equipment.** The goal is to target energy sieves (DPEs F and G) and worst-performing housing (DPEs E) as a priority. These energy renovations must ensure that the energy system can provide the necessary decarbonised energy, both in the medium and long term (electric closure and biomass closure), protect household purchasing power and combat energy poverty, while promoting adaptation to the future climate (including improved summer comfort). They will also make it possible to adapt housing to climate change, in particular heat waves. **In the tertiary sector, the reduction of energy consumption depends** mainly **on compliance with the targets of the tertiary eco-energy scheme, through renovation measures (insulation, changes in the energy vector), but also on sufficiency or optimisation (maintenance, adjustment, monitoring).** The sector's energy mix is being transformed by reducing the share of fossil fuels in favour of increasing electrification.

The transition from oil and gas heating systems to decarbonised solutions, such as aerothermal heat pumps, geothermal heat pumps and virtuous heat networks, **significantly reduces the sector's GHG emissions.** This reduces our dependence on fossil energy imports, protects households from price volatility and improves air quality by reducing emissions of air pollutants.

By 2030, the sector's emissions in the SNBC 3 scenario are 36 Mt CO_2e (in which 23 Mt CO_2e for residential), a decrease of 61% since 1990 (or 37% since 2023). The sector has begun its decarbonisation through the energy renovation of the stock, including the replacement of heating systems with decarbonised alternatives.

In 2050, the sector's emissions in the SNBC 3 scenario are 3 Mt CO_2e, a decrease of 97% compared to 1990 (or 95% since 2023), with residual emissions mainly from domestic products (paints, aerosols) and other tertiary activities (fireworks, military activities). By this

[187] *Refrigerants are used in air conditioning, refrigeration or heat pump systems to ensure heat transfer; if leaked, they can be released into the atmosphere and contribute to climate change due to their global warming power (GWP), often much higher than that of CO_2.*

[188] *Definition of major renovations p.10: https://www.anah.gouv.fr/sites/default/files/2025-03/202503-guide-aides-financières.pdf*

time, the housing stock will have to be renovated to be energy efficient (DPE A, B or even C). The use of fossil fuels will then be marginal.

With 697 TWh of final energy consumption in 2024, the buildings sector is the most energy-intensive sector (approximately 45% of French final energy consumption). Energy consumption in the sector (excluding environmental heat) decreased by 29% in 2050 compared to 2024. Its energy mix is moving towards a total outflow of fossil fuels in 2050 (34 TWh of low-carbon gas in 2050) and electrification (the share of electricity increases from 45% in 2024 to 52% in 2030 and then to 64% in 2050). The share of heat networks in the energy mix triples between 2023 and 2050. Decreases in energy consumption are more pronounced in the residential sector than in the tertiary sector. In the tertiary sector, the marked increase in data centers-related electricity consumption to 40 TWh in 2050 mitigates energy savings elsewhere; the tertiary eco-energy scheme contributing to reducing electricity consumption by around 20% between 2023 and 2050 in tertiary sectors other than data centres.

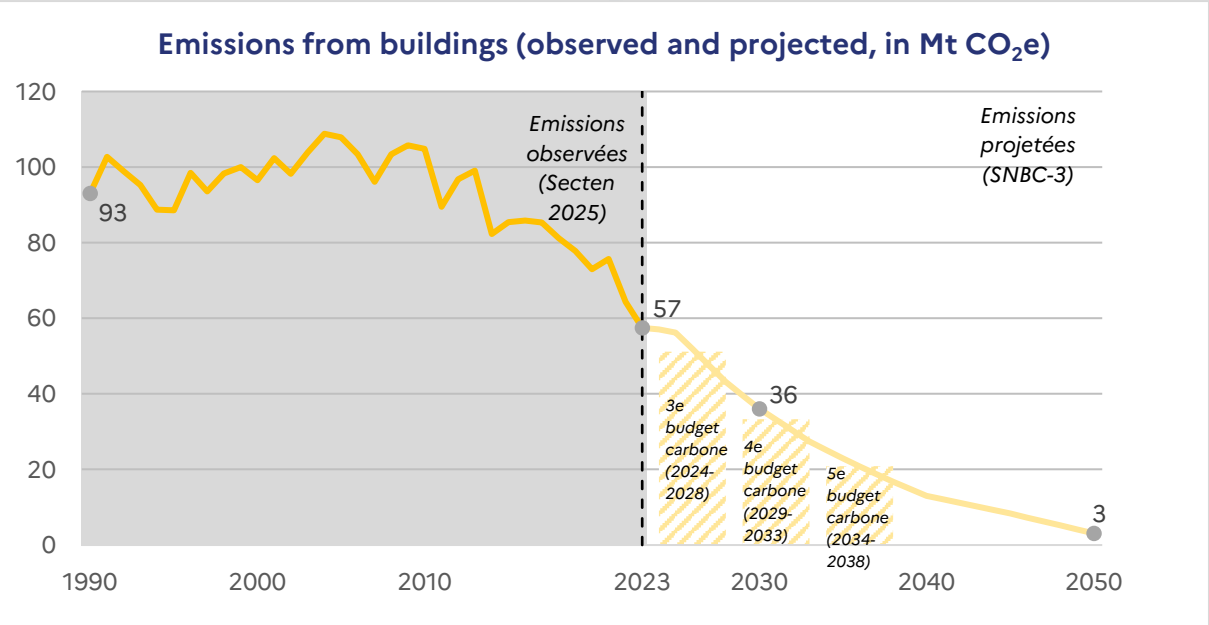


Figure: 44 *Evolution of direct emissions (historical and projected) from the buildings sector in Mt CO_2e between 1990 and 2050 (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC modelling).*

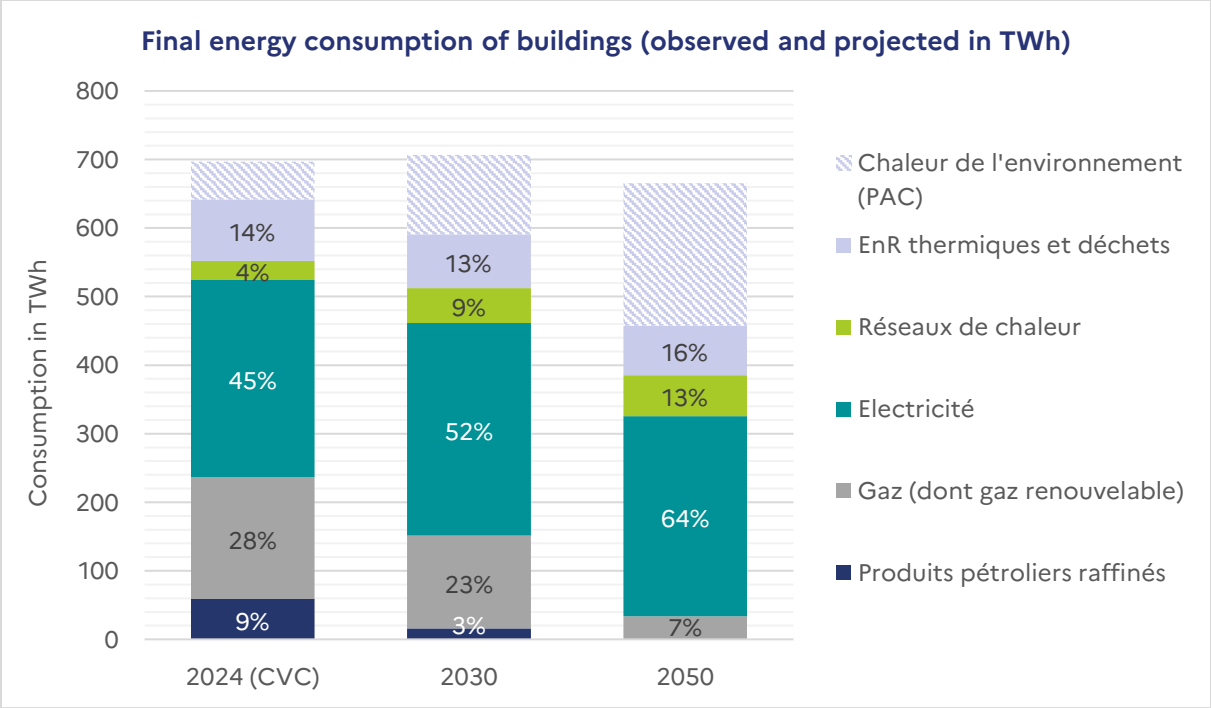


Figure: 45 *Final energy consumption of buildings (history and projections)*
(Sources: France's energy balance sheet, SDES, 2025 edition; DGEC modelling)

The expected GHG emission reductions by levers are described in the following figures.

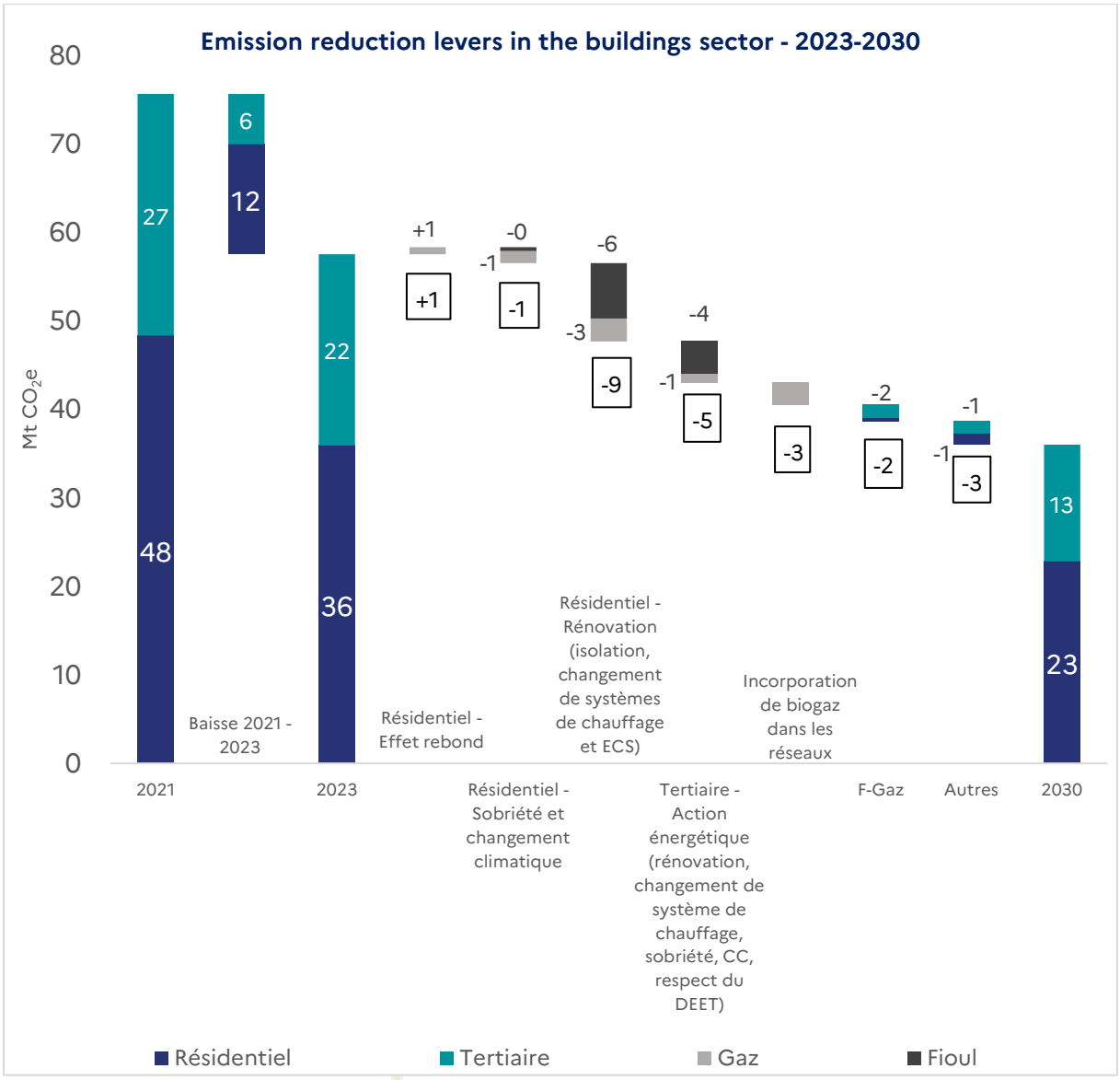


Figure: 46 *Indicative decomposition by lever (LMDI method) of the reduction of greenhouse gas emissions from buildings between 2023 and 2030 based on modelling work (Sources: DGEC modelling)*

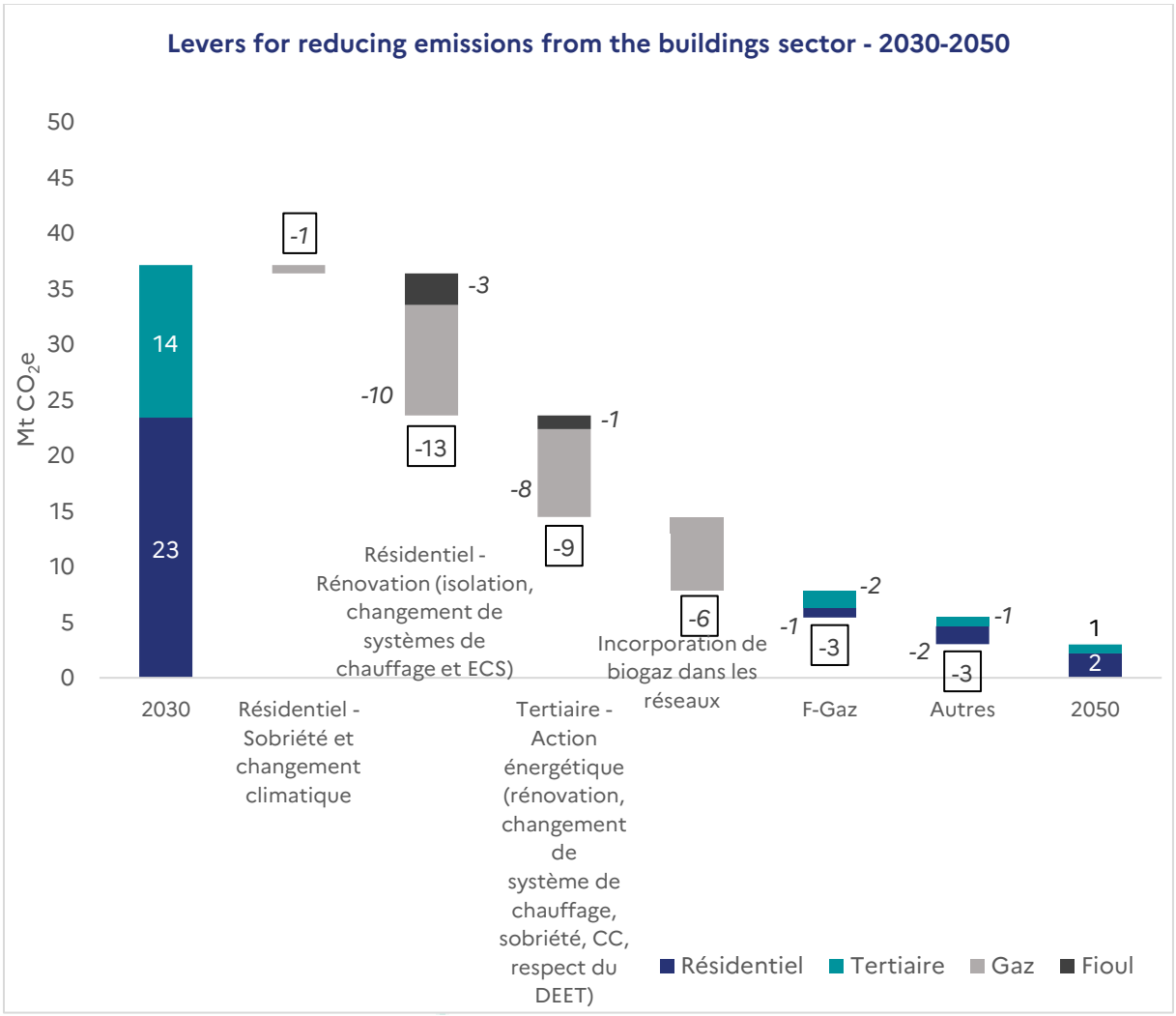


Figure: 47 *Indicative decomposition by lever (LMDI method) of the reduction of greenhouse gas emissions from buildings between 2030 and 2050 based on modelling work (Sources: DGEC modelling). For methodological reasons, reductions in electricity consumption are not visually included in the summary of emission reduction levers in the building sector. In the Secten format, electricity-related emissions are indeed accounted for in the energy production sector rather than in the building sector.*

b. Main targets of the buildings sector

Residential and tertiary	Greenhouse gas emissions	61% direct emissions in 2030 compared to 1990, and near-complete decarbonisation in 2050.
	Construction of new housing	Respect the RE2020, decarbonize materials and promote bio-sourced materials.
	Energy Sufficiency	Respect set temperatures (19 °C hot, 26 °C cold), control the rebound effect post-renovation.
	Urban heat networks	Massively deploy urban heat networks to achieve the targets of MEP 3. In particular, reach 5.8 million homes connected in 2035 (325,000 connections per year on average between 2023 and 2030).
	Air conditioning and refrigerants	Control the increase in the use of air conditioning and decarbonize refrigerants in connection with the F-Gas regulation.
Residential	Evolution towards a high-performance stock	Renovate the housing stock to obtain a stock composed mainly of DPE A, B or even C. Eradicate energy sieves by 2035-2040.
	Exit of oil boilers	Reduce the number of oil boilers in dwellings by at least 60% between 2023 and 2030 (around 250,000 households per year on average) and then move out of oil boilers.
	Gradual replacement of gas boilers	Reduce the stock of gas boilers in dwellings by at least 20% between 2023 and 2030 (around 350,000 households per year on average), and replace the majority of gas boilers by 2050 with decarbonised solutions.
	Installation of heat pumps	Massively install heat pumps in homes (approximately 9 million PACs in the stock in 2030 - 1 million annual installations in 2030; continued momentum until 2050).
	Renovation of housing	Achieve 700,000 home renovations allowing for at least two DPE class breaks on average per year between 2025 and 2030 (including social stock), notably through the installation of decarbonised heating systems (in particular PACs and connection to

		heat networks). Among these renovations, 250 000 renovations are large-scale renovations, targeted at the worst-performing housing.
Tertiary	Energy action	Reduce the energy consumption of tertiary buildings in line with the targets of the eco-tertiary energy scheme.
	Exit of oil boilers	Reduce oil-fired tertiary areas by 85% between 2020 and 2030.
	Gradual replacement of gas boilers	Decrease by 17% of gas-heated tertiary areas between 2020 and 2030 and by 85% between 2020 and 2050.

c. Main orientations of public policies

1- Residential

- **Bat orientation. Res. 1 – Ensuring consistency of renovation support schemes in order to achieve energy renovation targets**

During renovation work, various workstations can be treated such as the treatment of the housing envelope (wall insulation, roof insulation, low floor insulation, replacement of exterior joinery), the installation of an efficient mechanical ventilation system, the installation of a heating system and the production of decarbonised domestic hot water. These renovations contribute to lower energy consumption and reduce GHG emissions. In addition, insulation also improves the thermal comfort of the inhabitants (both winter comfort but also summer comfort[189] during heat waves).

Aid for the energy renovation of housing (MaPrimeRenov' by gesture, MaPrimeRenov' accompanied pathway and MaPrimeRenov' Co-ownership, CEEs, reduced VAT, eco-PTZ, etc.) are essential tools to facilitate the implementation of these projects. By providing significant financial support, these aids make renovation works accessible to a larger number of households, especially those with modest incomes.

In 2024, **MaPrimeRénov' aid from Anah evolved to better meet the needs of housing and households.** They have thus been restructured around two routes: a 'MaPrimeRenov' major renovations scheme to finance major renovations (where appropriate in stages) and a 'MaPrimeRenov' scheme by gesture to support one-off energy efficiency or decarbonisation operations in housing. The system continues to evolve in 2025 in view of the dynamics observed. In addition, major renovations supported by MaPrimeRenov' (MPR) for single-family homes will no longer be able to lead to the maintenance of gas heating at the end of the works.

[189] *The National Climate Change Adaptation Plan (PNACC) proposes adaptation measures for housing at high heat risk (measure 9).*

The Decree on the **sixth period of the Energy Savings Certificate (CEE) scheme,** which started on 1 January 2026, was published in the Official Journal on 4 November 2025. This decree lays down the annual energy savings obligations to be met by electricity, gas, heating and cooling suppliers, as well as fuel and heating oil customers for the years 2026 to 2030. It reinforces the role of EWCs in achieving national energy and climate targets, by defining a total energy savings obligation of 1 050 TWh cumac per year, **an increase of 27% compared to the years 2023 to 2025.** The CEE scheme is one of the main instruments of French energy demand control policy. Each year, it finances more than one million energy-saving operations in the buildings, transport, industry and agriculture sectors, while contributing directly to France's energy sovereignty, thanks to the consumption reductions it allows. In particular, for buildings, **the target is to generalise energy savings and sustainably reduce the consumption of the building stock.**

The State will pilot these schemes in order to achieve the energy renovation targets.

The territorial network of France Rénov' advisory areas is essential to support households. In 2024, there were around 600 France Rénov' structures to cover almost the entire territory In relation to local authorities, these offices inform and advise households in their renovation choices ranging from changing heating systems for a decarbonised solution to a major renovation. These points of contact have been maintained and strengthened by the territorial pacts between the State and the local authorities deployed since 2025.

In addition, the Mon Accompateur Rénovateur (MAR) scheme has been deployed since 2023 and has around 1300 structures to support households in their major renovation projects.

Steps will be taken between the State and local and regional authorities to reach households, including landlords and condominiums, **in order to encourage desirable energy renovation operations.**

- **Bat orientation. Res. 2 – Incentives for renovation at key moments in the life of dwellings, i.e. at the change of lease or at the time of transfer**

The rental decency obligations introduced by the Climate and Resilience Law aim to trigger part of the major renovations. This law provides that each owner provides the tenant with housing that meets the criteria of decency, with increasingly demanding minimum energy performance levels.

In mainland France, in order to be classified as 'decent', housing must:

- From 1 January 2025, have at least class F of the DPE;
- From 1 January 2028, have at least class E of the DPE;
- From 1 January 2034, have at least class D of the DPE.

The green value[190] of the goods constitutes an incentive to **renovate the energy sieves when they are sold, thus helping to gradually eliminate those energy-intensive dwellings from the housing stock.**

Renovating energy sieves will help effectively combat energy poverty, a phenomenon that has increased in recent years, affecting more than 3 million households or 10.8% of the population, according to data from the National Observatory for Energy Precarity (ONPE).[191]

Focus – Exploring incentives for energy renovation

A study could be launched on the incentives for energy renovation of housing during real estate changes, in particular the new credit offers put in place, by studying the effect of the decency measure on the green value of goods.

➨ Bat orientation. Res. 3 – Renovating the social stock

The social landlords will organise themselves collectively and in conjunction with the public authorities in order to comply with the decarbonisation trajectory laid down in SNBC 3, and will plan the renovation work and the reduction of gas consumption accordingly, consistent with the rental stock's obligations of decency. Social landlords will in particular, but not only, renovate housing in the social rental stock classified G, F, and E by 2034. They will share their experiences with each other in order to develop common solutions to renovate their stock, and work with their tenants on the sufficiency of use. **They may be subject to reinforced renovation and decarbonisation targets as part of their contractualisation,** which may be accompanied by obligations to design renovation plans in line with the targets set. To support this dynamic, donors will continue to develop and pool their operational skills when necessary to carry out these plans, as well as to ensure the coordination and monitoring of the resulting renovation operations.

➨ Bat orientation. Res. 4 – Structuring the sector in terms of overall and efficient energy renovations

The economic sector of energy renovation will have to evolve rapidly and be strongly strengthened to meet the growing needs, estimated by the SGPE at around 170 000 to 250 000 additional jobs by 2030.[192] In particular, the large-scale renovation sector will have to speed up

[190] *Increase in value generated by a better energy and environmental performance of one property compared to another. Housing with an energy label A or B, i.e. with a high green value, generally sells at a higher price compared to less efficient goods. On the other hand, thermal sieves (energy-intensive housing) see their value decrease.*

[192] *https://librairie.ademe.fr/batiment/7803-onpe-tableau-de-bord-de-la-précarité-energetique-December-2024.html*[192]
https://www.info.gouv.fr/upload/media/content/0001/10/df0f4182ce4d0e71f75a915e68ed32f233c82b35.pdf

its structuring. **The State will support the sector in its development and structuring, in conjunction with the local authorities responsible for training and economic development.**

Several levers for structuring the sector could be implemented, such as the promotion of business models allowing companies to group together, for example to respond to global offers *via* the temporary grouping of companies (GME); the deployment of digitalisation of the sector and off-site construction; anticipating the need for jobs and skills, in particular by strengthening efforts on initial and continuing training and the attractiveness of professions, particularly in the renewable heat and high-performance air-conditioning sector.

Reflections on the bridges between the construction/structural work and those of energy renovation can also be studied, in order to facilitate professional retraining and mobility in a context of increasing skills in the sector.

At the same time, the fight against energy renovation fraud and unfair canvassing will also need to be strengthened in order to preserve the quality of renovations.

- **Bat orientation. Res. 5 – Exit from oil-fired boilers by 2035**

Due to the very high carbon intensity of oil, **the replacement of oil boilers will be prioritised by 2030 to significantly reduce CO2 emissions from dwellings and aim for an almost complete exit from oil boilers by 2035.** The development of the France Rénov' public service, aid for the purchase of decarbonised systems and the ban on oil boiler installations since July 2022 should support this dynamic.

- **Bat orientation. Res. 6 – Gradually replacing gas boilers in the residential stock with decarbonised solutions**

All financial incentives for the installation of gas boilers were removed in early 2025. The supply and installation of gas boilers no longer benefit from reduced VAT and are now subject to the standard rate of 20%.

The continued decline in gas consumption, which began in 2021, will be based on the introduction of additional measures, such as: economically favour electricity over gas, ensure the competitiveness of the purchase of decarbonised heating systems compared to gas boilers or limit the installation of gas boilers, in particular in single-family homes and where decarbonised alternatives exist. As part of the announcements of the electrification plan, it will no longer be possible to install gas boilers in all new residential buildings from 2027.

The reduction in gas consumption and the reduction in the number of gas-heated homes require a reflection on the evolution of the architecture of gas distribution networks. The network will maintain a key role in a decarbonised energy system by exclusively distributing renewable gas in 2050, while evolving to meet the most relevant uses. It will probably be necessary to maintain these networks for buildings where a transition to alternative to gas heating is technically complex, but streamlining networks in areas where alternatives are possible will make it possible to control their unit cost in a context of declining consumption volume. These reflections on the future of gas networks will need to be carried out in a coordinated manner at local level with renovation strategies to reduce heating needs and improve housing, as well as the development of collective decarbonised systems, such as

district heating networks. In addition, a decree will provide, from 2027, that buildings requesting a connection to the gas network bear the cost.

- **Bat orientation. Res. 7 – Developing decarbonised solutions in the residential sector: massively install heat pumps, structure the sector in France and extend heat networks**

Public support for the development of the French heat pump industry (PAC) aims to **produce and install in France every year around one million PACs from 2027**[193] **onwards, in particular through the C3IV.**[194] **At the same time, the State has begun to reflect on the trend of aid towards the French and European PACs.** Air/water PACs will mainly be installed as a replacement for gas or oil boilers. Specific measures will be put in place to encourage the development of heat pumps in collective housing and the urban environment, in particular by better taking these equipment into account in planning authorisation procedures and by reflecting on good architectural integration practices. In the absence of a hot water loop, air/air PACs will replace inefficient joule electric heating, improving the energy efficiency of homes and lowering the electric peak. Where the installation of PACs is not technically feasible, other decarbonisation options (heat networks, geothermal energy and, as a last resort, biomass heating) should be preferred. However, this type of heating will remain relatively marginal across the housing stock and will have to be reserved for renovation. **A Centre of Expertise on the Heat Pump (CEPAC) will be responsible for informing and equipping all building professionals.** As part of the electrification plan, the State wishes to create a secure and turnkey commercial offer for the installation of PACs and make it possible to reduce heating bills. It will primarily affect almost 25 000 households and contribute to the target of setting up one million CAPs annually in 2030.

Heat networks represent a valuable solution for the decarbonisation of collective housing, particularly gas-heated collective housing in urban areas. **The development and extension of heating networks will be supported through the ADEME Heat Fund. The number of connected dwellings will increase fourfold by 2035,** in particular thanks to the tools for identifying areas with potential for the deployment of district heating and cooling networks, the incentives for carrying out feasibility studies, the classification of district heating networks, which makes it compulsory to connect new or renovated buildings located in a priority development area. **Other acceleration measures will also be studied (accompanying** the creation of secondary hot water loops in collective buildings, conditioning public funding for connection operations in the context of major development operations, etc.).

At the same time, in order to meet the cooling needs in housing, the State will encourage the use of energy-efficient systems such as cooling networks (which are planned to be extended by 2030 in the Multiannual Energy Programming) or reversible heat pumps, which are less energy-intensive than mobile air-conditioning systems. A reflection will be carried out in

[193] *https://www.economie.gouv.fr/actualites/plan-action-pumps-heat-2027*

[194] *The tax credit for investments in green industry makes it possible to finance up to 20% of certain expenditure linked to the introduction of production for four key technologies: batteries, wind, photovoltaics and heat pumps.*

conjunction with manufacturers on the possibility of introducing a minimum set temperature on all air-conditioning installations.

➨ Bat orientation. Res. 8 – Building new low-carbon housing in line with housing needs

Since 2022, new residential buildings must comply with the Environmental Regulation 2020 (RE2020), which is based on three pillars: further improving the energy performance of buildings, with particular emphasis on the sufficiency and performance of the envelope; take into account the consumption-based emissions of new buildings over their entire life cycle; ensure that residents and occupants are provided with housing adapted to heat waves. The rules provide for a gradual increase in requirements with the evolution of thresholds for certain indicators in 2025, 2028 and 2031, in particular as regards the building's consumption-based emissions.

The number of new buildings will respect housing needs, taking into account the target of reducing housing poverty by 2050, but also the remobilisation of vacant housing and second homes. For topics related to materials and construction industry, see Part IV. Consumption-based emissions.

➨ Bat orientation. Res. 9 – Continuing energy sufficiency efforts

The Energy Sufficiency Plan launched by the Government on 6 October 2022 continues to mobilise French people. A new version of the annual campaign "Every move counts: Save Energy"[195] was launched in October 2024, with sufficiency representing a significant potential to reduce consumption (up to 50 TWh/year). The plan aims to change habits and behaviours, by lowering the set temperature and controlling the consumption of business, government and household buildings. The target is to achieve energy savings to sustain the 12% decrease in gas and electricity consumption observed over the years 2022-2023, and 2023-2024 compared to 2018-2019.

In addition, the renovation of energy sieves will reduce situations of energy poverty, thus reducing the sufficiency suffered by households. At the same time, it is crucial **to promote a chosen sufficiency** based on simple and accessible actions such as lowering the heating set-point temperature to 19 °C, adopting a sober air-conditioning behaviour by limiting the set-point temperature to 26 °C, adjusting the temperature of domestic hot water, and individualising the cost of co-ownership heating.

Beyond the sufficiency actions as such, a better handling of the systems (thermostats, piloting, etc.) will also make it possible to achieve energy savings.

[195] *https://www.ecologie.gouv.fr/press/each-gesture-account-save-lenergy-launch-third-edition-campaign-communication*

2- Tertiary

- **Bat orientation. Ter. 1: Developing decarbonised solutions in the tertiary sector: massively install heat pumps, structure the sector in France and extend heat networks**

With some exceptions, **tertiary areas will no longer consume fuel oil from 2030** onwards. At the end of the life of gas boilers in the tertiary sector, the decarbonisation of the heating mode will become widespread through the installation as a substitute for heat pumps and the connection to a heating network depending on the situation.

As in the residential sector, **the development of the heat pump sector will make it possible to decarbonise the tertiary sector (substitution** of gas and oil boilers with air-to-water heat pumps) and to replace inefficient electric convectors with air-to-air heat pumps. **Energy-efficient geothermal heat pumps will be preferred where possible. The development of district heating networks will also contribute to the connection of tertiary areas in urban areas,** in particular for offices, educational and health facilities.

At the same time, to meet the refrigeration needs of tertiary premises, the State will encourage the use of energy-efficient systems such as refrigeration networks (which are planned to be extended by 2030 in the Multiannual Energy Programming) or reversible heat pumps, which are less energy-intensive than mobile air-conditioning systems. Consideration will be given, in conjunction with manufacturers, to the possibility of introducing a minimum set-point temperature suitable for use on all air-conditioning installations.

- **Bat orientation. Ter. 2: Significantly reduce energy consumption in the sector, in particular in line with the tertiary eco-energy scheme, including through piloting (BACS, etc.)**

The trajectory of the Tertiary Eco-Energy scheme requires tertiary areas above 1 000 m^2 to reduce energy consumption by 40% in 2030, 50% in 2040 and 60% in 2050 (compared to a reference year which may not be before 2010), or failing that, to reach an absolute value expressed in kWh/m^2/year. This will trigger many energy actions (energy renovation, renewal of low-performing business equipment, etc.) and encourage sufficiency. **This trajectory will be supported by a generalisation of the equipment of tertiary surfaces with energy consumption monitoring systems, in particular pursuant to the BACS** decree (for 'building automation and control system') adopted on 7 June 2023. This decree makes it mandatory to install temperature control systems for heating and cooling systems for buildings with an effective rated output above 70 kW by 2030.

Furthermore, **the Energy Efficiency Directive** (EED, 2023/1791/EU), published in the Official Journal of the EU in September 2023, **requires public buildings to be exemplary in reducing energy consumption.**

Bat orientation. Ter. 3: Support investments in improving the energy efficiency of tertiary buildings and in decarbonising heating and process modes

The State's support for local and regional authorities via the 'Green Fund'[196], which has been in place since January 2023, has made it possible to speed up the renovation of their buildings, in particular primary schools ('Plan école'). **The CEEs will be mobilised more heavily by the private sector to finance energy actions.**

The gradual entry into force of the RE2020 (2022 for housing and primary and secondary education buildings; 1 May 2026 for universities) will ensure high efficiency of new educational buildings, in addition to the EET scheme which aims to reduce the energy consumption of existing tertiary buildings. Due to the associated learning and health challenges and the large size of this built heritage in the community stock, the renovation of school buildings is the subject of a specific plan launched in 2023 by the government. This plan is based in particular on:

- the EduRénov programme of the Banque des Territoires, which offers support to local authorities and the financing of projects with the mobilisation of EUR 2 billion in loans and EUR 50 million in engineering credit over five years.
- State subsidies, first and foremost the Green Fund, which has made the renovation and renaturation of schools a priority.

The EUR 220 million CEE ACTEE+ programme (Action of local and regional authorities for energy efficiency) is also mobilised to support local authority engineering, as well as the heat fund, in particular for the development of geothermal energy to heat and cool schools.

Knowledge of the tertiary sector and sub-sectors struggling to achieve energy savings will be improved to better adapt support schemes to these sectors. Existing data (CEE, OPERAT, Secten, other ad hoc studies) will be cross-checked to identify sectors struggling to achieve energy savings and deploy adequate support schemes.

Bat orientation. Ter. 4: Continue energy sufficiency efforts

In line with the energy sufficiency plan launched by the Government in 2022, public institutions will communicate the importance of sufficiency in the consumption of heat, cold and other uses, in connection with tensions on the electricity system and climate targets. Buildings can be a source of flexibility, reducing and shifting heating consumption away from peaks in electricity consumption.

A more streamlined management of electrical uses will gradually be introduced, with targeted measures such as the regulation of set temperatures for heating (19 °C) and air conditioning (26 °C), an optimised setting of the set temperature for domestic hot water, particularly in

[196] Green funds: https://www.ecologie.gouv.fr/fonds-vert

public buildings, and the supervision of certain uses such as digital advertising and night lighting.

Beyond the sufficiency actions as such, a better handling of the systems (thermostats, piloting, etc.) will also make it possible to achieve energy savings.

➨ **Bat orientation. Ter. 5: Controlling the increase in data center power consumption**

The target will be **to control the increase in the power consumption of data centers anticipated by the exponential trend** emerging from prospective studies and calls for the control of the power consumption of data centers to be made a medium-term priority, otherwise an additional electricity closure constraint would emerge in 2050 that would compete with the decarbonisation levers of other sectors. This target will be articulated with the imperative of ensuring French digital sovereignty in a conflicting international environment by considering the numerous data center implementation projects already launched and announced, in particular in the context of the AI Action Summit. The guideline for this is detailed in the Complements - I. I 'Reducing the digital consumption-based emissions' section.

d. Main elements of the SNBC 3 scenario

Residential

- **Renovation of housing:** To keep up with the renovation trajectory, the number of renovations (assisted and unassisted) increases by 2030, focusing on large-scale renovations[197] and the renovation of thermal sieves. On average, the number of renovations corresponding to at least two DPE class leaps is 700 000 renovations per year by 2030 (including 250 000 major renovations), for the private and social stock. Such renovations can be carried out through the installation of heat pumps or through major renovations. Large-scale renovation should be prioritised if the characteristics of the dwelling lead to situations of energy poverty. As part of the major renovations, the opportunity to install a heat pump instead of fossil fuels should be seized as much as possible. Energy sieves (DPE F and G) decrease by 75% between 2023 and 2030, and disappear almost entirely from the housing stock in 2040. Houses with a DPE A or B account for 63% of the stock in 2050; including DPE C, this share is 89%.
- **Construction of new housing:** the implementation of the 'Housing Recovery Plan' makes it possible to add 2 million dwellings by 2030. The number of new housings starts then gradually decreases, increasing to about 275,000 on average per year between 2030 and 2040 and 200,000 on average per year between 2040 and 2050 at the entire French perimeter. These new homes comply with energy and environmental regulations, thus contributing to the reduction of energy consumption and GHG emissions in the residential sector.

[197] *For the purposes of the Anah, that is to say, a renovation comprising at least two gestures of thermal insulation and allowing a gain of at least two energy classes.*

- **Exit of oil boilers:** the SNBC 3 scenario foresees the replacement of 60 % of oil-fired boilers by a decarbonised heating system by 2030, i.e. around 250 000 households per year. Just over one million households (1.2 million) are still heated with oil in 2030 and almost no households are heated with oil in 2035.
- **Gradual replacement of gas boilers:** the SNBC 3 scenario foresees the replacement of 20 % of gas-fired boilers by a decarbonised heating system by 2030, covering around 350 000 households per year. Around 9.4 million households are heated by gas in 2030 and a majority of gas boilers disappear by 2050. By then, 100% of the gas injected into the networks will be low-carbon gas.
- **Decarbonised heating systems:** the exit from oil heating and the reduction of gas heating imply a massive development of decarbonised heating systems. The number of dwellings using a heat pump (aerothermal or geothermal) as their main heating mode increases from around 3 million in 2023 to around 9 million in 2030 and more than 20 million in 2050, of which around half are air/water PACs. In dense urban areas, the connection to a district heating network of an average of 360 000 dwellings per year by 2035 makes it possible to reach 5.8 million dwellings connected in 2035 and 6.7 million in 2050. The installation of biomass boilers as a replacement for oil or GPL boilers in rural areas can sometimes also contribute to the decarbonisation of housing. The share of wood-fired dwellings remains stable in 2030 and 2050, with the number of biomass boilers slightly increasing with the growth of the stock. Biomass energy consumption decreases in line with the energy efficiency gains of heating systems. The installation of electric joule radiators to replace oil or gas boilers can also contribute to the decarbonisation of housing, although a reduction in these heating modes is preferred at the scale of the housing stock.
- **Off-heating:** for cooking and domestic hot water uses, the decarbonisation dynamics are comparable to heating, mainly through electrification. Improving energy efficiency also makes it possible to control electricity consumption. Regarding cold requirements, heat input is limited by the installation of passive solutions (strands, sunshades, etc.). At the same time, the number of homes equipped with cooling systems is gradually increasing until 2050 thanks to the installation of energy-efficient systems (connection to cooling networks or air conditioning through reversible heat pumps). In addition, refrigerant gases and fluids used in air conditioning systems comply with F-Gas regulations and gradually become less greenhouse gas emitters.
- **Energy efficiency and climate change:** the SNBC 3 scenario foresees a 7% decrease in consumption between 2020 and 2030 and 10% between 2020 and 2050 linked to household sufficiency efforts, as well as a 5% decrease in heating consumption between 2020 and 2030 and 10% between 2020 and 2050 linked to the effects of climate change (assuming a global climate trajectory of +2 °C to 2100, see Supplements Part - II.E.3). The use of air conditioning is increasing but the induced electrical consumptions remain controlled thanks to the sufficiency (set temperature does not go below 26 °C).

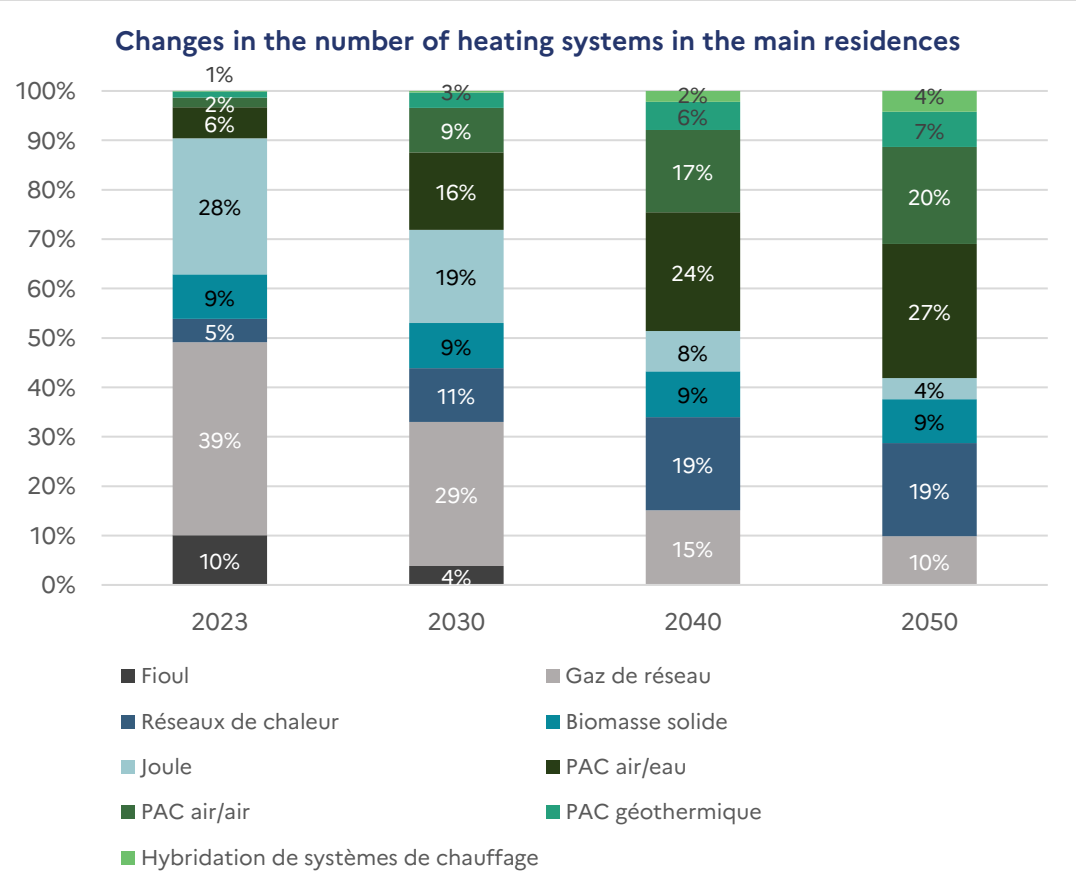


Figure: 48 *Decomposition of the stock of heating systems in the residential*

Sensitivity test – Less deployment of heat pumps

A scenario of lower deployment of heat pumps compared to the levels expected in the reference scenario (-3.5 M PAC in 2035 in the WEM scenario compared to the WAM scenario, i.e. -30 % PAC stock in 2035 between the two scenarios) could lead to:

- A 40% increase in gas boilers in 2035, assuming that non-deployed PACs are replaced by gas boilers.
- An increase of around 23 TWh in network gas consumption in 2035, thus increasing France's import dependency and the pressure on biomethane supply, as well as a decrease of 9 TWh in electricity consumption.
- An increase of 4 Mt CO_2e in 2035 compared to the central scenario.

Tertiary

- **Changes in the size of the tertiary sector:** stability or even slight decrease in the size of the tertiary stock around 1 000 million m² over the whole period 2020-2050, due to a decrease in office space (teleworking).
- **Exit of oil boilers:** in 2030, the use of fuel oil in tertiary areas becomes very marginal (-85% of areas heated with fuel oil between 2020 and 2030). Around 2% of surfaces continue to

be heated with fuel oil or to use it for non-heating purposes, in situations where the transition to a decarbonised system is technically or economically very complex.

- **Gradual replacement of gas boilers:** the SNBC 3 scenario foresees the replacement by a decarbonised heating system of 17% of gas heated areas by 2030, leading to around 38% of the gas heated stock in 2030 versus 46% in 2020. Gas-heated areas fell by 85% between 2020 and 2050 and accounted for only 7% of the stock by 2050.
- **Phasing out of electrical convectors:** the share of tertiary surfaces heated by electric convectors decreases sharply, in favour of more efficient air/air heat pumps.
- **Decarbonised heating systems:** the replacement of oil and gas boilers and electric convectors involves the massive installation of decarbonised and energy-efficient heating systems. This includes the deployment of heat pumps (23% of the stock in 2030 and 54% in 2050), the connection of surfaces to the district heating network (19% of the stock in 2030 and 24% in 2050), and a moderate increase in biomass boilers.
- **Excluding heating:** for domestic hot water uses, the decarbonisation dynamics are comparable to those for heating. Cooking follows the same path of electrification and energy savings, with the gradual replacement of fossil cooking equipment with electrified equipment (induction hobs, stoves and electric ovens). Regarding cold requirements, heat input is limited by the installation of passive solutions (strands, sunshades, etc.). At the same time, the number of buildings equipped with cooling systems is gradually increasing until 2050 thanks to the installation of energy-efficient systems (connection to cooling networks or air conditioning through reversible heat pumps). In addition, refrigerant gases and fluids used in air conditioning systems comply with F-Gas regulations and gradually become less greenhouse gas emitters.
- **Energy action in the tertiary sector:** decreases in consumption and missions are made possible by improving the energy performance (and sufficiency) of tertiary buildings: sites with more than 1 000 m ^{2} of tertiary areas are subject to the tertiary eco-energy scheme. This scheme must make it possible to reduce the energy consumption of the sites subject to the obligation by 40% in 2030, 50% in 2040 and 60% in 2050 compared to a reference year which cannot be before 2010, or, failing that, to achieve an absolute value expressed in kWh/m^2/year. Non-taxable premises, in particular the most energy-intensive and those belonging to the public sector, also reduce their consumption, either in accordance with the targets set by the European directives (see Guideline Bat. Ter. 2), either by knock-on effect induced by the actions put in place by the persons subject to the tertiary decree at the level of their assets. Improving energy efficiency also makes it possible to control consumption for all uses (cooking, domestic hot water, cooking, refrigeration, electrical appliances, steam production and drying), despite an increase in consumption linked to data centres due to the increase in uses. The performance and service life of the business equipment sold is improving and the rate of renewal of low-performing or fossil-based business equipment is increasing.
- **Energy efficiency:** in addition to the renovation activities carried out by the tertiary actors, sufficiency measures are implemented and contribute to the reduction of energy consumption provided for in the eco-tertiary energy scheme, with a direct economic interest for the actors in the sector. The use of air conditioning is increasing but the induced electrical consumptions remain controlled thanks to the sufficiency (set temperature does not go below 26 °C).
- **Data centre:** new efficient data centres, some dedicated to intensive computing for artificial intelligence, are being set up on the territory in response to the development of

new uses. A place-based strategy for the deployment of these data centres ensures that the associated increase in electricity consumption is compatible with electricity grids and does not compete with the deployment of other decarbonisation levers (e.g. electrolysers or industry decarbonisation) (see Complements - I. I "Reducing the digital consumption-based emissions").

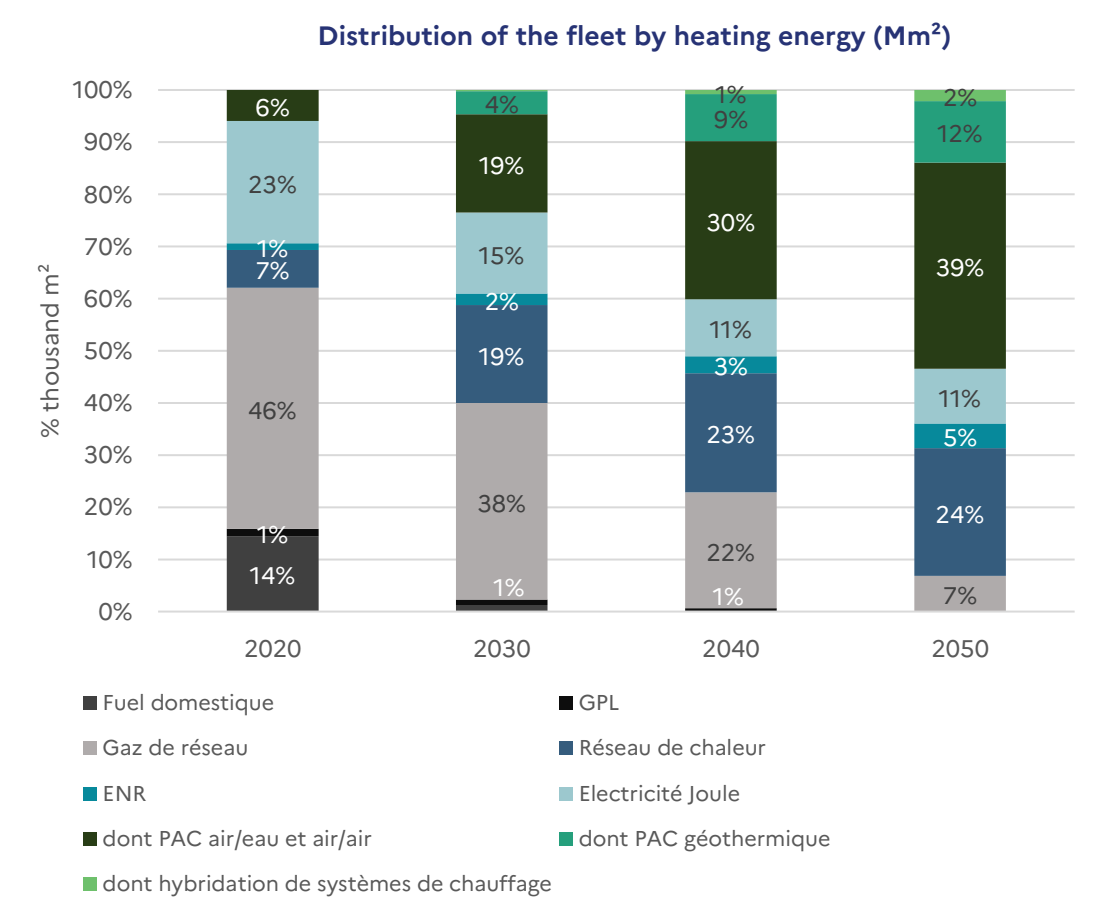


Figure: 49 *Decomposition of the heated surfaces of the tertiary stock according to the type of heating*

Sensitivity test – Achievement of the targets of the Tertiary Decree

If the targets of the eco-tertiary energy scheme are met by only **half of taxable persons in** 2050 (instead of a low non-compliance rate in the central scenario), this would lead to overconsumption of network gas and electricity. Two situations can then be envisaged:

- If 100% of network gas is supplied as low-carbon gas in 2050, overconsumption would result in an additional need for around 30 TWh of biomethane, putting high pressure on production capacity and biomass closure.
- Conversely, considering that this overconsumption of 30 TWh is covered by fossil gas, this would result in additional emissions of about 6 Mt CO_2e

In both cases, widespread non-compliance with the scheme would significantly jeopardise the achievement of energy and climate targets in 2050.

E. ENERGY PRODUCTION AND TRANSFORMATION

GUARANTEEING THE AVAILABILITY OF DECARBONISED ENERGY FOR THE TRANSITION

Appropriations: Arnaud Bouissou / Terra

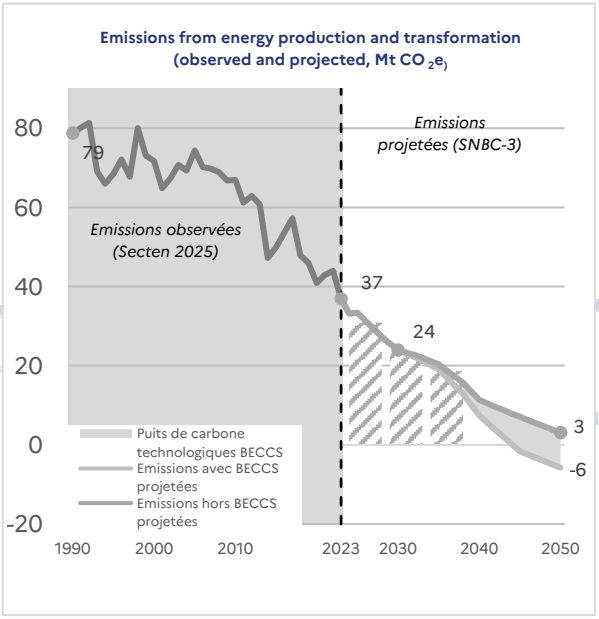
GUARANTEEING THE AVAILABILITY OF DECARBONISED ENERGY FOR THE TRANSITION

1) The **energy production and processing sector** emitted 37 Mt CO_2e in 2023, representing **10% of France's gross emissions.**

2) These emissions will have to be reduced by 70% in 2030 and 96% in 2050 compared to their 1990 level.

3) The decrease in emissions will mainly be based on the **decarbonisation of electricity and heat production.**

4) In addition, the energy sector will develop **technology sinks** (capture and storage of biogenic emissions) to help achieve climate neutrality.



The main public policy guidelines:

Electricity generation

- Producing decarbonised, available and competitive electricity to enable the decarbonisation of other sectors
- Phasing out of coal and oil-fired power plants
- Develop flexibilities (storage, erasure) and strengthen demand management in order to encourage consumption lags outside periods of stress
- Update and then implement the EPPs of the NZs

Heat production

- Developing renewable energy and recovery
- Developing urban heating and cooling networks
- Developing geothermal and solar thermal

Production of biofuels, biomethane and hydrogen

- Increase biomethane production for injection into gas networks
- Increase biofuel production
- Implement the national strategy for the development of decarbonised hydrogen in France

Exploitation and refining of petroleum products

- Anticipating refinery closures
- Decarbonising refining activity
- Converting refining activity to the production of low-carbon fuels

1. State of play and challenges

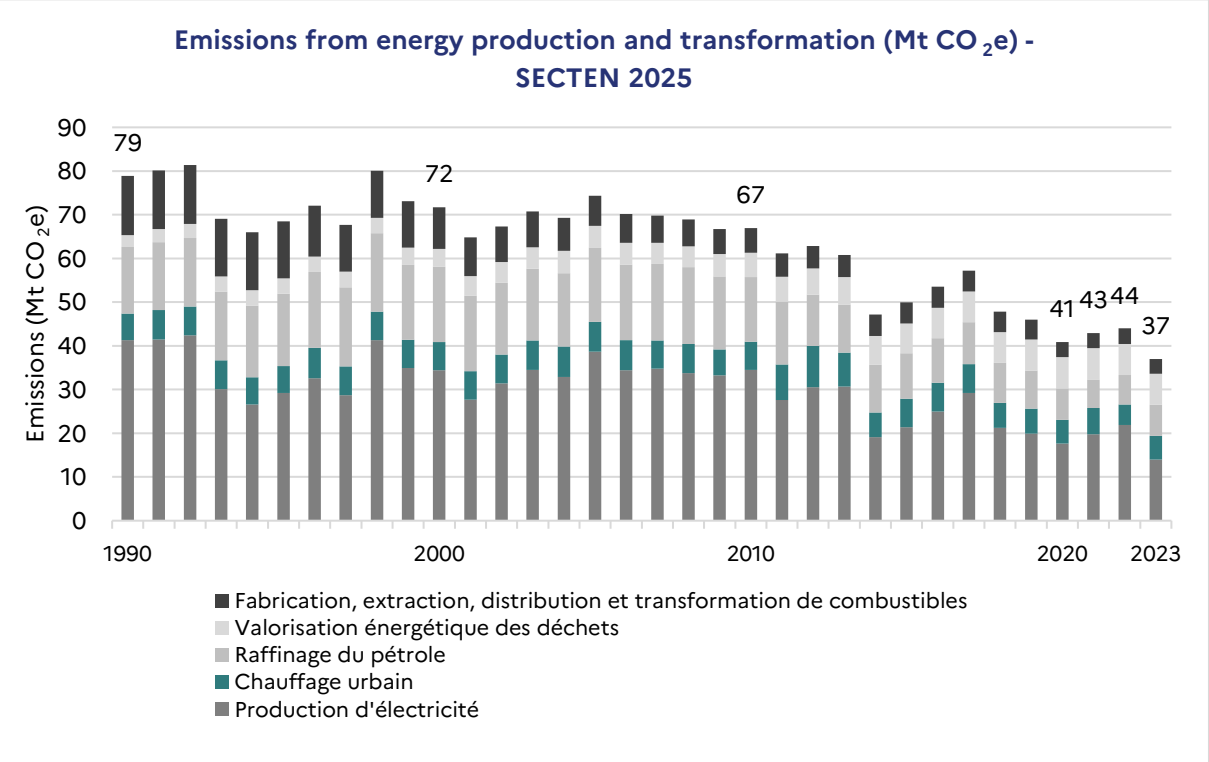


Figure: 50 *Evolution of emissions from the energy production and processing sector, in Mt CO 2e (Sources: National Inventory of Greenhouse Gas Emissions, Citepa, Secten 2025).*

The **energy production and processing sector emitted 37 Mt** CO 2e in 2023, representing 10% **of France's** gross emissions, a structurally low share in France compared to European countries thanks to low GHG emissions from electricity production due to the high proportion of nuclear in the electricity mix. These **emissions have been decreasing since the 1990s,** in particular as a result of the decarbonisation of our electricity system (in particular the decrease in coal-fired electricity production). In 2023, emissions from the energy industry are split between electricity generation (38%), district heating (15%), oil refining (19%), waste energy recovery (19%), and other transformations and losses (9%) (Citepa, Secten 2025). Almost three quarters of the sector's emissions are covered by the European carbon market (EU ETS).

Note: this sector covers the production and processing of energy, not its end-use by other sectors. All sectors combined, 'energy use' is the main source of greenhouse gas emissions in France (approximately 70% of total non-LULUCF emissions in 2023).

SNBC 2 provided for a carbon budget of 240 Mt CO 2e (48 Mt CO 2e/year) for the period 2019-2023. This carbon budget is respected with a margin of 29 Mt CO 2e (5.7 Mt CO 2e/year), due to the development of renewable energies which have led to a decrease in electricity production from fossil fuels. In particular, the setting of an end-of-coal electricity production target has led to a decrease in the subsector: Coal-fired electricity generation reached a historic minimum in 2023 with 2.9 TWh. In addition, the Heat Fund has made it possible to decarbonise heat production for urban networks: 66.5% of heat generation for grids comes from renewables and

recovery in 2023, up from 59% in 2019. The WEM 2024 scenario,[198] which estimates emission trajectories as a result of policies and measures adopted until 31 December 2023, shows that, as a result of measures adopted until 2023, emissions are projected to decrease by 62% between 1990 and 2030, driven by the gradual closure of coal- and oil-fired power plants. By 2050, the WEM 2024 scenario is 64% lower than in 1990.

2. The Strategy

a. Presentation of the strategy

The decarbonisation of the sector is mainly determined by the orientations of the Multiannual Energy Plan for the short term (2030 and 2035). The SNBC sets out longer-term guidelines to guide the sector's contribution to achieving climate neutrality in 2050. This decarbonisation must be seen both in terms of reducing energy consumption and increasing the production of decarbonised energy (electricity, renewable and recovery heat, low-carbon fuels, low-carbon gases, etc.), but also in terms of infrastructure (grids, storage, etc.). In addition, fugitive emissions of fuels (methane leaks) are expected to be reduced. In the long term, the energy production sector can accommodate carbon sinks, for example by capturing and storing emissions from biomass combustion (BECCS). Captured emissions can also make it possible to manubill sustainable synthetic fuels for the aviation and maritime sector.

By 2030, the sector's emissions in the SNBC 3 scenario are 24 Mt CO2e, a 70% decrease since 1990 (or 35% since 2023). Consistent with the targets and orientations of MEP 3, fossil-based electricity production is very low, and heat production is increasing, as is its renewable share.

In 2050, the sector's emissions in the SNBC 3 scenario are 3 Mt CO_{2e} (excluding technology sinks), a decrease of 96% since 1990 (or 92% since 2023). Electricity production is completely decarbonised, residual emissions are due to the refining of residual oil consumption and the combustion of non-renewable waste in energy recovery units (reduced through carbon capture and storage). Technology sinks of 9 Mt CO_2e/year are allowed through the capture and storage of biogenic emissions in heat production or biorefineries.

[198] *WEM report 2024* https://www.ecologie.gouv.fr/politics-public/scenarios-prospectives-energie-climat-air

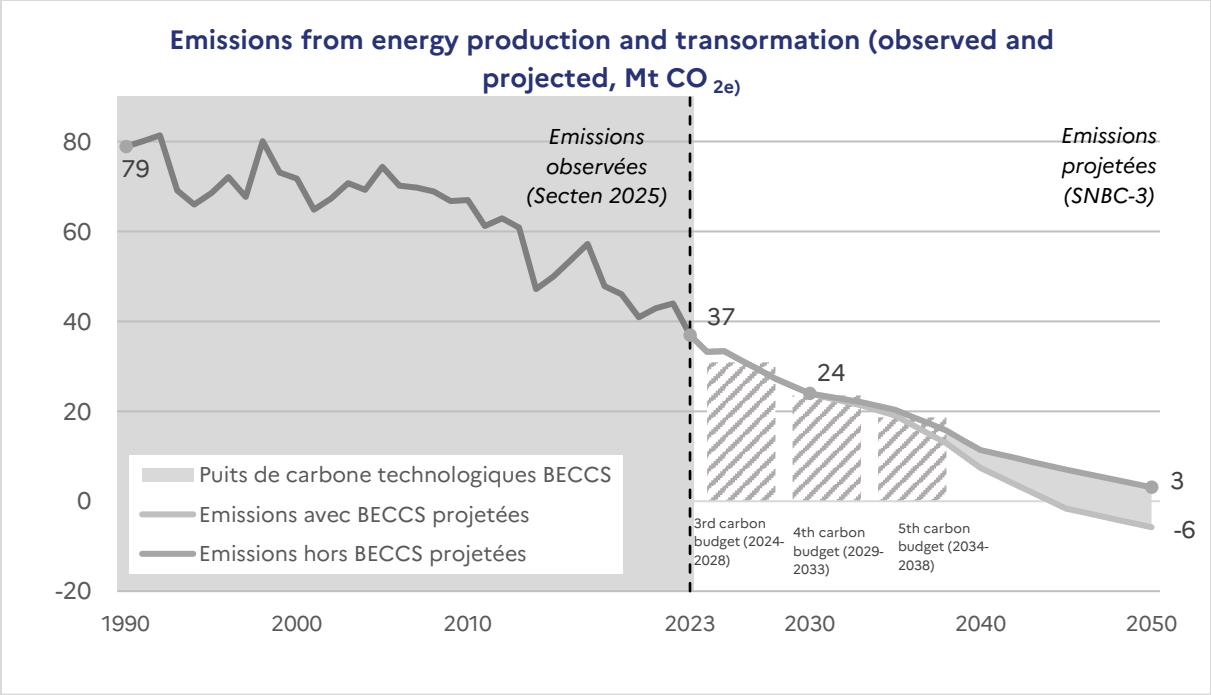


Figure: 51 *Evolution of emissions (historical and projected) from the energy production and transformation sector into Mt CO2e between 1990 and 2050 (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC modelling).*

The GHG emission reductions achieved by levers are described in the following figure.

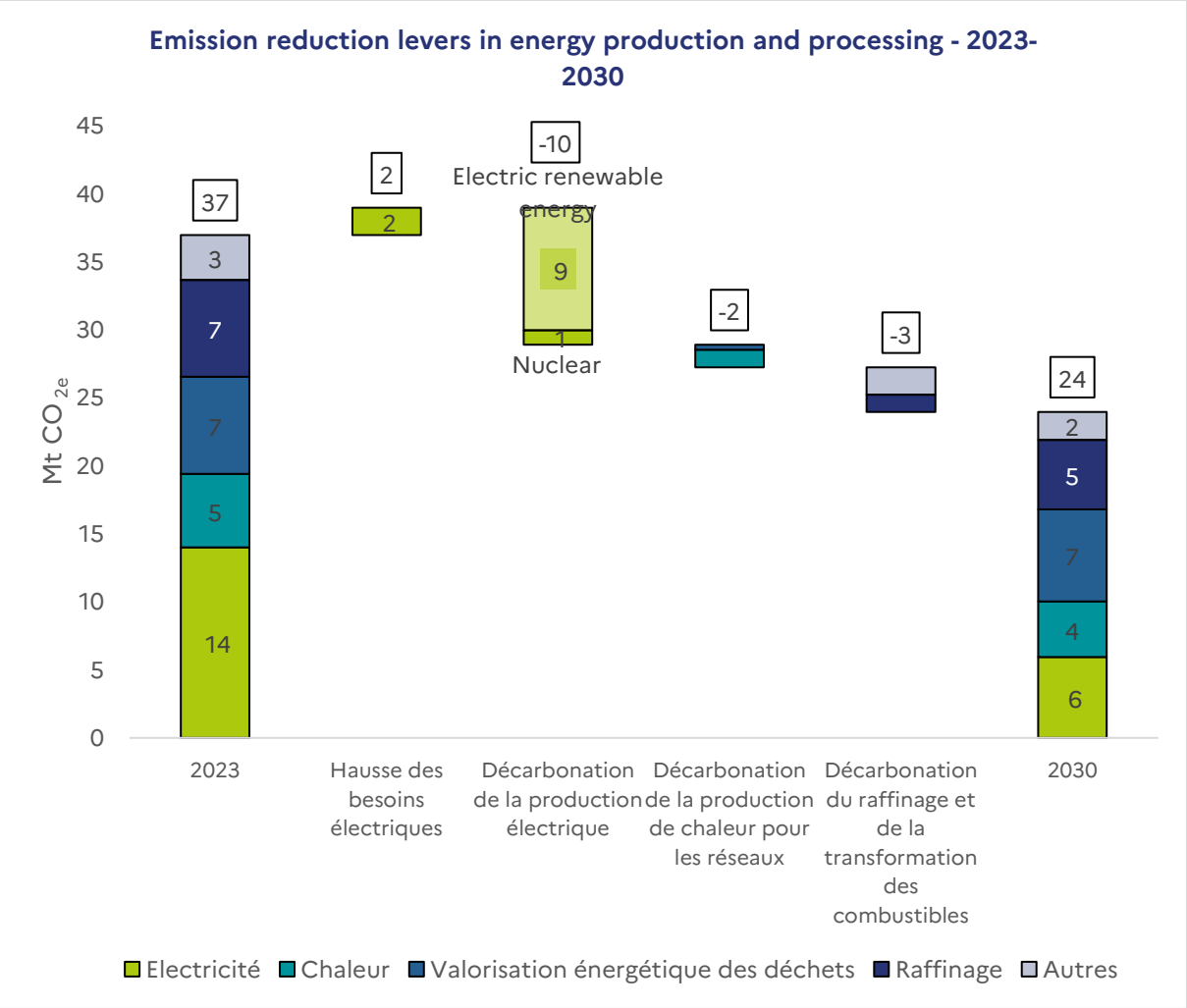


Figure: 52 *Indicative decomposition by lever of the reduction of greenhouse gas emissions from energy production and transformation between 2023 and 2030 based on modelling work (Sources: DGEC modelling)*

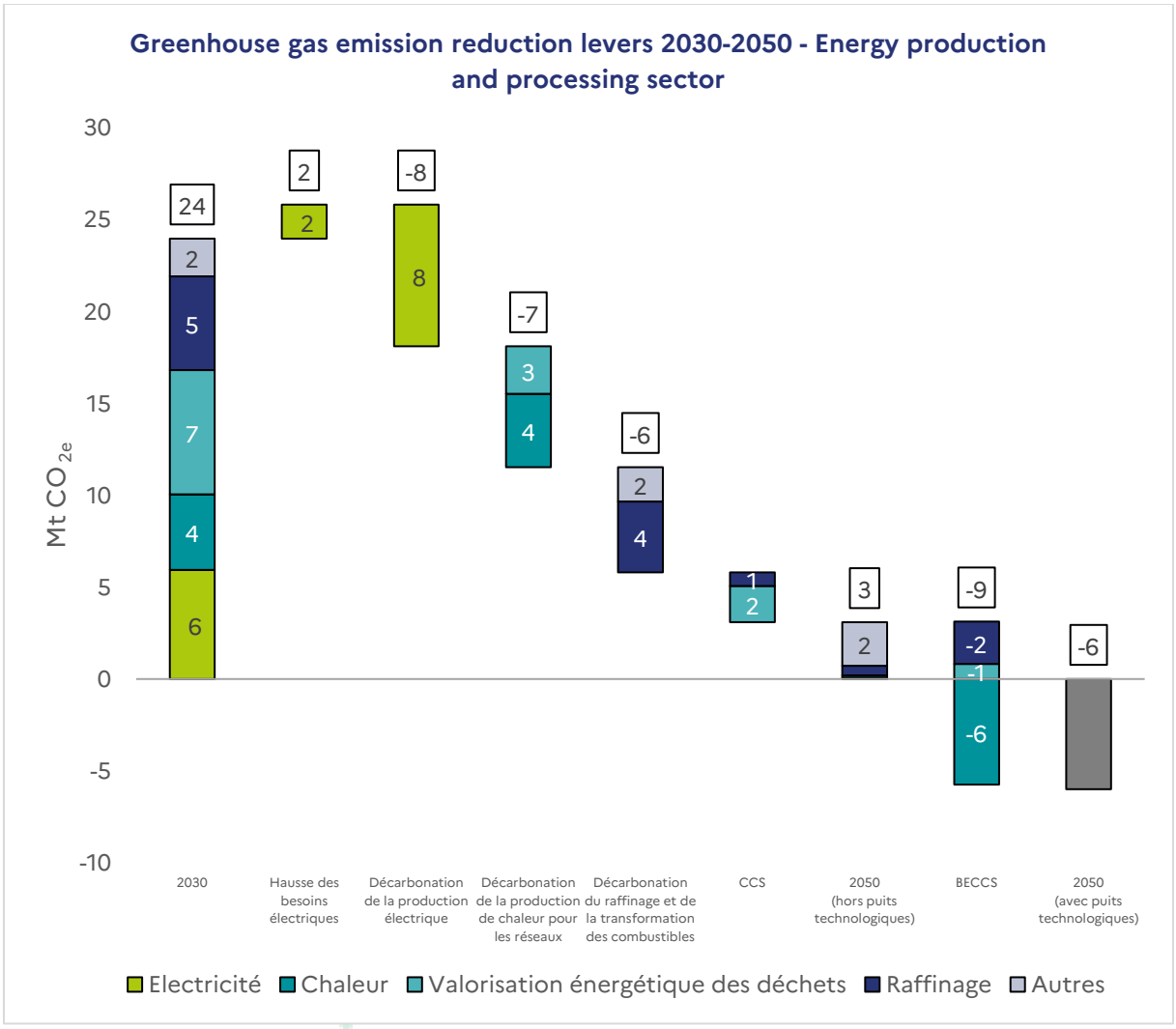


Figure: 53 *Indicative decomposition by lever of the reduction of greenhouse gas emissions from energy production and transformation between 2030 and 2050 based on modelling work (Sources: DGEC modelling)*

b. Main targets of the energy production and processing sector

Greenhouse gas emissions	-70% emissions in 2030 compared to 1990. Achieve a net carbon sink in 2050 through the capture and storage of biogenic emissions.
Electricity generation	Shut down coal-fired power generation by 2027. Achieve 585 TWh of decarbonized power generation by 2030. The targets for each sector are set by the multiannual energy programme. Achieve a 100% decarbonised electricity mix by 2050, and around 800 TWh of electricity production by that time to meet equivalent consumption.
Heat production	Develop decarbonised heat production capacities and heat networks in line with the targets of the MEP.
Bioenergy	Develop the production of biofuels, wood-energy and biomethane in line with the guidelines set by the MEP, and continue the dynamics to reach about 60 TWh of biofuels and 100 TWh of biomethane by 2050.
Hydrogen	Install up to 4.5 GW of electrolysers in 2030 and up to 8 GW in 2035, as foreseen by the National Decarbonised Hydrogen Strategy.
Exploitation and refining of hydrocarbons	Stop the production of crude oil and fossil gas on the national territory in 2040. Decarbonize refining and develop biorefineries.
Carbon Capture (CCUS)	Install between 8.5 and 16 Mt CO_{2e} of CO_2 capture capacities - mainly biogenic (~80 %), for example via biomass heat production - in 2050 in energy, in line with the state of play and prospects for the deployment of the CCUS in France, published in July 2024.

c. Main orientations of public policies

1- Electricity generation

- **Orientation Energy Electricity 1 - Producing decarbonised, available and competitive electricity to enable the decarbonisation of other sectors**

MEP 3 sets the targets for installed capacity for all renewable energies (RES), for the relaunch of nuclear power *through* the continued operation of the existing nuclear fleet, taking into account the safety and commitment constraints for the construction of new capacity for the nuclear fleet, as well as the limits of thermal capacity and their decarbonisation pathways. It is based on a credible development trajectory at the operational and industrial levels. The additional production of decarbonised electricity resulting from this increase in generation capacity will absorb the increase in consumption linked to the electrification of other sectors (transport, buildings, … industry) and reindustrialisation. It must also enable the French

electricity system to be 'looped in power', i.e. to ensure the balance between supply and demand at all times, in particular at the highest peaks of consumption, on the basis of reasonable assumptions regarding the use of interconnections in order to guarantee France's security of energy supply.

EPP 3 details all planning, support, incentives and support measures to achieve these targets.

Orientation Energy Electricity 2 - Exit from coal and oil-fired power plants

The 2019 energy-climate law has put in place **the regulatory tools to allow the closure of the last coal-fired power plants.** The Gardanne power plant closed in 2021, as well as that of Le Havre.

Following the energy crisis linked to the war in Ukraine and the decline in 2022 in the availability of the French nuclear fleet, Law No 2022-1158 of 16 August 2022 on emergency measures for the protection of purchasing power authorised the operation of the Cordemais and Saint-Avold power plants in a derogation from the 2019 energy-climate law, with an obligation to offset the carbon emissions linked to these activities.

While the exceptional measures taken in 2022 do not call into question the target of the closure of coal-fired power plants, it is important that this transition takes place while preserving France's security of energy supply. In all scenarios, this will involve using these power plants only at peak consumption, to pass the voltage peaks of the electricity grid, thus generating very low emissions, decarbonising them by replacing them with decarbonised fuel and eventually, if necessary taking into account operating constraints, closing them down.

MEP 3 aims to stop coal-fired electricity production by 2027, as well as to stop oil-fired electricity production by 2030.

Orientation Energy Electricity 3 - Develop flexibilities (storage, electricity demand response) and strengthen demand management in order to encourage the shift in consumption outside periods of tension

MEP 3 **pursues the target of controlling state-of-the-art consumption and developing the available flexibility package:** batteries, pumped energy transfer stations, demand management, decarbonised term thermal capacities and interconnections. **It will formalise the main measures envisaged, which will need to be complemented and deepened with RTE** and its analyses on security of electricity supply and flexibility packages, the first results of which have been presented in the synthesis of its 2035 forecast balance published on 20 September 2023, updated on 9 December 2025, and more precise assessments of mobilizable biomass.

- **Energy-Electricity Guideline 4 – Updating and then implementing the MEP of the non-interconnected zones**

The process of updating the MEP of the non-interconnected zones will make it possible to continue the decarbonisation movement of these territories while taking into account their local characteristics and constraints.

To facilitate these updates, **support for non-interconnected zones** in their energy transition will be strengthened **with the creation of a 'Task** Force Etat', the role of which will be to carry out a study entitled 'Energy Futures 2050 Overseas territories' formalising technically and economically viable energy mix scenarios for each territory, adapted to each territory, enabling informed political decision-making (this study will be able to draw in particular on the existing and ongoing work of ADEME and CRE). This study has already been launched in La Réunion.

2- Heat production

- **Orientation Energy Heat 1 - Developing renewable energy and recovery**

The use of renewable and recovered thermal energy will continue to be supported, in particular by the Heat Fund and by financing through Energy Economy Certificates (EEC), so as to completely decarbonise centralised heat production by 2050.

Renewable heat projects at home will be supported via the MaPrimeRénov scheme and supported by the France Renov public service, as will those of local authorities or companies through the strengthening of local activities and the generalisation of renewable heat operators in each region.

Industrial and tertiary waste heat recovery may be promoted by carrying out recovery potential studies for installations of significant size, in particular for data centres and biomass plants (cogeneration), and by carrying out heat recovery feasibility studies on nuclear installations, waste water networks and treatment plants.

Waste-to-energy units will continue to play a major role in the production of recovered heat, through the improvement of processes to increase efficiency, the connection to heat networks and the development of cogeneration processes (simultaneous production of electricity and heat). Carbon capture will reduce residual fossil emissions and generate negative emissions through the capture of biogenic emissions.

- **Orientation Energie Chaleur 2 - Developing urban heating and cooling networks**

The development of district heating networks is essential to develop the use of renewable heat and recovery in urban areas. It provides a long-term cost-effective solution for consumers through stable delivered heat prices, while facilitating the transition from fossil fuels to renewables for domestic needs. **These networks will grow massively thanks to the generalisation of feasibility studies for installing networks in all intermunicipalities with more than 10 000 unequipped inhabitants and the drawing up of local heating and cooling plans in municipalities with more than 45 000 inhabitants.** For voluntary local authorities, buildings close to urban heating networks will be systematically connected to them.

Orientation Energy Heat 3 - Developing geothermal and solar thermal

The implementation of the geothermal plan will be continued, and a national plan for solar thermal will be developed on the same model. Calls for projects could be launched, for example via the Heat Fund, to promote these renewable heat sources and encourage heat network operators to develop them.

3- Production of bioenergy and hydrogen

Orientation Energy Bio. 1 - Increase biomethane production for injection into gas networks

The MEP foresees the definition of a trajectory of obligation to surrender Biogas Production Certificates (BPCs) for the period 2028-2035, in line with the biomethane production targets. The establishment of BPCs from 2026 complements the current budget support for biomethane production without the two financing schemes simultaneously supporting the facilities.

Work to simplify and facilitate the deployment of new gas production sectors will be carried out in collaboration with stakeholders in the sector. This reflection will take into account the challenges of sustainability of the resources committed, and competitiveness of the different sectors.

Orientation Energy Bio. 2 - Increase biofuel production

Currently, the production and consumption of biofuels comes mainly from first-generation biofuels (known as "1G"), which are produced from agricultural resources that may also have food uses, partly imported.

The current challenge is therefore to develop the production of so-called 'advanced' biofuels, mainly derived from co-products, residues and waste that do not compete with food or are part of sustainable forest management. Biofuels will accompany the decarbonisation trajectory of mobility in segments where alternatives are difficult to implement, especially when the decarbonised solution is not mature or non-existent.

MEP 3 thus plans to accompany the installation of the first industrial sites for the production of advanced biofuels, with priority for aviation and maritime .[199]

Orientation Energy Bio. 3 - Implement the national strategy for the development of decarbonised hydrogen in France

Several stakeholder consultations were conducted in 2023 and 2024 to update the French Hydrogen Strategy in 2025.

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[199] *See, for example, early 2025: https://www.ecologie.gouv.fr/presse/france-2030-gouvernement-devoile-4-lauréats-lappel-projets-carb-aero-faveur-décarbonation-du*

This national strategy for the development of low-carbon hydrogen aims to control the entire value chain, its products and key technologies. It supports the development of the electrolysis and long-distance hydrogen mobility sectors, with the target of contributing significantly to the decarbonisation of industry and transport (for non-road uses). Hydrogen production will initially take place in industrial hubs and near consumption areas. The development of transport and storage infrastructure will take place in the longer term, and could reduce the costs of hydrogen production and contribute to the flexibility of electricity demand. **A strategy on hydrogen infrastructure development will be published in 2026.**

4- Exploitation and refining of hydrocarbons

Orientation Energy Refining 1 - Anticipating refinery closures

Refining capacity in the territory has already decreased in recent years, with the closure of six refineries since 2011, due to the reorganisation of global refining (closure of old and smaller refineries in favour of new more modern ones and larger processing capacities).

The demand for fossil fuels is expected to decrease gradually until 2050. By that time, it is essential to ensure the security of supply of fossil fuels, biofuels and synthetic fuels, and to anticipate as far as possible the consequent adaptation of oil logistics in France and supply chain infrastructure, in particular with intermediate depots. The State will work closely with the sector to this end, paying attention to the economic balance that allows infrastructure to be maintained for as long as necessary, while encouraging the conversion of infrastructure.

The future of the transport networks for petroleum products and distribution (including service stations) will also have to be anticipated.

Guidance Energy Refining 2 – Decarbonising refining activity

The State will ensure that refineries move towards an energy transition, while ensuring national consumption needs. **Refining sites will continue to decarbonise their activity** through the use of decarbonised hydrogen, as well as CO2 capture and storage technologies, where appropriate building on synergies at industrial platform level where refineries are integrated into a petrochemical complex.

Orientation Energy Refining 3 - Converting refining activity to the production of low-carbon fuels

The refineries will be oriented towards active participation in the fight against climate change through the production of alternative fuels, while ensuring that the necessary capacities are maintained to ensure the security of supply and the sovereignty of France for its supply (co-processing of crude oil and bio-based oils, replacement of hydrogen from methane vapor-forming by electrolytic hydrogen, CO2 capture). The State is monitoring the development of refining to ensure that alternative fuels are produced in France and thus reduce the use of fossil energy in processes.

d. Main elements of the SNBC 3 scenario

Electricity generation

- **Deployment of decarbonised energy in line with the MEP for 2030-2035:** deployment of renewables (photovoltaic, onshore wind, offshore wind, hydroelectricity) and maintenance of the historic nuclear park at its maximum potential, taking into account safety constraints. Continued dynamics after 2035 to reach around 800 TWh of decarbonised electricity production (100% of the mix)[200] in 2050, in order to meet equivalent consumption.
- **Fossil thermal energy output:** end of coal-fired electricity production in 2027 and end of oil-fired electricity production in 2030.
- **Non-interconnected areas:** consistent with the specific MEP of non-interconnected areas, rapidly achieving a decarbonised electricity mix of more than 99%, enabling a good level of electricity quality of service, through the development of electric renewable energy combined with storage solutions (STEP, battery) and bioliquid-fired thermal power plants (partly imported from France). Conversion from thermal power plants to decarbonised energy sources, with particular attention to the challenges of biomass availability.

Heat production

- **Increased production of renewable heat** and recovery in 2030 and 2035 in line with the MEP. In 2050, production is around 500 TWh, of which 250 TWh is heat from the environment used in heat pumps.
- **Development of renewable and recovery energy (EnR&R) delivered by the grids** in line with the targets set by the MEP for 2030 and 2035. In 2050, 100% of the heat produced comes from decarbonised heat sources.
- **Heat generation from waste:** The volume of waste incinerated in energy recovery units (ERUs) decreased slightly in 2030 (13.5 Mt compared to 14.4 in 2020), and then in 2050 (8 Mt), as a result of increased recycling and the ramp-up of the solid recovery fuel (SRF) industry. The volumes of commercialized heat of ERUs nevertheless increase in the short term, through the extension and creation of heat networks and the optimization of heat recovery technologies in ERU. The composition of incinerated waste is changing slightly as a result of public policies for sorting bio-waste at source and recovering it via composting and methanisation: the share of biogenic carbon decreases slightly, from around 55% today to 50% in 2050 (leading to a slight upward effect on emissions). In the long term, carbon capture and storage devices make it possible to reduce UVE emissions and generate negative emissions through the capture of biogenic emissions: 1 Mt CO_2 is captured in 2035 and 4 Mt CO_2 in 2050. Overall, GHG emissions from ERU decreased by 5% in 2030, 28% in 2040 and 42% in 2050 compared to 2023 excluding CCS. The CCS on the fossil share of emissions makes it possible to increase these reductions to 45% in 2040

[200] *Continental perimeter, excluding self-consumption of thermal power plants, consumption for uranium enrichment, and consumption due to flexibilities*

and 69% in 2050. Capturing biogenic emissions generates 1 Mt CO_{2e} of negative emissions in 2050.

- **Deployment of biomass heat plants with carbon capture:** the captured carbon can then be stored to generate negative emissions or used for the manufacturing of synthetic fuels (e-kerosene, e-methanol, etc.). The central reference scenario incorporates an assumption of 17 Mt CO2e captured in 2050 in energy production and transformation (heat production from biomass and biogenic waste, refining and methanisation). Low and high variants are also considered, in line with the CCUS Strategy (see Part SNBC - II.B.2).

Production of bioenergy and hydrogen

- **Increased production of biomethane for injection into gas networks consistent with the MEP for 2030 and 2035.** In 2050, the available biomass identified for the production of biomethane would make it possible to produce around 105 TWh PCS in the central reference scenario (see sensitivity test below), to which is added a low-carbon production of around ten TWh from the new gas production chains.
- **Increased production of biofuels in line with the MEP for 2030 and 2035.** Demand for biofuels could stabilise after 2035: the massive electrification of road transport is gradually reducing the need for biofuel for these uses, but this decrease is offset by an increase in demand in air and maritime transport. National biofuel production reaches about 60 TWh in 2050. It will be partly based, as it is today, on imports of raw materials. See Supplements - II. B.
- **Increased wood-energy production consistent with the MEP for 2030 and 2035,** and articulation with the targets of carbon storage in wood products and long-term forest sink maintenance (see Part G. Natural carbon sinks).
- **Production of hydrogen from electrolysis for** all new production capacities. Electrolysis accounts for the majority of long-term production. The target is to install up to 4.5 GW of electrolysers in 2030 and up to 8 GW in 2035, in line with the Hydrogen Strategy. This capacity will be powered by the decarbonised French electricity mix or by dedicated renewable electricity generation facilities, depending on the economic optimum that will be found for each of the facilities. The SNBC 3 scenario identifies a long-term need for around 100 TWh of decarbonised H2 for industry, transport and synthetic fuel manufacturing. Some synthetic fuels are imported.

Sensitivity test – Low-carbon gas production volume

Long-term low-carbon gas production capacities are subject to heterogeneous estimates, due to uncertainties about the availability of biomass and the development of new gas production pathways (synthetic gas, hydrothermal gasification, … pyrogasification).

Thus, foresight scenarios envisage for 2050 low-carbon gas volumes exceeding those of the reference scenario by several tens of TWh. These trajectories require a significant deployment of emerging technologies while ensuring an efficient allocation of resources. These production levels would keep more users on the gas grid (boilers, … industries), and potentially limit the need for investment in the electricity grid.

Conversely, if the production of low-carbon gases is lower than in the central scenario, this could require the use of residual fossil gas consumption in 2050 (20 TWh represents

about an additional 4 Mt CO2e per year), unless it acts even more strongly on gas consumption in buildings (sufficiency, renovation) or industry (efficiency gains, electrification, ...).

Exploitation and refining of hydrocarbons

- **Gradual cessation of the exploitation of hydrocarbons on French soil:** the production of fossil gas and crude oil on French territory gradually decreases until it is extinguished in 2040, in accordance with the law ending research and the exploitation of conventional and unconventional hydrocarbons adopted in 2017.
- **Decrease in refining activity:** in the reference scenario of SNBC 3, refining activity decreases as the use of petroleum products decreases in France (-29% refined quantities in 2030 compared to 2019 in the reference scenario). In the long term, France retains refining capacity for residual consumption of petroleum products.
- **Decarbonisation of refining sites:** Refineries invest in decarbonization projects to optimize and improve their energy efficiency and electrify certain processes. To this end, they are also investing in low-carbon hydrogen technologies and carbon capture and storage technologies, which will be deployed in the medium term.
- **Production of low-carbon fuels:** At the same time, it will provide increasingly decarbonised energy products (biofuels, advanced biofuels, synthetic fuels, etc.) to meet greenhouse gas emission reduction targets. These may include projects to convert refineries into biorefineries or co-processing.

F. WASTE

GUARANTEEING SUSTAINABLE WASTE MANAGEMENT

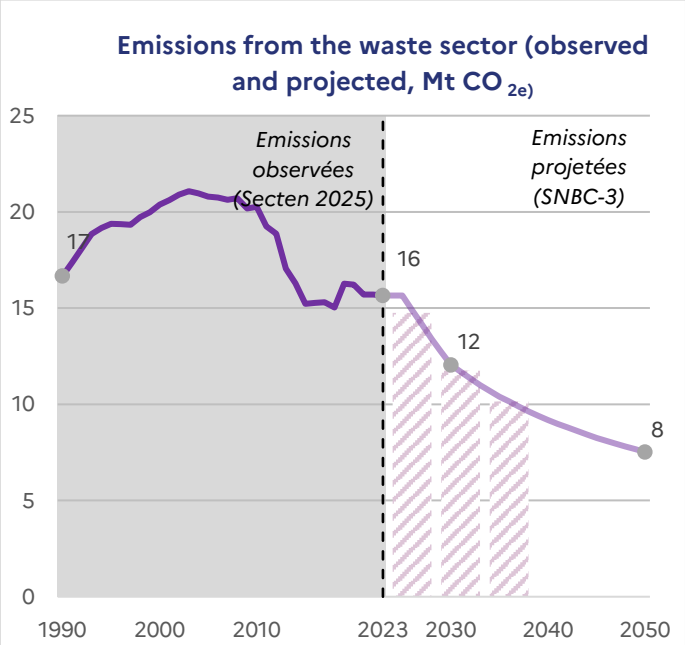
Credit: Damien Valente / Terra

GUARANTEEING SUSTAINABLE WASTE MANAGEMENT

1) The **waste sector** emitted **16 Mt CO $_{2e}$** in 2023, representing 4% of France's gross emissions.

2) These emissions will have to be reduced by **28%** in 2030 and **by 55%** in 2050 compared to their 1990 level.

3) The reduction of emissions will be mainly based on the decrease in the volumes of waste stored in ISDND and the evolution of their composition (towards a composition with less organic matter and therefore less emissive in methane). The capture of biogas from storage sites, as well as the elimination of wastewater discharges without treatment, also helps to reduce emissions.



The main public policy guidelines:

- Preventing waste generation
- Securing the implementation of the obligation to sort bio-waste at source
- Massively develop sorting and recycling, particularly via Extended Producer Responsibility (EPR) channels
- Reducing Fugitive Greenhouse Gas Emissions in Non-Hazardous Waste Storage Facilities (ISDND)
- Reflect on the development of the model for the tri-stabilization of residual household waste.

1. State of play and challenges

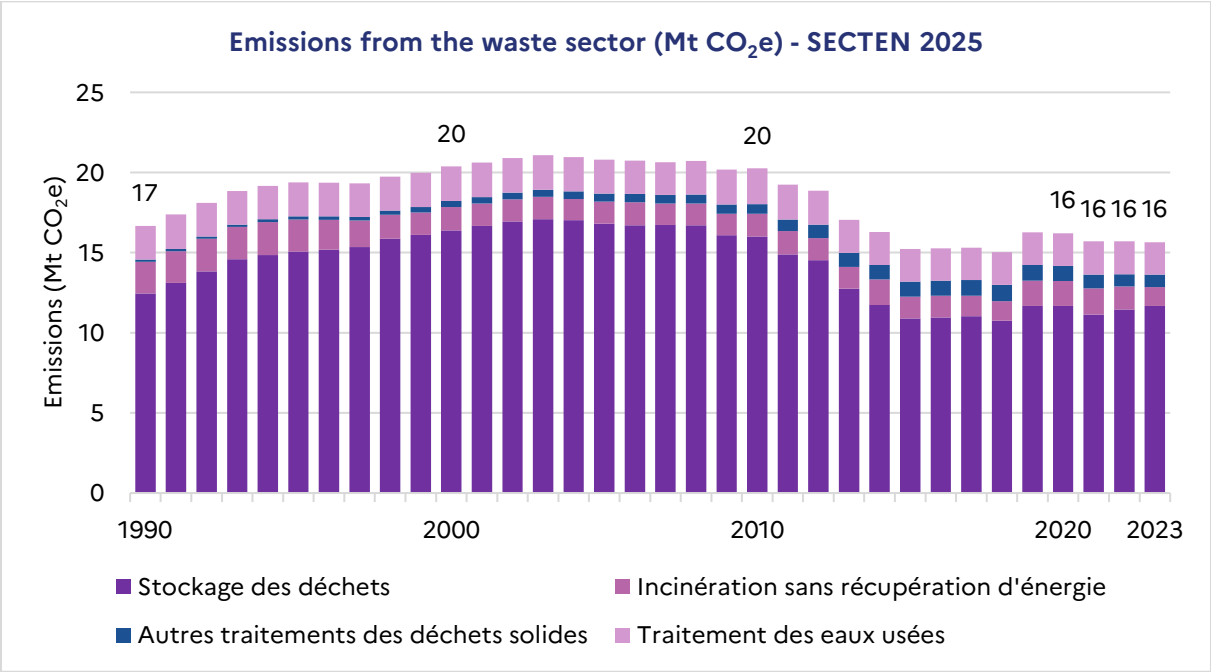


Figure: 54 *Evolution of direct emissions from the waste sector, in Mt CO_2e (Sources: National Inventory of Greenhouse Gas Emissions, Citepa, Secten 2025).*

The **waste sector** emitted 16 Mt CO_2e in 2023, representing 4% of France's gross emissions (Citepa, Secten 2025). These **emissions are mainly related** to methane from the degradation of fermentable waste in non-hazardous waste storage facilities (ISDND). To a lesser extent, non-hazardous waste incineration without energy recovery, waste treatment *via* biological processes (composting and methanisation) and methane and nitrous oxide emissions from waste water treatment contribute to emissions from the sector. Emissions from recycling are counted in industry and those from incineration with energy recovery are counted in energy (nomenclature Secten).

These emissions are comparable to those of 1990, but have been decreasing since the mid-2000s.

The waste processing and recovery sector also contributes to limiting France's carbon and material consumption-based emissions through the recycling of raw materials.

SNBC 2 provided for a carbon budget of 14 Mt CO_2e/year for the period 2019-2023. The carbon budget is exceeded by 2.1 Mt/year. The WEM 2024 scenario,[201] which estimates emission trajectories as a result of policies and measures adopted until 31 December 2023, shows that,

[201] *WEM report 2024 https://www.ecologie.gouv.fr/politics-public/scenarios-prospectives-energie-climat-air*

as a result of measures adopted until 2023, emissions are projected to decrease by 20% between 1990 and 2030 and by 46% by 2050.

2. The strategy

a. Presentation of the strategy

Reducing emissions from the waste sector requires action on the prevention of waste generation, the redirection of waste towards material and energy recovery pathways and the capture of methane in non-hazardous waste storage facilities.

By 2030 , the sector's emissions in the SNBC 3 scenario are 12 Mt CO_2e, a decrease of 28% compared to 1990 (or 23% since 2023). The volume of non-hazardous non-inert waste is stable at around 80 Mt, with a reduction in household waste but an increase in industrial waste in connection with reindustrialisation. Incineration without energy recovery disappears by 2030 while the volume of waste incinerated with energy recovery and waste stored in ISDND decreases. The composition of the waste stored in ISDND is changing thanks to the sorting of biowaste and the capacity to capture biogas produced on site is increasing. Taken together, these developments reduce methane emissions. At the same time, the treatment of waste by composting (industrial and household) and methanization is increasing, the CSR sector[202] is developing rapidly.

In 2050, the sector's emissions in the SNBC 3 scenario are 8 Mt CO_2e, a decrease of 55% compared to 1990 (or 52% compared to 2023). By 2050, waste volumes continue to be stable with a decrease in the volumes of waste stored in ISDND and incinerated with energy recovery and an increase in the volumes treated by methanisation and composting. By this time, there is no more discharge of waste water without treatment, the vast majority of the population being connected to a wastewater treatment plant (STEP).

[202] *Solid Recovery Fuels*

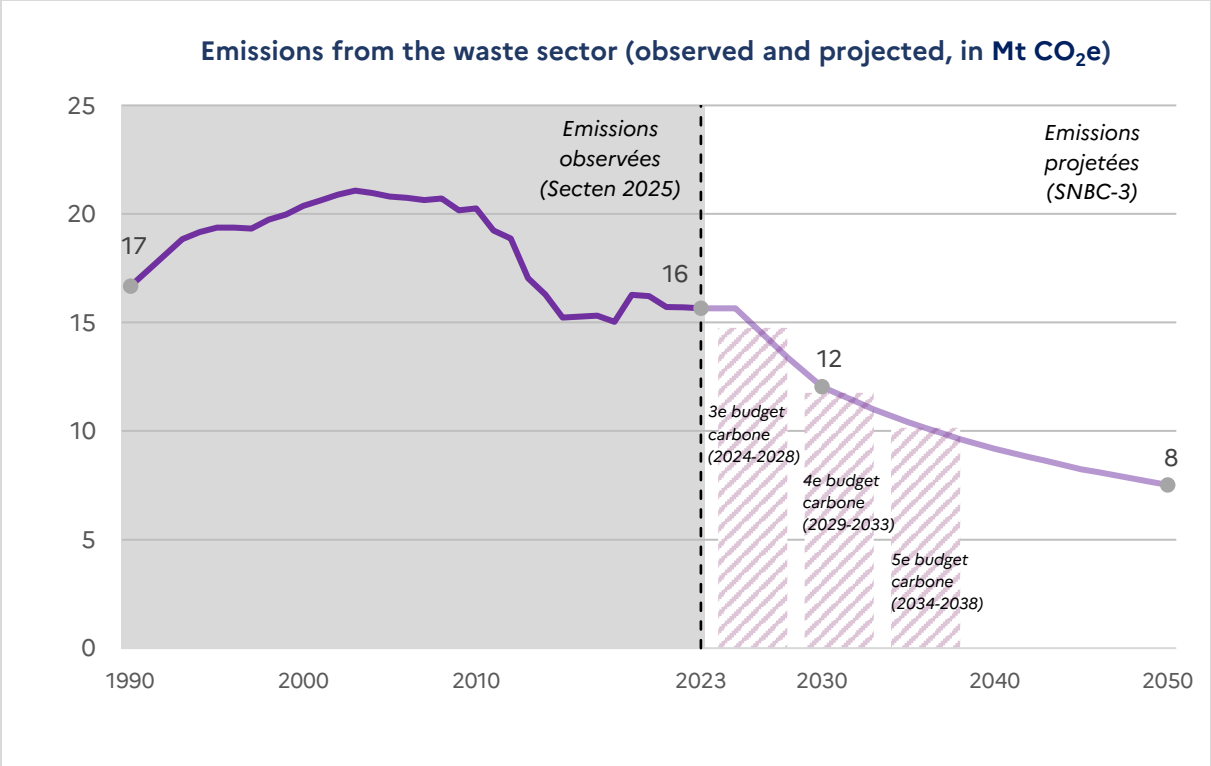


Figure: 55 *Evolution of emissions (historical and projected) of the waste sector in Mt CO_2e between 1990 and 2050 (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC modelling)*

The expected GHG emission reductions per levers are described in the following figure.

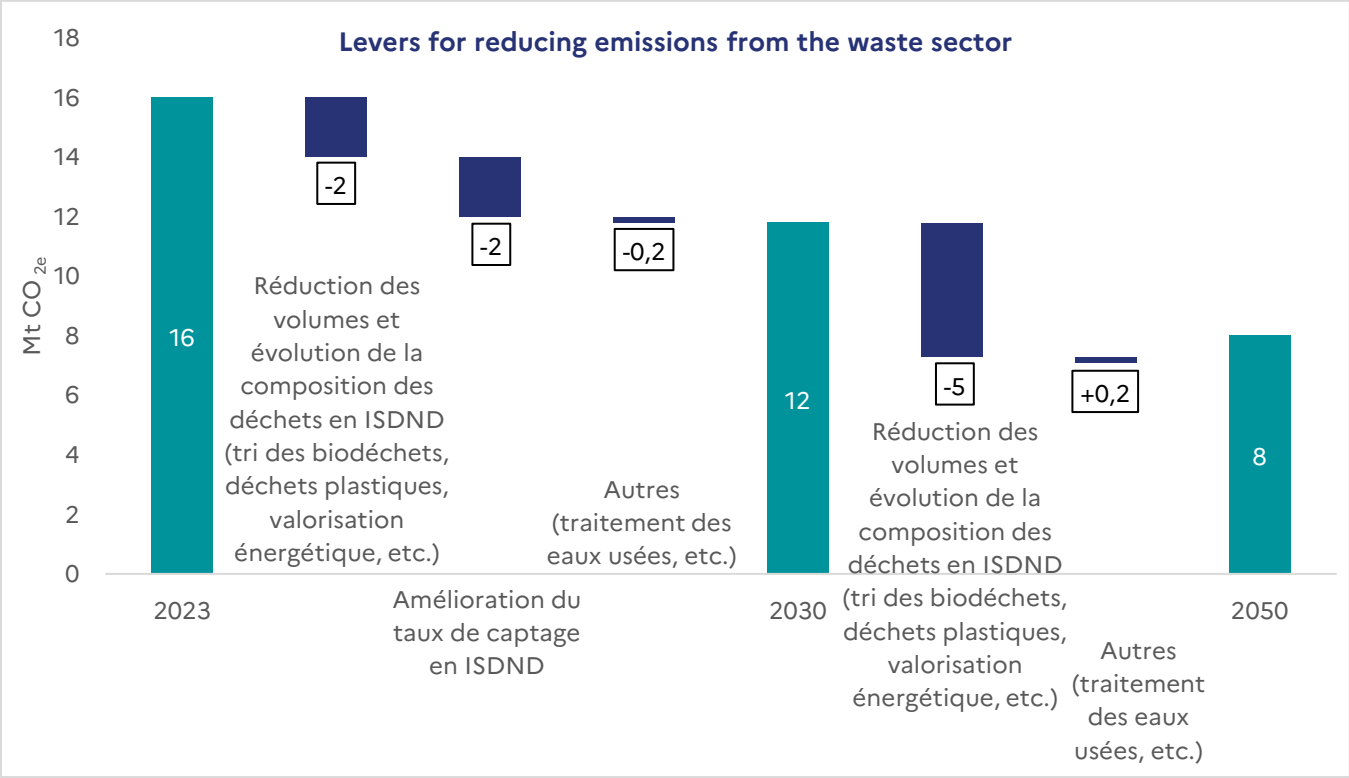


Figure: 56 *Indicative* decomposition by lever *of the reduction of greenhouse gas emissions from waste between 2023 and 2030 based on modelling work (Sources: DGEC modelling)*

b. Main targets of the waste sector

Greenhouse gas emissions	-28% emissions between 1990 and 2030 and -55% emissions between 1990 and 2050.
Volume of waste	Reduce the volumes of waste generated: -5% of DAEs (waste from economic activities) and -15% of DMAs (household and similar waste) generated in 2030 compared to 2010. In particular, reduce by 40% the volume of waste stored in ISDND between 2022 and 2030 and by 70% between 2022 and 2050. Reduce volumes of plastic waste.
Sorting at source of bio-waste	Securing the implementation of the obligation to sort bio-waste at source.
Material valorization	Encouraging material valorisation.
Energy recovery	Support the ramp-up of the solid recovery fuels (CSR) sector (4 Mt treated in 2030), the improvement of the biomethane capture rate in ISDND, incineration with energy recovery.
Connection to wastewater treatment systems (STEP)	Increase the connection of the population to a STEP in line with the Urban Waste Water Directive (80% in 2020).

c. Main orientations of public policies

Waste Guideline 1: Preventing waste generation

The total amount of non-hazardous non-inert waste is stabilising by 2030, despite population growth and reindustrialisation. This is based on a **reduction in the amount of household and similar waste,** in particular plastic waste: Indeed, with one of the largest consumption in Europe (of which around 40% for the packaging sector alone), almost 4.5 Mt of plastic waste per year is currently produced, with the consumption of single-use plastic remaining particularly high. This reduction in the amount of household and similar waste will include **raising awareness of the environmental challenges of waste,** extending the period of use of products, **developing consumption patterns without packaging, including the sale of bulk products,** and **reducing the use of single-use plastics,** particularly in packaging, with the aim of ending single-use plastic packaging in 2040 (Anti-waste and Circular Economy Act (AGEC)). This target is broken down into reduction, upcycling and recycling (3R) targets per five-year period and a target to halve the quantities of plastic bottles placed on the market by 2030. All of these measures in the

Government's 2025-2030 'plastics' plan will contribute to reducing the production of plastic waste.

- **Waste Guideline 2: Securing the implementation of the obligation to sort bio-waste at source**

The obligation to sort bio-waste at source, in force since 1st January 2024 under the Anti-waste and Circular Economy Act (AGEC Act), **will gradually shift bio-waste towards methanisation and composting.** The decomposition of waste into ISDND will therefore gradually be more inert and less methane emitting. **Measures will be considered to secure the implementation of this obligation in all territories.** This obligation is complemented by a 50% reduction target for food waste in 2050 (see Agriculture section).

- **Waste Guideline 3: Massively develop sorting and recycling, particularly via Extended Producer Responsibility (EPR) channels**

Sorting will become more widespread by 2030 and even more so by 2050, both for household waste and for waste from economic activities. This will feed the industry with increasing volumes of recycled raw materials. The new EPR (Extended Producer Responsibility) sectors, set up by the AGEC law, will speed up this process for the activities concerned, as well as funding from the circular economy fund of ADEME and France 2030 concerning innovation (Call for projects 'Innovative solutions for improving the recyclability, recycling and reincorporation of materials (RRR)').

- **Waste Guideline 4: Reducing Fugitive Greenhouse Gas Emissions in Non-Hazardous Waste Storage Facilities (ISDND)**

New regulatory measures on ISDNDs entered into force in 2024, notably strengthening the prevention of greenhouse gas leakage (the operator must now establish a leak detection and repair plan). The supervisory authority may, if necessary, be mobilised to ensure the implementation of these provisions and provide feedback on their benefits in order to consider possible additional measures.

In addition, a reflection will be initiated in order to launch a campaign to characterize the waste resulting from refusals to sort. This will make it possible to specify how greenhouse gas emissions from storage facilities are to be calculated and, if necessary, to adjust any overestimation of those emissions.

- **Waste Guideline 5: Reflect on the development of the model for the tri-stabilization of residual household waste**

The tri-stabilization of residual household waste serves several purposes. First of all, the mechanical sorting stage makes it possible to sort the various materials, including the extraction of organic matter, but also the extraction of metals and materials, such as ferrous, non-ferrous metals, plastic, paper/cardboard, etc., which makes it possible to recover them. Next, the biological stabilisation stage of the organic fraction makes it possible to reduce greenhouse gas emissions prior to its possible entry into a storage facility, and thus to reduce

methane emissions from ISDNDs. It seems possible to associate biogas production with this stage.

A reflection on the economic model, performance and future orientations of this sector will be conducted in order to identify the conditions for its possible contribution to the reduction of greenhouse gas emissions from the waste sector, in coherence with ongoing or future discussions at European level.

d. Main elements of the SNBC 3 scenario

- **Volume of waste:** stable tonnage of non-hazardous non-inert waste around 80 Mt over the period 2020-2050, with a reduction in household waste but an increase in industrial waste in connection with reindustrialisation.
- **Redirection of waste to the material and energy recovery sectors:** the waste streams generated each year in France are massively redirected towards the material and energy recovery sectors, in particular with the target of reducing the amount of waste stored from 16 Mt in 2020 to 8 Mt in 2030 and 4 Mt in 2050. The implementation of the obligation to sort bio-waste at source allows waste stored in ISDND to become increasingly inert. The tonnage of recycled waste increases from 39 Mt in 2020 to 42 Mt in 2030 then 48 Mt in 2050, methanized (excluding agriculture) from 1 Mt in 2020 to 3 Mt in 2030 then 5 Mt in 2050, composted from 9 Mt in 2020 to 10 Mt in 2030 then 11 Mt in 2050. The production of reclaimed solid fuels reaches 4 Mt in 2030 and 5 Mt in 2050.
- **Methane capture in non-hazardous waste storage facilities:** the capture rate of ethane in non-hazardous waste storage facilities (ISDND) in operation increases from 66% in 2020 to 83% in 2030, 84% in 2040 and 85% in 2050 (note that this corresponds to apparent capture rates[203] of 52%, 63%, 70% and 76% respectively, when also taking into account emissions from NDSW that are no longer in operation). The recovery rate of captured biomethane increases from 77% to 85% in 2030 (and remains stable).

Sensitivity test – waste stored in ISDND

If the volume of waste stored in ISDND and its composition does not evolve as expected in the central scenario (stability of the stored volume, emitting organic composition), this could lead to a doubling of GHG emissions in 2050 (approximately +7 Mt CO_{2e} in 2050 compared to the central scenario).

[203] *The apparent capture rate corresponds to the ratio of the captured methane to the methane produced according to the first-order model used by the IPCC. In the context of SNBC, and for the sake of consistency with the greenhouse gas inventories carried out by CITEPA, this apparent capture rate is calculated* ***by taking into account the emissions produced by all the waste stored since the 1950s,*** *in all the ISDNDs located in France (whether in operation, post-operation or observation phase). This apparent capture rate differs from the capture rate most commonly used by the profession, which is calculated only on operating storage facilities. Mathematically, the apparent capture rate is lower than the capture rate of operating facilities alone, as it takes into account methane production from facilities that are no longer in operation, in addition to production from operating facilities.*

G. NATURAL CARBON SINKS – LAND USE, LAND-USE CHANGE AND FORESTRY

STOP THE DEGRADATION OF NATURAL CARBON SINKS BY ADAPTING FOREST AND AGRICULTURAL PRACTICES

Credit: Damien Carles / Terra

STOP THE DEGRADATION OF NATURAL CARBON SINKS BY ADAPTING FOREST AND AGRICULTURAL PRACTICES

1) In 2023, the LULUCF sector*, representing a natural carbon sink overall, represented -37.3 Mt CO_2e/year. **The forest-wood sector constitutes the majority, with a carbon sink of -51.5 Mt CO_2e, despite its significant decline since 2013.**

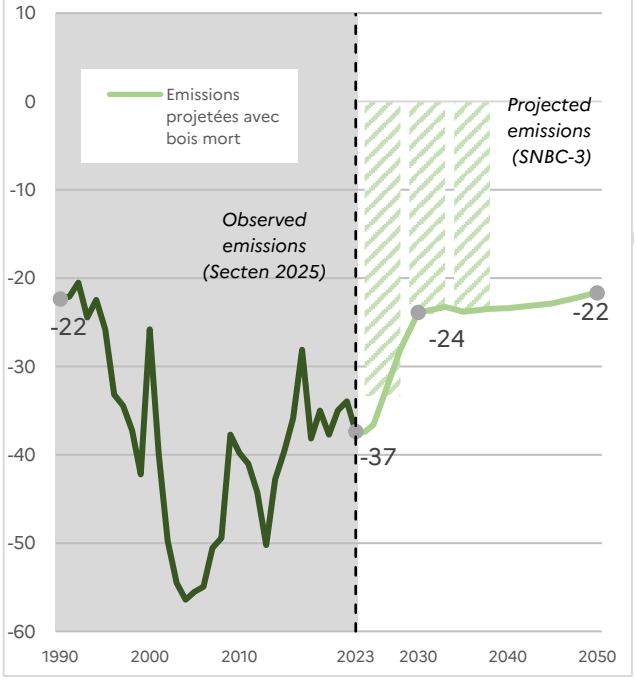
2) The natural carbon sink will have to reach -24 Mt CO_2e in 2030 and -22 Mt CO_2e in 2050.

3) To achieve this target, the forest-wood sector will need to maintain its carbon sink functionality at -35 Mt CO2e in 2030 and -28 Mt CO_2e in 2050 (excluding forest soils).

4) The levers for preserving the natural carbon sink concern the implementation of the forest renewal plan to adapt forests to climate change and fire protection measures, the prioritisation of wood material uses, the achievement of net zero artificialisation and an improvement in carbon storage in agricultural soils.

*Land use, land use change, forestry

Emissions absorbed by the Land Use, Land Use Change and Forestry sector (observed and projected, Mt CO_2e)



The main public policy guidelines:

Forest ecosystem

- Defending forests against fires
- Adapting forests to climate change by accelerating forest renewal
- Promoting sustainable and multifunctional management of French forests
- Encouraging afforestation
- Enhancing forest knowledge and inventory methodologies to account for carbon in forests

Wood products

- Support the structuring of the sector to develop the value chain
- Incentivising the use of wood-material in construction and renovation
- Improving the supply of wood products by supporting the development and competitiveness of processing industries
- Improving the governance of biomass uses to apply the cascading principle
- Develop recycling and energy recovery of end-of-life wood products

Other LULUCF compartments – Artificialisation, deforestation, grassland

- Combating illegal land clearing
- Maintaining grasslands
- Ensuring the implementation of net zero artificialization (ZAN)
- Ensuring the preservation of natural and semi-natural ecosystems

1. State of play and challenges

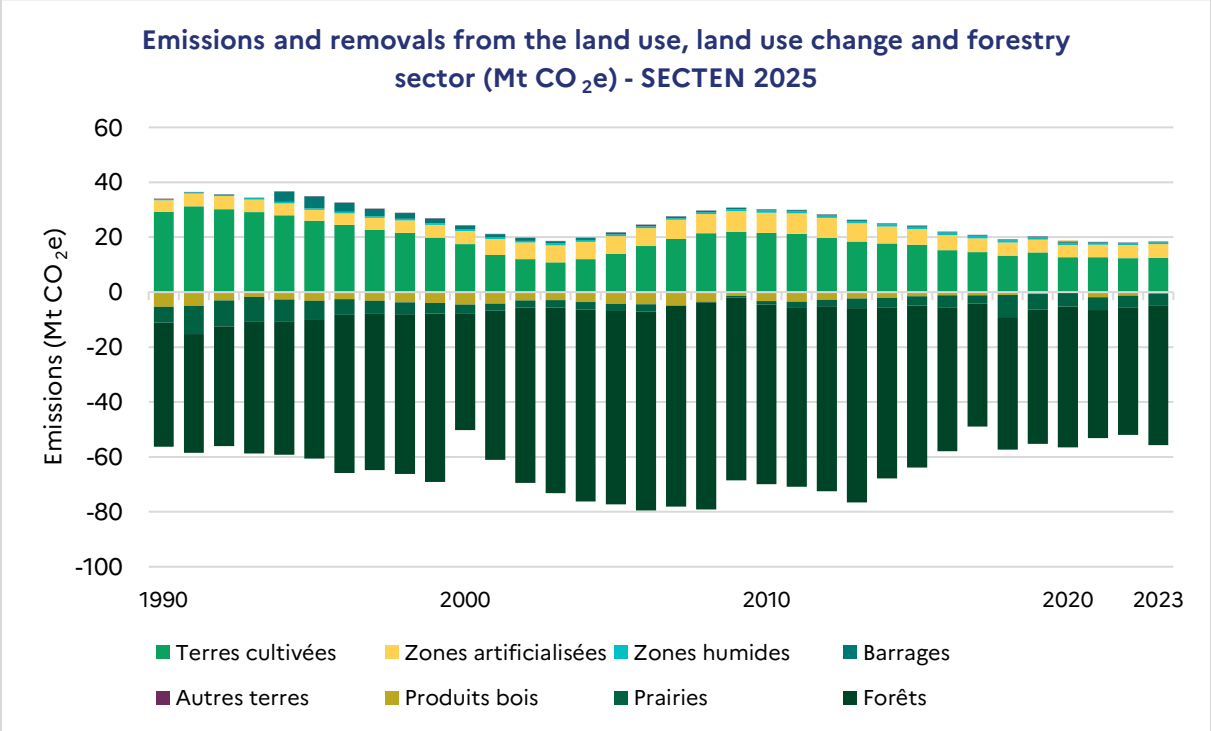


Figure: 57 *Evolution of emissions and removals from the LULUCF sector, in Mt CO 2e (Sources: National Inventory of Greenhouse Gas Emissions, Citepa, Secten 2025)*

The inventory of the LULUCF sector (Land use, land use change and forestryry) corresponds to a balance of annual carbon flows with the atmosphere of three main carbon reservoirs: live biomass, dead biomass and soils. Changes in greenhouse gas emissions and removals within this sector correspond to ecosystem-specific evolutionary dynamics,[204] land-use change or anthropogenic practices. The LULUCF sector is organised into subsectors corresponding to the broad land use categories defined by the IPCC in its Guidelines for National Inventories: Forests, Crops, Prairies, Artificial zones, Wetlands, Other lands. Carbon stored in wood products is the last sub-sector. In France, as in the majority of major forest countries, the LULUCF sector is marked by the "forests" category, which represents significant carbon stocks and flows within woody biomass and soils.

The LULUCF sector, hereinafter referred to as "natural carbon sinks", **achieves net CO2 removals.** In 2023, the sector's removal is -37 Mt CO 2e (Citepa, Secten 2025), corresponding to 10% of emissions from other sectors. The LULUCF part of the national GHG emission inventory 2025 presents an important methodological evolution through the assessment of the carbon

[204] *For example, an old-growth forest stores more carbon, but more slowly than a young forest, until the carbon stock reaches a balance. The annual sequestration dynamics, the carbon flow, of a young forest grows enormously in the early years, with a peak reaching between 30 and 50 years depending on the species.*

sink related to the presence of deadwood in the forest, leading to a significant change with the LULUCF sink values reported in the 2024 inventory. Indeed, as detailed below, the growth in mortality observed in forests in recent years has caused an increase in the volume of deadwood and consequently the carbon stored by this deadwood. This methodological development was planned as part of the continuous improvement of the quality of inventories and in accordance with the European Regulation LULUCF 2018/841.

Historically, the carbon sink represented by this sector was on the rise until 2008, despite the two storms at the end of 1999 (Lothar and Martin), which caused a peak in forest mortality, and despite the heatwave of August 2003, which severely degraded the biological growth of 2003. This increase, resulting at most in a well estimated at -56 Mt CO_2e in 2004, was due, on the one hand, to the steady increase in forest area and stand growth, and, on the other hand, to the decrease in the rate of conversion of grassland to cropland and, to a lesser extent, to the improvement in agricultural practices, reducing the historically positive net emissions from cropland. The natural carbon sink then decreased sharply until 2017 to -28 Mt CO_2e.

The fall in the natural carbon sink is largely due to the effects of climate change, leading in particular to droughts whose frequency and intensity have increased since 2015, health crises (in particular the bark beetle crisis), as well as an increase and aggravation of forest fires (resulting in increasing CO2 emissions linked to the combustion of vegetation), all of which have led to an increase in mortality and a slowdown in the growth of forest stands, with large disparities between forests and territories. According to the IGN, tree mortality has doubled in 10 years in mainland France, from 7.4 Mm^3/year in 2005-2013 to 15.2 Mm^3/year in 2014-2022, which represents 0.5% of the total volume of trees present in the forest.

The sectoral target of SNBC 2 provided for a natural carbon sink of -40 Mt CO_{2e} by 2030, and -67 Mt CO_2e by 2050 (excluding deadwood), based in particular on an improvement in the carbon sink capacity of the French forest and to a lesser extent on the growth of carbon storage in wood products (all goods, materials or infrastructure made of wood, paper and cardboard used in construction, renovation, interior and exterior development, furniture, packaging, etc.). **The effects of climate change described above mainly explain the difference between the trajectory followed from 2015 to the present and the SNBC 2 scenario highlighting the great difficulty in steering the LULUCF sector, which, despite constant progress in the quality of inventories through the use of data and models specific to local circumstances, still contains great uncertainties. However, significant public action has been taken in recent years to ensure the renewal of the French forest** with a view to adapting to climate change and to improve the industrial processing capacity of wood from French forests, in particular through public financial support for investment, as well as the development of innovative tools such as the Label bas-carbone, which notably supports forest stand restoration projects. In addition, the preservation and development of hedgerows as well as the maintenance of permanent grassland were also supported. Finally, the use of bio-based materials, including wood, in construction is encouraged by the latest building environmental regulation (RE2020) adopted in 2021.

These measures are expected to have concrete impacts in a few years for the wood industry and construction sector, with positive effects on the value chain of the French forest-wood sector and a reduction in its trade deficit. The actions taken to adapt forests to climate change

in connection with the revitalisation of biological growth are part of the dynamics of forestry cycles extending over several decades, or even centuries: their effects in terms of carbon sinks will be measurable in the long term, for many after 2050. Fire defence measures deliver more immediate results by limiting the greenhouse gas emissions associated with these natural disturbances, the frequency and intensity of which increase with climate change.

In the 'With Existing Measures' (WEM 2024) scenario,[205] which estimates emission trajectories taking into account policies and measures adopted until 31 December 2024, the natural carbon sink continues to decline to around -6 Mt CO_{2e} in 2030 and around -4 Mt CO_{2e} in 2050 (excluding deadwood). This structural decline is due, on the one hand, to the forest-wood well, which is not returning to its pre-crisis level, which began in 2015, and is decreasing in the short term as a result of a slight increase in timber harvesting compared to historical levels and in the long term as a result of climate change.[206] The difference in the evolution of the natural carbon sink between the WEM 2024 scenario and the SNBC 3 reference scenario is explained in particular by the absence in the measurement state to increase the annual rate of afforestation outside the forest and to improve the wood-product sink (harvest allocation for long-lived products, longer lifetime of wood products through recycling, reuse and sufficiency). On the other hand, in the WEM 2024 scenario, cropland emissions double from 2020 to 2050 due to increased conversions of permanent grassland to arable crops, due to a lack of measures to preserve permanent grassland by 2050, contrary to the SNBC 3 scenario. Finally, the WEM 2024 scenario was carried out before the inclusion of deadwood in the inventory and projection methodology, so this compartment is not part of the WEM 2024 exercise and also explains some of the differences in results with the SNBC 3 scenario.

In **general, caution should be exercised with regard to the figures put forward** in the LULUCF sector, where the sink is highly dependent on the forestry sector. As a reminder, the forest sink is mainly dependent on three components of carbon emissions and removals: growth, mortality and harvesting. Since the orders of magnitude of these components are high, a change in only one of them can lead to a significant change in the forest sink and, by extension, the natural carbon sink, from year to year. In recent years, forest mortality has increased from 14 Mt CO_2e/year in 2010 to 41 Mt CO_2e/year in 2023. This increase in mortality, combined with a slight decrease in growth, estimated at 5 Mt CO_2e/year over the same period, mainly explains the fall in the forest sink.

[205] *MEA 2024 report: https://www.ecologie.gouv.fr/politiques-publiques/scenarios-prospectifs-energie-climat-air*
[206] *Memento IGN 2024: https://inventory-forestier.ign.fr/IMG/pdf/memento_2024.pdf*

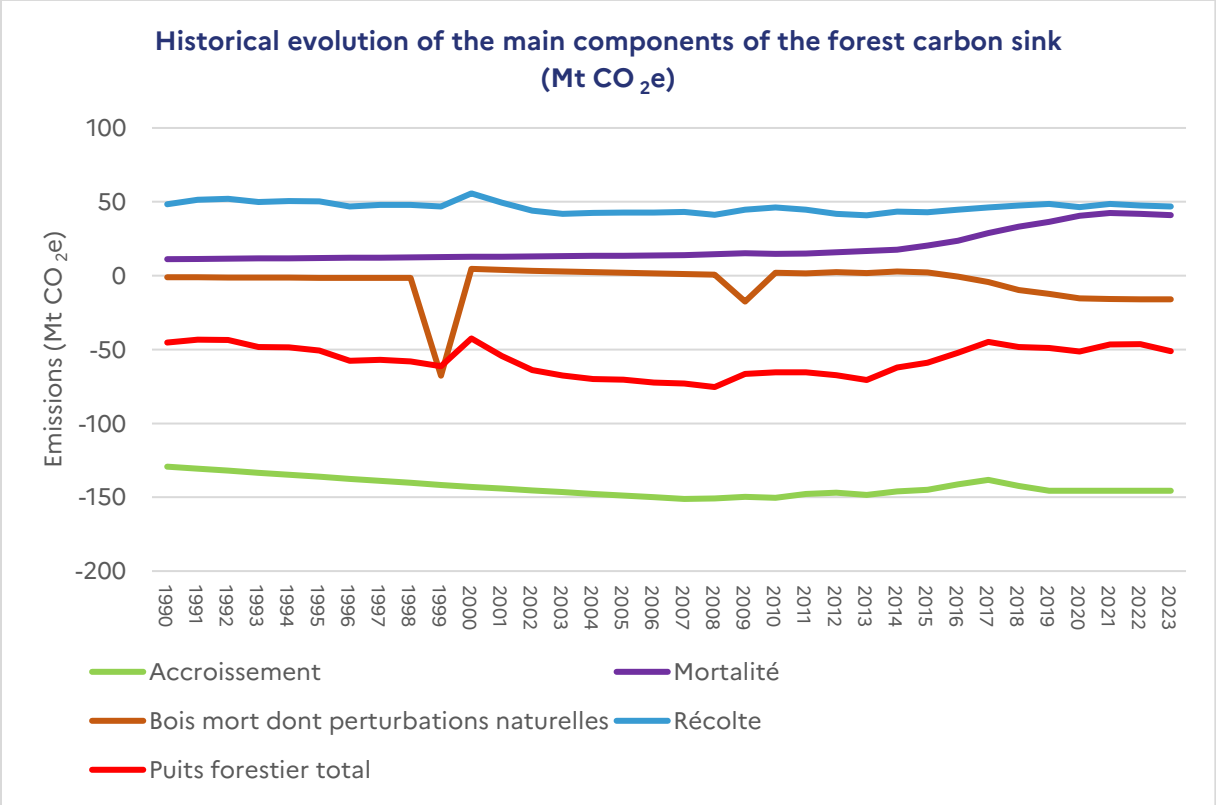


Figure: 58 *Historical evolution of the components of the forest sink in Mt CO 2e (Source: Citepa)*

The calculation of the main compartments of the forest sector (increase, mortality, etc.) for a year n corresponds to a 5-year average of n-2 to n+2. Each year, a representative sample of the whole territory is inventoried by the IGN. It can be combined with samples from adjacent years to produce more accurate results based on several annual samples. The standard results thus cover five successive years and provide estimates for the median year of the window. Taking into account an additional year to carry out the inventories, the final results are therefore only known at n+3. However, in order to obtain emissions and removals in 'real time', extrapolations over the last two years are carried out. For example, in the 2025 national GHG emission inventory, the years 2021, 2022 and 2023 are extrapolated. For 2023, the final results will be known in 2028 and will take into account the averages from 2021 to 2025.

Finally, the results are also dependent on methodological developments associated with the compilation of inventories, which are regular with the aim of reducing the uncertainty of results and are framed for the LULUCF sector in the framework of the European regulations LULUCF 2018/841 and Governance 2018/1999. This is the case, for example, for dead wood. Indeed, previously, the carbon sink of dead wood was not accounted for in France's emission inventory and was estimated, as is still the case for forest soils, in a specific scenario (called INV+). Deadwood is now explicitly modeled in relation to forest mortality. From a carbon sink perspective, deadwood acts as a short-term buffer during a forest mortality crisis. Concretely, since the beginning of the mortality crisis observed in the forest during the 2010s, dead wood has increased significantly so that the associated well is of the order of -10 Mt CO 2e/year, up to -17 Mt CO 2e/year in 2022. This increase thus delays the fall in the forest-wood well over these years. However, some of the carbon stored in dead wood will eventually be released into

the atmosphere, while the other will go into the soil, increasing its carbon content and improving the useful water supply of the soil. This process explains the notion of "buffer effect". Carbon stored in forest soils remains unaccounted for in national inventories for the time being due to a lack of sufficient data and the very heterogeneous carbon content of forest soils. It is, however, the subject of work to be integrated.

2. The Strategy

a. Presentation of the strategy

The main subsectors addressed here are the forest ecosystem, wood products and other LULUCF compartments (deforestation, artificialisation, grassland).

Due to climate change, the French forest, which **is highly dependent on climate change, is currently facing unprecedented levels of mortality, as well as a trend decline in its average annual biological growth, contributing to the significant fall in its carbon sink.** The causes of this increase in mortality are multifactorial: effects of climate change (particularly through a summer increase in water stress and temperatures), a succession of episodes of drought and heatwaves of unprecedented intensity that have induced massive dieback phenomena, aggravated by health problems such as the proliferation of bark beetle on spruce and fir trees. It is difficult for researchers and experts to decide on the sustainability of these developments, because while the steady increase in average temperatures and the frequency of extreme heatwave and dry events are scientifically validated, the water component of climate change still has a significant margin of uncertainty. Managers must therefore take into account a fairly wide range of climate scenarios in their strategy for adapting to new climate conditions. In order to emerge from this period of crisis, adaptation measures are and will be put in place to increase the resilience of forests by defending them against fires and renewing them with species adapted to France's current and future climates. However, the impact of these renewal plans on the carbon sink can only be observed in the long term and sometimes after 2050, when stands planted in the next ten years enter their full growth momentum and sequester significant new amounts of atmospheric carbon each year. Fire defense measures, on the other hand, should have more immediate effects. Indeed, climate change has a strong impact on the risk of forest and non-woodland fires. The unfavourable development of the conditions conducive to the development of fires is gradually affecting the entire national territory, with increasingly extended periods upstream and beyond the summer months. In France, a TRACC-compliant scenario would mean a 60% increase in fires above 20 ha by 2050 and an intensification of the risk in historic areas, where the period of danger is expected to increase from 79 to 127 days at the end of the century, with a seasonal core from 36 to 90 days, and the area affected by the risk to increase from 27 to 40% in 2050. The implementation of prevention and defense actions against these disturbances makes it possible to limit the increase in greenhouse gas emissions associated with this increase in fire risk and the maintenance of the carbon sink function of these stands.

Moreover, in view of the sub-sectors concerned, **the LULUCF sector has a strong link with ecosystems and biodiversity in general.** Indeed, in some cases, the preservation and restoration of natural and semi-natural ecosystems generates as a co-benefit an additional

absorption of atmospheric carbon. For example, the restoration of degraded ecosystems so that subservient species regain their full functionality and growth dynamics, the fight against artificialisation, or conservation actions such as that of dead wood in the forest provide benefits for biodiversity and carbon. In this sense, the European Nature Restoration Regulation (NRR) recognises the key role of ecosystems in the fight against climate change, in particular as natural carbon sinks. It requires Member States to restore habitats capable of sustainably storing carbon: forests, peatlands, wetlands, agricultural soils. The NRN thus establishes a synergy between biodiversity and climate.

In this sector, the policies and measures of the SNBC to preserve the natural sink are based in particular on agroecological practices (planting and sustainable management of hedges, agroforestry, carbon storage in agricultural soils, etc. – see III.B.2.c) on the one hand and on the implementation of the National Forest and Wood Programme (PNFB) on the other, with in particular the boosting of forest management, but also in the longer term on a strategy for adapting French forests as well as on nature restoration measures as part of the national nature restoration plan.

Four levers are identified as complementary in the forest-wood sector to contribute to the overall mitigation of climate change, without compromising the sink target: carbon sequestration in the forest ecosystem, carbon storage in wood and wood-waste products, substitution of energy-intensive materials by bio-based products and energy recovery of bio-based products or waste from these products that replace fossil fuels. However, for the LULUCF sector, only carbon stored in forests and wood products is accounted for, without taking into account substitution effects. These substitution effects are also accounted for through other sectors; a monitoring indicator is set up under SNBC 3 to estimate them.

For the forestry sector, which plays a key role in the evolution of the natural carbon sink, the SNBC 3 scenario is based on some scenarios from the recent IGN-FCBA work.[207] The choice was made to focus on the intermediate scenario of effects of climate change on forest ecosystems, which results in a series of crises, the next of which would take place before 2050 and whose impact was moderated until 2050. A "strong climate change impact" sensitivity scenario has also been developed, where the forest sink is modelled in the light of a continuous crisis, thus allowing possible less favorable situations to be considered. Climate change has a decisive impact on key parameters such as growth and mortality.

The graph below shows the evolution of the main parameters determining the forest carbon sink. There is a continuous decrease in the capacity of the current French forest to absorb carbon until 2050, mainly due to structural changes in mortality and natural growth and partly to an increase in the harvest between 2024 and 2050. Despite this decline, the forest remains an important carbon sink in 2050. There is also the importance of new forests from afforestation on non-forest land in the forest carbon sink in 2050.

[207] *Projections of wood availability and carbon stocks and flows in the French forest sector, study report, May 2024, IGN-FCBA*

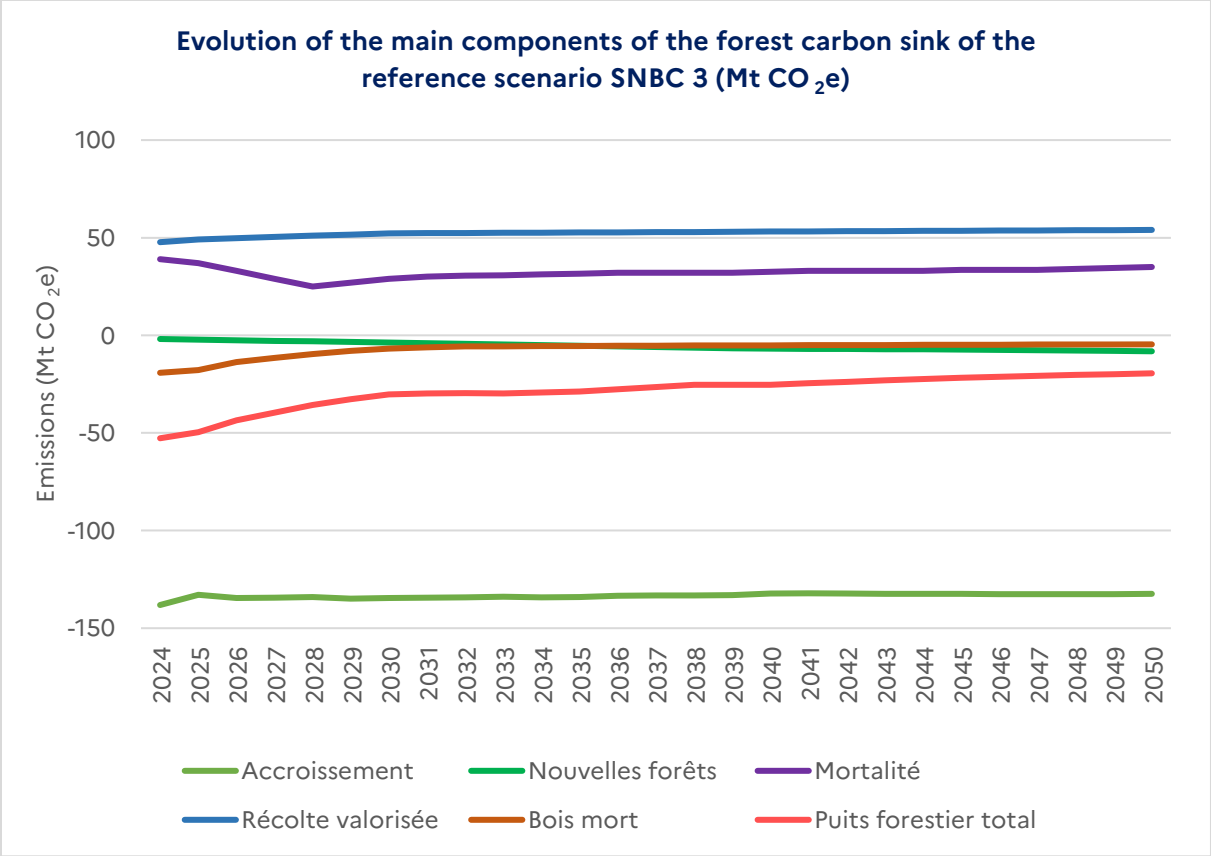


Figure: 59 *Evolution of the components of the forest sink within the SNBC 3 scenario in Mt CO 2e (Source: DGEC)*

In the SNBC 3 scenario, removals reach -24 Mt CO 2e for the LULUCF sector by 2030, and -22 Mt CO 2e by 2050. In the short term, the current crisis continues, and the decrease in removals due to forest mortality is offset by the increase in the flow of carbon stored in deadwood. In the long term, the effects of climate subsequently lead to a structural decline in growth and an increase in mortality, reaching levels close to those observed at the height of the crisis in 2050. The decrease in growth and the increase in mortality are partly offset by the increase in non-forest afforestation.

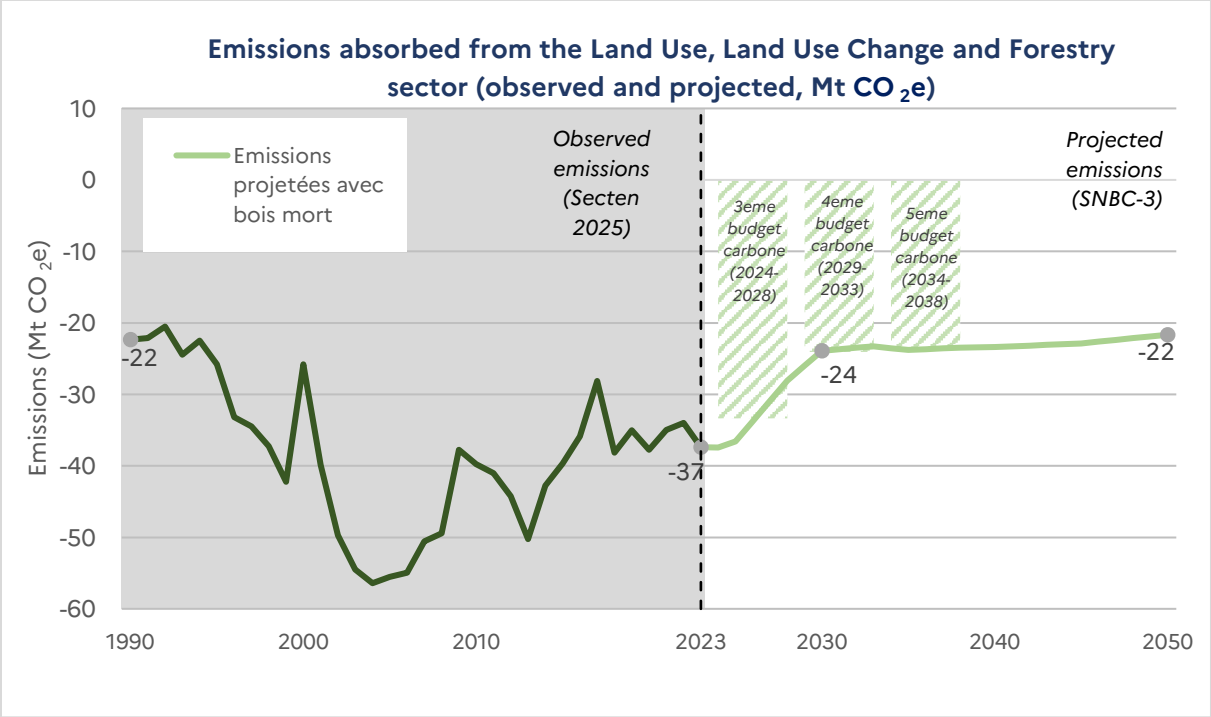


Figure: 60 *Evolution of emissions (historical and projected) of the LULUCF sector in Mt CO2e between 1990 and 2050 (Sources: national inventory of greenhouse gas emissions, Citepa, Secten 2025; DGEC modelling)*

The emission reductions obtained by levers are described in the following two figures. The first shows the developments in each of the LULUCF subsectors and refers directly to the figure above, the second analyses more specifically the developments in two of its subsectors: forest and wood products. The main levers for changing the natural carbon sink are growth, mortality, harvesting, new forests, long-lived wood products, combating land artificialization and reducing emissions from the agricultural sector (less reversal, increased hedge line, development of agroforestry and the establishment of cutlery, see III.B.2.c).

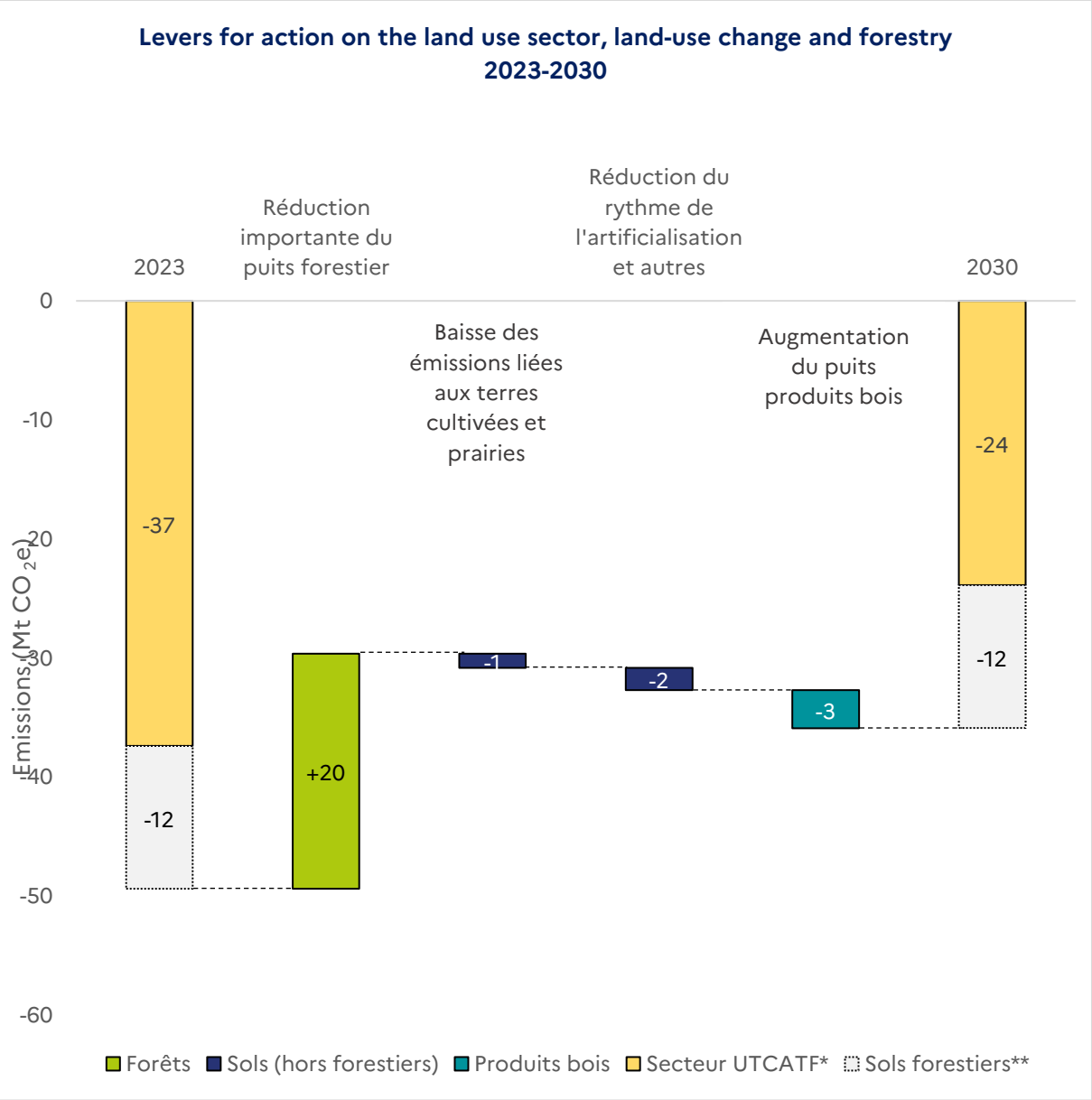


Figure: 61 *Indicative decomposition by lever of the evolution of emissions from the LULUCF sector between 2023 and 2030 based on modelling work (Source: DGEC modelling).*
** : the scope of the Secten 2025 inventory*
*** : the carbon sink associated with the soils of forest land (excluding new forests) is not part of the scope of the Secten 2025 inventory, so it is modelled by the DGEC.*

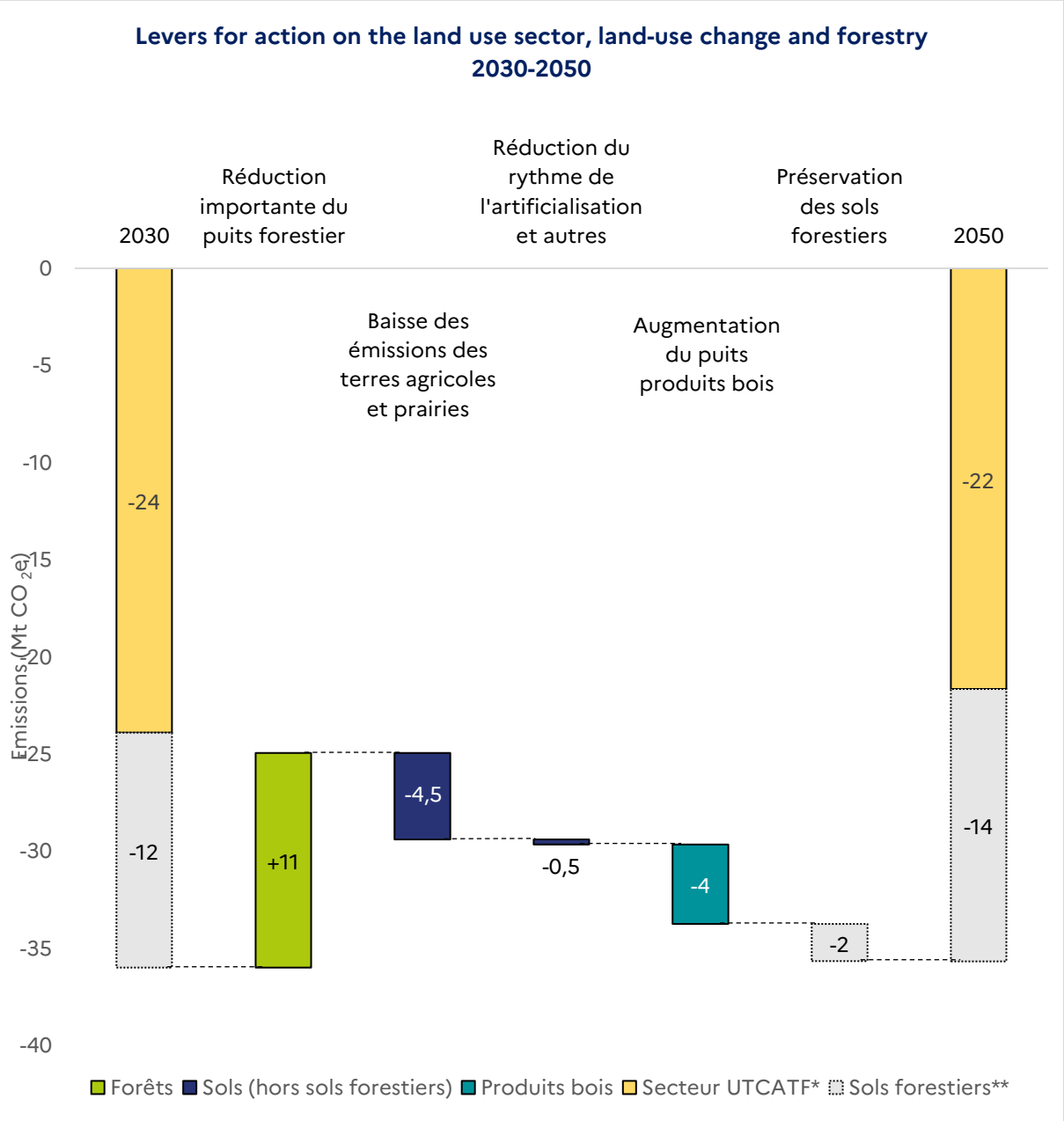


Figure: 62 *Indicative decomposition by lever of the evolution of emissions from the LULUCF sector between 2030 and 2050 on the basis of modelling work (Source: DGEC modelling).*
** : the scope of the Secten 2025 inventory*
*** : the carbon sink associated with the soils of forest land (excluding new forests) is not part of the scope of the Secten 2025 inventory, so it is modelled by the DGEC.*

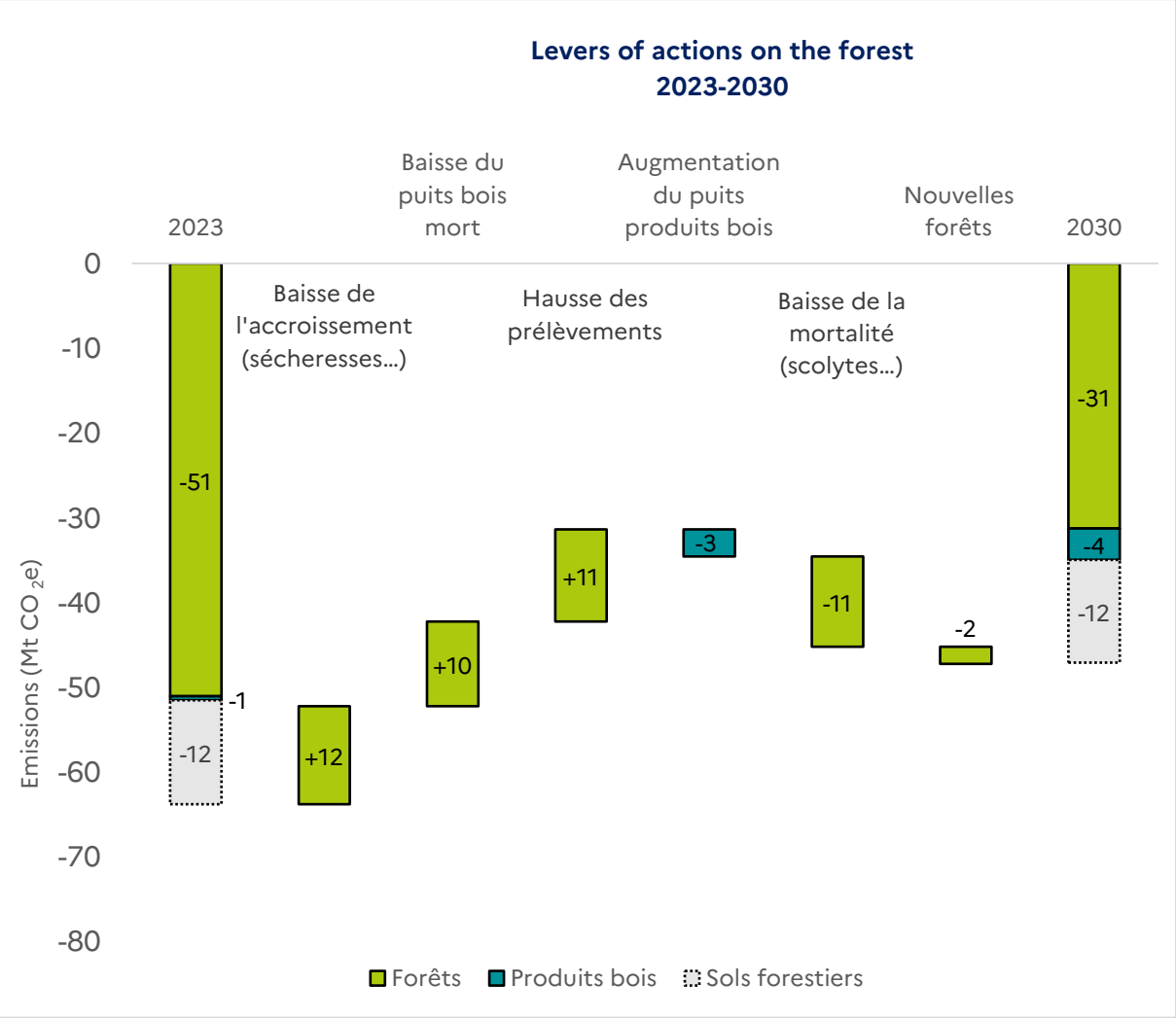


Figure: 63 *Indicative breakdown of the evolution of forest carbon sinks and wood products between 2023 and 2030, based on modelling work (Source: DGEC modelling).*

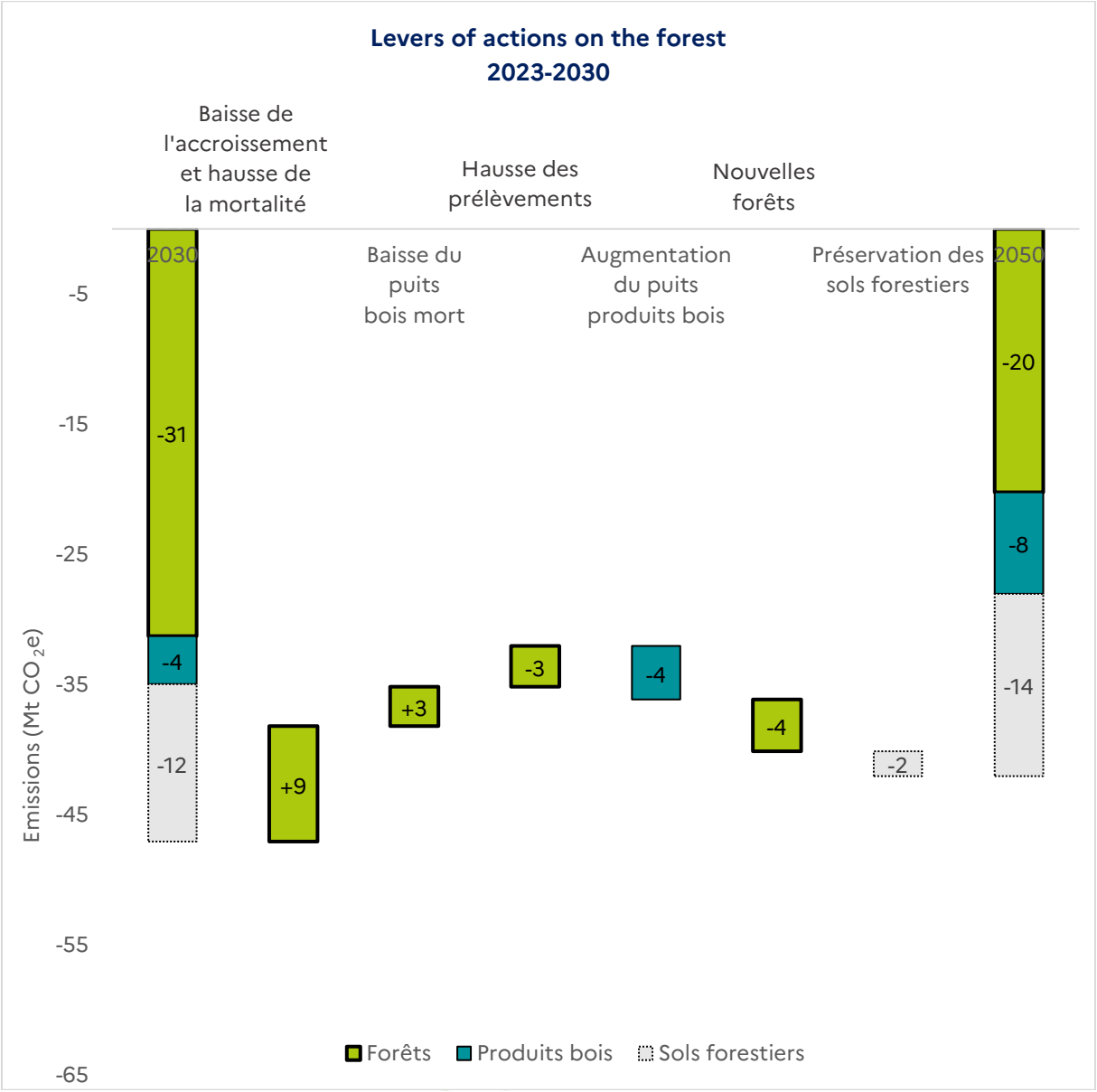


Figure: 64 *Indicative breakdown of the evolution of forest carbon sinks and wood products between 2030 and 2050, based on modelling work (Source: DGEC modelling).*

Finally, as specified in Part II.B.5, these projections reflect uncertainties and difficulties in achieving the target of the EU LULUCF Regulation, in a context of significant reduction of the natural carbon sink at European level. Various avenues are being explored to move closer to these targets.

It is important to note the great complexity of effectively steering the LULUCF sector. Indeed, as mentioned in this section, most of the decline in the natural carbon sink observed over the past decade is due to the effects of climate change, with a significant loss of sinks of the order of 20 Mt $CO_{2e.}$ The SNBC 3 scenario incorporates for the forestry sector likely impacts of

climate change, thanks to recent work by IGN-FCBA,[208] but it remains very difficult to quantify the impact of climate change and natural disturbances on the GHG removal capacities of the LULUCF sector and when these impacts will be observed.

b. Main targets of the LULUCF sector

Greenhouse gas absorptions	Absorb 24 Mt CO_{2e} per year in 2030 and 22 Mt CO_{2e} per year in 2050.
Adapting the French forest to climate change	Renew and adapt 10% of the French mainland forest by 2032, prioritising damaged, declining and vulnerable stands, with the aim of establishing more diversified stands adapted to new climatic conditions and thus consolidating the carbon sink in the long term. Defend forests from fires by limiting associated greenhouse gas emissions to conserve the carbon sink capacities of stands.
Increase the French forest area	Increase the annual rate of afforestation in order to afforest 200,000 ha from 2030 to 2039 and maintain an afforestation rate of 15,000 ha/year in 2050.
Mobilizing the Wood Resource to Develop the Wood Products Well	Achieve a harvested wood products sink of at least 3 Mt CO_2e/year, based on a harvest of 60 Mm^3/year in 2030.
Maintaining productive permanent grassland	Maintain approximately 7 150 kha of productive permanent grassland from 2020 to 2050[209], in order to conserve the carbon storage they allow.
Increasing carbon storage in agricultural soils	Reduce the current emissions of carbon from agricultural soils so as to move closer to a balance between emission flows and carbon sinks by 2050.

[208] *Projections of wood availability and carbon stocks and flows in the French forest sector, study report, May 2024, IGN-FCBA*

[209] *It should be noted that a methodological change has been incorporated into the annual agricultural statistics, which have not been included in the modelling: grassland is considered permanent if it has been grassland for more than 5 years, whereas the 6-year threshold is considered in the SNBC 3 modelling.*

Reducing the impact of land take	Achieve the goal of Zero Net Artificialization by 2050.

c. Main orientations of public policies

1- Forest ecosystem

Forest Guideline 1: Defending forests against fires

The increase in average temperatures in France as a result of climate change is reflected in particular in an increase in the number and intensity of heat waves and droughts. These increase the vulnerability of forest stands to fires, the frequency and scale of which have been increasing in recent years. The unfavourable development of the conditions conducive to the development of fires is gradually affecting the entire national territory, with increasingly extended periods upstream and beyond the summer months, and an intensification of risk in historic areas. Forest fires pose a threat to the natural carbon sink in the short term, as burnt wood depletes carbon into the atmosphere, but also in the longer term through the reduction of the carbon sink of the burned stand and a smaller sink of wood products from harvest recovery. Adaptation of forests to climate change will therefore include the target of reducing vulnerability to forest fires.

The primary target must be to limit the number of fire departures. Before the fight, the challenge is to put in place means of prevention.

Amplifying the implementation of legal brush cutting obligations

The clearing and maintenance obligation applies to owners of land located less than 200 metres from woods and forests. The importance of compliance with this obligation was confirmed by the Fire Law promulgated in July 2023, which provides simplification and clarification measures based on feedback from the field. The aim is **to amplify its implementation** through, for example, dedicated information campaigns, support for the municipalities concerned and control operations.

Implementation of the national strategy for the protection of forests and non-forested areas against fire

The national strategy for the protection of forests and non-forested areas against fire aims at a comprehensive approach, which covers both the preparation of a territory, its planning, the maintenance of an economic dynamic adapted to the context of risk (forestry, pastoralism, agriculture, nature activities), and preventive measures, integrating the development of risk culture.[210]

[210] *https://www.ecologie.gouv.fr/press/prevention-risks-fires-government-launch-strategy-national-defense-forets-surfaces#:~:text=It%20est%20repose%20on%20three,%2D%20En%20limit%20les%20cons%C3%A9quences.*

➽ Forest Guideline 2: Adapting forests to climate change by accelerating forest renewal

Implementation of the "Forest Objective" report

On 26 July 2023, the 'Forest Objective' **report, with a view to drawing up the national forest renewal plan,** was submitted by the Specialised Committee on Sustainable Forest Management. This plan, reflecting the Government's ambition to address climate change, takes stock of the situation while proposing concrete actions to respond to one of the major axes of the roadmap for adapting forests to climate change and strengthening the role of forests as carbon sinks. It aims to support public and private owners in adapting their forests to climate change over the next 10 years.

In addition, the National Climate Change Adaptation Plan 3[211] (PNACC 3) provides for the implementation of a series of actions aimed at making our forests and the economic sectors that depend on them more resilient to climate change and maintaining a well-functioning carbon sink in the long term. Some of these actions are particularly important in the short term for carbon sequestration, taking into account the long duration of the forest: the implementation of a national strategy for the adaptation of forests to climate change as part of the revision of the national forest-wood programme, the development, production, conservation and diversification of forest genetic resources (seeds/plants), the production of forest vulnerability maps at the scale of test territories.

Finally, **long-term financing for forest renewal,** announced at the close of the forest and timber meetings in March 2022 and in a press release issued by the Minister responsible for forests on 4 July 2024, makes it possible to provide long-term State support for forest renewal and the adaptation of forests to their new climatic conditions. It was initiated by France Relance and then France 2030, and now takes the form of a sustainable window within the framework of the France Nation Verte Ecological Planning. The implementation of forest renewal and the revision of the scheme as provided for in measure 38 of the PNACC3 will make it possible to halt the fall of the carbon sink by massively renewing in the next ten years with effects by 2050 and beyond. As provided for in the PNACC, the scheme must incorporate structuring environmental criteria in order to achieve diversified and resilient forest renewal. In addition, a call for projects for productive investments in the forest and agroforestry seeds and seedlings sector was opened in 2024 in order to increase the production capacity of the sector in quality seedlings while improving environmental performance. The aim is to produce plants in sufficient quantity, quality and diversity.

Restoration of the forest-animal balance

Significant efforts will be made to restore the forest-animal balance in order to allow forest renewal. The aim is to make it possible to regenerate forests with the least possible protection, giving priority to natural regeneration where possible and provided that the species present

[211] *National Climate Change Adaptation Plan 3: https://www.ecologie.gouv.fr/sites/default/files/documents/PNACC3.pdf*

are adapted to climate change, with the presence of ungulates in good balance with the available food capacities and therefore in good health.

To this end, a map of imbalanced areas will be drawn up in all regions. In addition, the National Committee for Forest – Ungulate Balance was launched at the end of 2024. It will propose solutions in the coming months to promote a return to balance. It will build on the ungulate forest balance observatory, based on the best available data.

- **Forest Guideline 3: Promoting sustainable and multifunctional management of French forests**

A sustainably managed, climate-resilient and climate-resilient forest is the best guarantee of consolidation of the forest carbon sink.

Encouraging more private forest owners to manage their forests sustainably

Today, 9.7 Mha of private forests, including some very small areas, do not have sustainable management documents. These forests represent two-thirds of the private forest and half of the mainland French forest. Sustainable forest management contributes to a better understanding of natural risks in the forest (in particular the risk of fire), an increased mobilisation of long-lived wood products and the identification of stands withering to be renewed, thus helping to meet our climate ambitions, in particular by adapting the French forest to climate change and decarbonising the French economy.

The fire law of July 2023 lowered to 20 hectares (instead of 25 ha) the threshold of forest area from which the simple management plan (SMP) is mandatory for private forest owners. The PSG is the main document of sustainable management in private forest, and this measure will make it possible to place more than 300,000 ha of private forest under guarantee of sustainable management. In addition, proposals are being studied to boost the procedure for taking over vacant and unmastered property (facilitating the identification of property, updating the cadastre), combat forest land fragmentation and encourage management groupings, particularly of small owners.

Promoting sustainable forest management, biodiversity and soil conservation

Article L121-1 of the Forestry Code states that forestry policy falls within the competence of the State and is intended to ensure the sustainable management and multifunctional, ecological, social and economic vocation of woods and forests. The Forest Code provides for a National Forest and Wood Programme (L.121-2-2) which determines the direction of forest policy and economic, environmental and social targets. This program is available in the regions in the form of Regional Forest and Wood Programs (RFPs), these RFPs are operationally translated for forest owners and managers by framework documents. The guarantees of sustainable forest management (Code Forestier art L124-1) are based on the existence of a sustainable management document (SMD) drawn up at forest ownership level, in accordance with the framework documents.

Taking account of global changes (climate change, … biodiversity crisis) leads in particular to the implementation of forestry management integrating soil conservation, the choice of more resilient tree species, the diversification of provenances and tree species and also the diversification of forestry management methods. The France Nation Verte ecological planning

roadmap for forest and timber aims to rethink the forest of tomorrow in all its components, from upstream to downstream, and takes the form of measures and resources set out in particular in the National Biodiversity Strategy (SNB) and through the action plan for the preservation of forest soils (PASF). They will also be taken into account in the National Forest and Timber Programme (PNFB), specifying the main targets of the State for the forest-wood sector, which will be revised in 2027.

All functions provided by forests, including ecosystem services, including the preservation of biodiversity, are combined with carbon sequestration removed from the atmosphere (resilient species, carbon sequestration in above-ground and underground biomass, litter and soil). The SNB thus provides for numerous provisions to preserve biodiversity, including the development of a national action plan on old-growth and old-growth forests. It also calls for the establishment of payments for environmental services for the forest, in line with the findings of a general inspection mission.

Concerning the soil, although the forest soil carbon sink is not included in the national inventories at the moment, estimates from the scientific community allow to make an assessment of this sink at about 12 Mt CO_2e/year currently. The conservation of the carbon sink function of forest soils is therefore a key issue. To this end, the PASF provides for a series of actions concerning the development of knowledge on the functionalities of forest soils and the impacts of global changes and human activities, but also the development of forest practices preserving forest soils (cable clearing, experiments) and the integration of specificities relating to forest soils into management support tools and forest management framework documents.

At European level, the regulation on nature restoration in France introduces restoration measures in forest areas, some of which will have carbon co-benefits, while the RED III directive on renewable energies regulates **certain forest management practices that today are likely to remove carbon** (harvesting of stumps and roots, harvesting of remnants and small woods on vulnerable soils, large-scale clear-cutting, removal of dead wood, settlement and soil degradation).

Forest Guideline 4: Encouraging afforestation

The Low Carbon Label enables the emergence of forestry projects aimed at reducing greenhouse gas emissions or sequestering carbon, by linking project leaders and funders. The Label bas-carbone will continue to be rolled out on a large scale, in line with the conclusions of the Assises de la forêt et du bois. Existing forest methods ('afforestation' and 'reforestation of degraded forest stands') have recently been revised to provide the necessary guarantees on the robustness of emission reduction calculations, strengthen environmental requirements and facilitate the development of new projects by improving the ownership of technical parameters by project owners. A Label bas-carbone methodology for mangroves in Overseas France has also been published. New methodologies will be approved to increase the number of certified projects and associated emission reductions.

Existing **non-forest afforestation will** not compete with agricultural land but will take place on wasteland and land under agricultural control. Efforts will be made to identify on the territory

wasteland, industrial wasteland, quarries that are no longer in operation and to implement on a case-by-case basis restoration measures prior to afforestation.

- **Forest Guideline 5: Building knowledge on forests and methodologies to account for carbon in forests**

The strengthening of forest knowledge (understanding of ecosystems, forest health, state of resources and their future modelling, applied research on the adaptation of forests to climate change, etc.) **will be continued,** in particular through the work of the IGN French Forest Observatory and the FORESTT (priority research projects and equipment) and through the establishment of a forest inventory in Overseas France.

Therefore, in order to further improve the quality of national greenhouse gas emission inventories, **soil carbon flow accounting methodologies will be improved.** Accounting for these flows will make it possible to have a more complete view, in line with the reality of the forest-wood sector well.

In addition, State forestry operators (ONF, CNPF, IGN) will continue to play their role of expertise and action to ensure that French forests are managed sustainably.

2- Wood products

- **Guideline Wood products 1: Support the structuring of the sector to develop the value chain**

Assisted by several calls for projects, the sector invests and organises itself in order to be able to make the most of the harvest increase planned for 2030. Two main triggering phenomena are identified:

- An increase in the demand for wood at national level, supported in particular by the increase in the use of wood products in construction and renovation
- An adaptation of harvesting and processing of crisis timber (storms, bark beetle, wasting, etc. ...). Strengthening a wood industry adapted to these crisis products is essential to enable a rapid response to the massive arrivals of these heterogeneous but often unfairly depreciated and undervalued woods. A strategic challenge for the country is to avoid excessive depreciation of timber, both in the forest and in the processing chain. Avoiding the degradation of the economic value of these woods means better use of renewable material, which prolongs off-forest carbon storage.

This mobilisation of the sector is based in particular on support for the renewal of forest stands, the consolidation of sustainable forest management, and the provision of decision-making and risk analysis tools to owners and managers, promoting the implementation of forest adaptation strategies. **Dynamic and reactive forest management makes it possible** to harvest decaying trees as a priority before depreciating the woods. It is essential that this adaptive management is part of a framework of sustainable forest multifunctionality, ensuring the preservation of biodiversity and other ecosystem services. Contractual arrangements for the marketing of timber must also be stepped up, forest services must be improved, the equipment of companies operating timber must be modernised and industrial wood-processing capacity

must be increased. However, the success of these investments depends on the development of the use and demand for crisis wood products and hardwoods.

In particular, action 13 of measure 38 of PNACC 3 provides for the development of an action plan for the adaptation of the downstream timber industry and the processing industry that will allow for concrete implementation. This orientation will also be integrated into the new NFPB.

- **Wood products guideline 2: Incentivising the use of wood-material in construction and renovation**

The deployment of the RE2020, whose environmental thresholds will be regularly strengthened, will encourage the use of bio-based materials in new construction, in particular wood.

In addition, the label "bio-based building" (new construction) revised and brought into line with the RE2020, will be supplemented by a label "bio-based building" for renovation (after a phase of methodological and technical work). Regulatory developments will be planned in favour of bio-based products. In addition, other measures could be considered to complement or replace financial incentives to promote the incorporation of bio-based materials in renovation, in particular by anticipating the application of Article 39 of the Climate and Resilience Law, which sets a target for the incorporation of bio-based or low-carbon materials in at least 25% of heavy renovations and public-order buildings from 2030. The ongoing revision of fire regulations in the wood construction sector will also have to reconcile the need to ensure the safety of people and property with the need to increase the use of wood in construction and renovation.

- **Wood products guideline 3: Improving the supply of wood products by supporting the development and competitiveness of processing industries**

Several types of projects are already supported by calls for projects initiated by the Recovery Plan and continuing today, aimed at developing all the links in the wood value chain in France, from logging activities to the development of industrial and innovation capacities of processing activities, while developing the energy autonomy of companies. An analysis of the effectiveness of these support schemes and of the supported projects will be carried out in order to foresee improvements if necessary.

In addition, a targeting effort on hardwoods, low-quality softwoods and products with long-lived uses, in the construction sector in particular, was initiated under the IPPB call for projects and will need to be increased overall in order to **guide investments to fully exploit the forest resources available in France.**

- **Wood products guideline 4: Improving the governance of biomass uses to apply the cascading principle**

In order to meet the principle of 'cascade use' of biomass laid down in the revised RED III Directive and the challenge of winding down biomass in the light of the various uses and needs, the **role of regional biomass cells** (grouping the State services and its agencies into regions) **will be strengthened to meet these challenges,** and the **governance of public policies**

surrounding biomass will be improved, on the basis of consolidated data, by better aligning State actions and regular exchanges between the State and stakeholders linked to biomass production and recovery issues. This issue is developed in Part II, section B.5 on biomass governance.

- **Wood products guideline 5: Develop recycling and energy recovery of end-of-life wood products**

Innovation will be supported in the activities of industries in order to make the most of the material over the longest cycle before energy use. Studies will have to be financed and valued in order to increase, in particular, the use of recycled products in renovation and construction, particularly in connection with the EPR sectors.

3- Other LULUCF compartments – Artificialisation-Deforestation-Grasslands-Natural ecosystems

- **LULUCF Guideline 1 – Combating illegal land clearing**

Means to combat illegal clearing will be put in place: strengthening the means of control, remote sensing and regulatory communication.

- **LULUCF Guidance 2 - Maintaining grasslands**

Measures **will be put in place to stop agricultural abandonment.** The productive permanent grassland will be maintained and will allow the development of extensive livestock farming. In particular, the conservation of grasslands of biodiversity interest (wetlands, catchment feeding areas, valley bottoms, habitats of Community interest, etc.) is prioritised. This orientation is further developed in Part III.B. Agriculture (Agri. Carbon storage 1).

- **LULUCF Guideline 3 - Ensuring the implementation of net zero artificialisation (ZAN)**

The consumption of natural, agricultural and forestry areas is reduced in order to achieve the 'zero net artificialisation' target set by the Climate and Resilience Law. (see Additional Part - I. E, Guidance on fitting-out 3: "Achieving the goal of net zero artificialisation by 2050").

The guidelines in the Complementary Section - I.E 'Sustainable land use planning' help to give credibility to the land take assumptions used in the LULUCF sector.

- **LULUCF Guideline 4: Ensuring the preservation of natural and semi-natural ecosystems**

The measures of the National Biodiversity Strategy (SNB) aim to preserve ecosystems and their carbon storage potential. A national nature restoration plan will be developed in line with the EU Nature Restoration Regulation and will preserve the ecosystem services provided by nature, including carbon storage.

The development of the Label bas-carbone for projects to restore natural ecosystems such as peatlands or Posidonia grasslands will be an opportunity for projects to reduce GHG emissions or sequester carbon. This will help achieve the quantified targets, imposed by the European regulation for nature restoration, for restoring part of the drained peatlands to habitats of

Community interest (whether they are still active or abandoned), prioritising areas where rewetting is possible and putting in place appropriate management measures.

The FairCarbon PEPR will enable the acquisition of data on the contribution of continental ecosystems to climate change mitigation.

d. Main elements of the SNBC 3 scenario

Forest ecosystem

- **Forest renewal:** forest renewal of around 10% of the mainland forest area, with more diverse stands adapted to new climatic conditions, is being implemented over the next 10 years. Scenario R1 of the IGN-FCBA study[212] is chosen.
- **Mortality:** As the evolution of the absorption potential of forests is uncertain, the scenario considers, in view of the severe crisis (in particular linked to the **succession of periods of drought and heatwaves and induced bark beetle crises**), that the mortality rate continues to increase until 2025-2027, then decreases around 2030 to reach a lower level than at the peak of the crisis but remains relatively higher than the pre-crisis level (pre-2015). Mortality then increases again until 2050 to a level comparable to the crisis years 2018-2019. The chosen scenario corresponds to a weighting of the scenarios B1R1C2 and B2R1C2 of the IGN-FCBA study,[213] the harvest level chosen in the SNBC 3 scenario (60 Mm ^{3} in 2030, 62 Mm3 in 2050) being framed by the latter. The one-off effect of scenario C2 on mortality is 'smoothed' over the entire projection period up to 2050. The same method is used for biological growth (see below).
- **Fire protection:** Fire-related emissions are included in mortality calculations for SNBC 3.
- **Biological increase:** the annual increase in mainland France continues to decrease following the current crisis (succession of periods of drought, heat waves, mild winters facilitating the occurrence of aggravating health problems such as bark beetle blooms). This decrease is then less rapid from 2030. However, in the chosen scenario, the effects of climate subsequently induce a structural decline in growth, reaching in 2050 a level slightly lower than that observed at the height of the crisis (2017). This decline in growth is partly offset by the success of the non-forest afforestation programme (see below).
- **Timber harvesting:** see the "Wood products" section.
- **Afforestation outside the forest:** the annual rate of non-forest afforestation increases from 1 000 ha/year in 2023 [214]to 20 000 ha/year in 2030 until 2039. It then decreases to 15 000 ha/year in 2050. In total, with natural increases, the rate of increase of new forest areas decreases from around 100 000 ha/year in 2023 to 45 000 ha/year in 2030 and 30

[212] *Projections of wood availability and carbon stocks and flows in the French forest sector, study report, May 2024, IGN-FCBA*

[213] *Projections of wood availability and carbon stocks and flows in the French forest sector, study report, May 2024, IGN-FCBA*

[214] *Approximately 1 000 ha of projects resulting from the Low Carbon Label afforestation method were labelled in 2023 (source: DGEC).*

000 ha/year in 2050. Afforestation outside the forest mainly concerns plantations on areas under agricultural abandonment, which are about to become increased forests ('crowd management'). Therefore, these afforestations do not compete with areas dedicated to agriculture. Afforestation also occurs on areas in industrial wasteland, although these remain marginal. Afforestation allows the creation of new forest stands from routes and species favourable for carbon storage in the context of climate change and ensures a significant carbon sink in 2050 estimated at around -7 Mt CO_2e, including natural increases (spontaneous colonisation of trees on a non-forest plot).

- **Deforestation:** see below under "Other LULUCF compartments"
- **Carbon sinks from dead wood and in soils:** As specified in the "state of play" section, the deadwood carbon sink is now accounted for in national inventories. The carbon sink of forest soils will also have to undergo a methodological evolution within the inventories, in accordance with the European Regulation LULUCF 2018/841, based on field data from the campaigns of the Soil Quality Measurement Network, a long-term soil quality monitoring programme, the analysis of which is still ongoing. In the reference scenario, the carbon sink of forest soils is assessed in historical terms on the basis of conservative scientific estimates from the IGN-FCBA study[215] (200 kgC/ha/year), as a precaution, pending the integration of a robust methodology based on field data from the whole territory, with a positive development in terms of better consideration of forest soils within forestry practices and routes. It should be noted that the national GHG emissions inventory method takes into account the evolution of the soil carbon stock of newly afforested land over a period of 20 years, so that this land reaches a forest reference stock for soil carbon. The SNBC 3 scenario thus assesses a GHG flux for the remaining forest soils.
- As regards the Amazon rainforest in French Guiana, it is a primary forest that is generally considered to be in equilibrium and its carbon sink is now estimated to be zero. It is therefore considered that biological growth, harvest level and mortality level remain constant over time.[216]

Sensitivity test 1 – Assumption of a high sensitivity of the forest sink to global warming:

The evolution of the carbon storage capacity of the LULUCF sector is highly dependent on the chosen scenario of climate effect on tree growth and mortality in forest areas. The assumption used in SNBC 3 is based on scenario C2 of the IGN study 'Projections of wood supplies and carbon stocks and flows in the French forestry sector', which estimates a moderate effect, between the optimistic scenario C1 and the pessimistic scenario C3.

If the observed climate effect scenario on forests were ultimately similar to the IGN C3 scenario, this could lead to a collapse of the forest-wood carbon sink, becoming a carbon source by 2050. This would correspond to a reduction in carbon sink capacity of 24 Mt

[215] *Projections of wood availability and carbon stocks and flows in the French forest sector, study report, May 2024, IGN-FCBA*

CO_2e/year in 2030 and 33 Mt CO_2e/year in 2050 compared to the central scenario (excluding forest soils). In particular:

- The French forest would become a source of GHG emissions, amounting to 13 Mt CO_2e/ year in 2050 (compared to the removals of 19 Mt CO_2e/ year in 2050 in the reference scenario)
- Harvested wood products sink and new forest-based sinks, linked to successful afforestation projects, would offset emissions from the forest sector.

In such a context of increasing mortality resulting in repeated crises, part of the harvest would be a harvest of crisis timber, the quality of which could then be degraded. Harvest management will be a key issue and could have a significant impact on the timber industry's supply chains. Furthermore, with the risk of the forest-wood sector becoming a source of carbon, maintaining the harvest trajectory of the central scenario could be reassessed. Accordingly, the following guidelines could then be considered:

- Reduce the use of wood energy by supporting the development of renewable energy and recovery solutions (ENR&R);
- Prioritising harvests in impacted stands to promote forest renewal and adaptation to climate change
- Support the wood sector to ensure full valorisation of the available resource and crisis timber. Indeed, the organisation of the downstream timber industry may have an impact on the harvested wood products sink of the order of 10 Mt CO_2e/year according to the IGN-FCBA study;
- Increase imports of wood energy and wood material, with a negative impact on the national consumption-based emissions;
- Actively support the development of technological carbon sink solutions.

Otherwise, if the effects of climate change are actually close to what the C1 scenario estimates, the forest-wood carbon sink would be improved by 8 Mt CO_2e/year in 2030, and by 19 Mt CO_2e/year in 2050 (excluding forest soils):

- The French forest would emerge from the crisis period with a forest sink that would increase by 8 Mt CO_2e/year in 2030 and 18 Mt CO_2e/year in 2050 compared to the central scenario;
- The harvested wood products sink would remain unchanged while the new forest sink would improve at the margin (gain below 1 Mt CO_2e/year) thanks to a better success rate of plantations due to a lower impact of climate change.

Wood products

- **Harvest:** increase of the harvest, estimated at 53 Mm^3 in 2021, to 60 Mm^3 in 2030. This increase is mainly based on removals from new private forests under management and helps to support the development of the timber industry in order to meet demand while preserving the forest sink. The harvest then increases slightly to reach 62 Mm^3/ year by 2050, with in particular a decrease of more than 4 Mm^3 of the harvest allocated to energy uses (including related) and an increase of nearly 5 Mm^3 allocated to material uses (sawmills, panels, insulators).
- **Carbon sequestration in wood products:** the share of harvest processed into 'sawmill' products remains constant at 12% until 2030 and then increases to 14.5% by 2050. The share of harvest entering the panel and insulator compartment increases from

10.5% currently to 13% in 2030 and then to 18% by 2050. Thus, thanks to the increase in the harvest of 7 Mm^3 from 2021 to 2030, the volume allocated to long-term uses is also increasing over this period. In terms of harvest share, long-term uses remain stable, however, given the dynamics of growth in wood energy uses, in particular by industrial projects and heating networks: Energy wood harvest growth from 24 Mm^3 in 2023 to 26 Mm^3 in 2030 (excluding related). However, from 2030 to 2050, the harvest allocated to wood energy uses decreases structurally and gradually by about 8 Mm^3 (excluding related). However, in total, this decrease is reduced by only 4 Mm^3 over this period taking into account the energy recovery of related. Carbon sequestration in wood products thus gradually increases from 1 Mt CO_2e/year in 2023 to 4 Mt CO_2e/year in 2030 and 8 Mt CO_2e/year in 2050.

- **Development of the circular economy for wood products:** the lifetimes of the materials used increase through changes in consumption practices and the development of re-use: half-lives of wooden frames reach 54 years instead of 50 years in 2023, wooden-floor/paneling 32.4 years instead of 30, panels 27 years instead of 25 and paper 7 years (no change) . The rate of incorporation of recycled raw materials into panels is increasing: 35% in 2030 and 55% in 2050, compared to 30% in 2021.

Sensitivity test 2 – Limited harvest:

The interpretation of the possible effects of climate change on average forest productivity and on changes in the volume of mainland standing timber (2.8 billion $m3)$ is a particularly complex exercise. IPCC forecasts point to an increase in the frequency of high-intensity events. It is therefore likely that we will have to manage significant inflows of timber from affected forests on a regular basis. In a context of transformation and adaptation of the forest to new climatic conditions and an increase in the share of private forests under sustainable management document, the assumption of an annual harvest of 60 Mm^3 in 2030 remains possible and conceivable.

However, in the event of an unfavourable combination of several factors, an alternative scenario in which it would be difficult to achieve this target cannot be excluded.

For example, if the maximum harvest level increased by only half compared to the chosen scenario, reaching 56.5 Mm^3 instead of 60 $Mm^{3,}$ this could, all other things being equal, have a significant impact on solid biomass closure:

- A reduced wood energy supply of 6 TWh/year in 2030, corresponding to a reduction of 2 Mm^3 of wood from forest per year, which would completely reduce the margin on biomass closure and would need to be compensated by recourse to import, or greater recourse to waste wood, at the expense of a material recovery beneficial to the harvested wood products sink. Greater electrification of industry's energy needs could compensate for this lack of biomass supply, going beyond the assumptions used in the central scenario. Finally, sufficiency efforts could also reduce demand for biomass;
- Dependence on processed timber imports for industrial timber and lumber, in particular for the construction-renovation sector, which is becoming essential to meet demand;
- These changes in supply could have consequences on wood prices and consequently call into question the achievement of the targets for the use of wood for the various uses, even by resorting to imports, and thus on the reduction of GHG emissions.

- Despite an improvement in the forest-wood carbon sink of around 5 Mt CO_2e/year in 2050, consequences both in terms of carbon leakage and therefore on the consumption-based emissions with likely recourse to imports but also on the loss-making trade balance of the forest-based sector.

Sensitivity test 3 – Maintaining dependence on wood energy:

The cumulation of trend demand for wood energy and that of projects (industrial and heating networks) initiated since 2019 constitute a floor for the allocation of wood chips for energy uses by 2030. One of the challenges for 2050 is to favour timber-producing forestry and a more efficient forest-wood carbon sink by reducing the share of wood harvest allocated to energy wood and increasing the share of harvest allocated to timber and industrial timber. To achieve this target, the sustainable management of a larger area of private forest is encouraged, with the development of forestry producing more timber, generating a more efficient forest-wood carbon sink.

If the volume of annual wood harvested from forests directly dedicated to energy uses remains constant from 2030 to 2050, whereas it decreases by 31% in the reference scenario, this could lead, all other things being equal, to a decrease in the forest-wood carbon sink of approximately 3 Mt CO_2e/year in 2050, reaching 22 Mt CO_2e/year (inventory perimeter, excluding deadwood and forest soils):

- Corresponding to a significant decrease in the harvested wood products sink of 3 Mt CO_2e/year in 2050, reaching then about 4 Mt CO_2e/year in total;
- This leads to higher wood prices for non-energy uses and higher imports of wood (for non-energy uses).
- Leading to an additional supply of wood energy of around 10 TWh which could disincentive the development of ENR&R technologies.

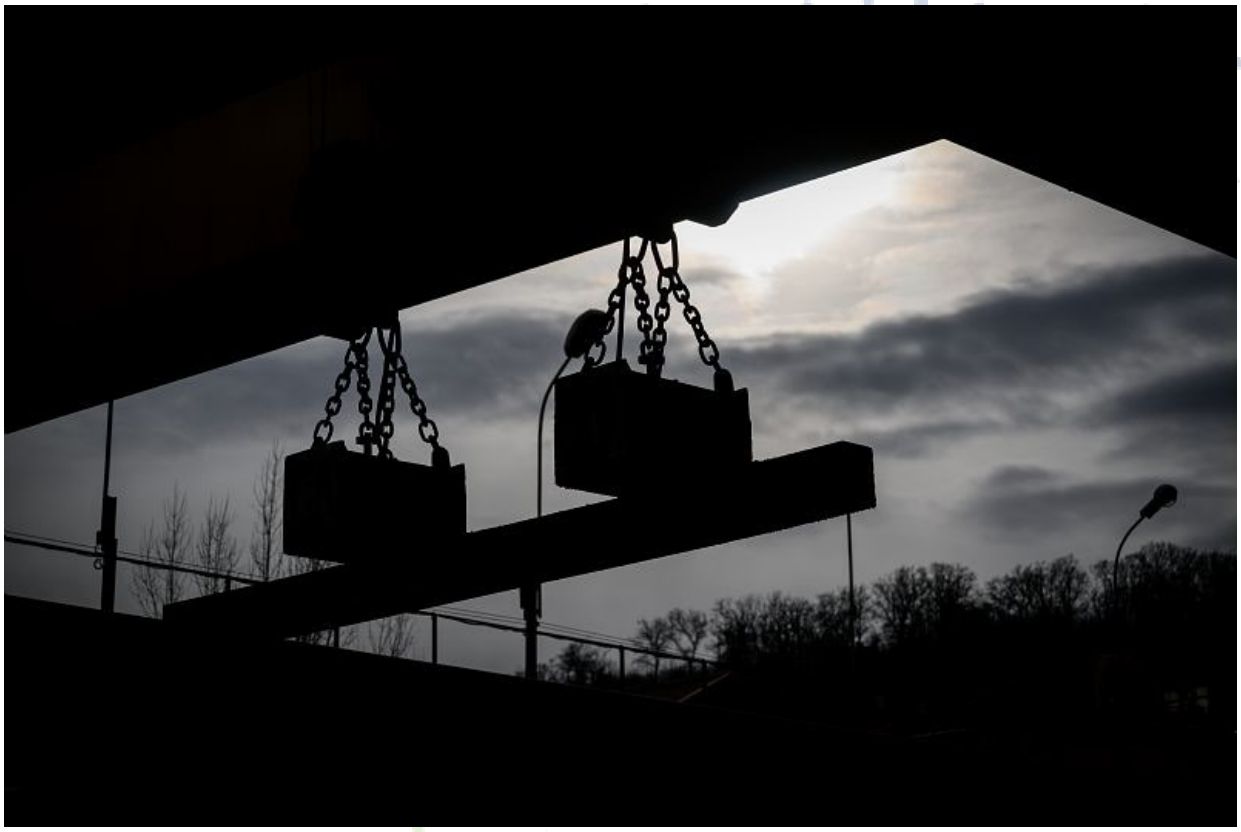
Other LULUCF compartments – Artificialisation-Deforestation-Grasslands-Natural ecosystems

- **Deforestation/deforestation:** two-thirds of the deforestation is now carried out in mainlands, where it accounts for about 33 kha/year. Emissions from deforestation are increasing from 16 Mt CO_2e/year today to 7 Mt CO_2e/year in 2030 and 3 Mt CO_2e/year in 2050. Deforestation refers to the conversion of forest land into other types of land: cropland, artificial land, etc. As afforestation is also counted, the existence of deforested areas each year in France does not mean that there is a decrease in total afforested areas;
- **Manubill:** gross land take decreases in line with the net zero artificialisation (ZAN) law: -50% of artificial land between the decade 2011-2021 and 2021-2031; -95 % between the decade 2011-2021 and the last decade until 2050. By 2050, the volume of artificialized surfaces is compensated by an equivalent volume of renaturated surfaces.
- **Agricultural land:** Net emitters of CO2 in 2023 (+8 Mt CO2e on the LULUCF perimeter), agricultural land (cropland and grassland) is seeing its emissions decrease by 2050. This development is made possible by the preservation of permanent grassland (therefore the large carbon stock with which it is associated), as well as the development of agroforestry (hedges and intraparcellar) and the generalisation of intermediate crops. These developments related to agricultural land are detailed in the "Carbon storage in soils" part of Part III. B. 'Agriculture' and have an impact on land use and land use change; the

associated emissions are therefore accounted for in the LULUCF sector, in the same way as removals and emissions of aboveground and root biomass and soils for the whole territory.

Devenir le premier pays à fixer un objectif en empreinte *pour réduire notre impact global et développer notre politique industrielle*

IV. Becoming the first country to set a consumption-based emissions target to reduce our overall impact and develop our industrial policy



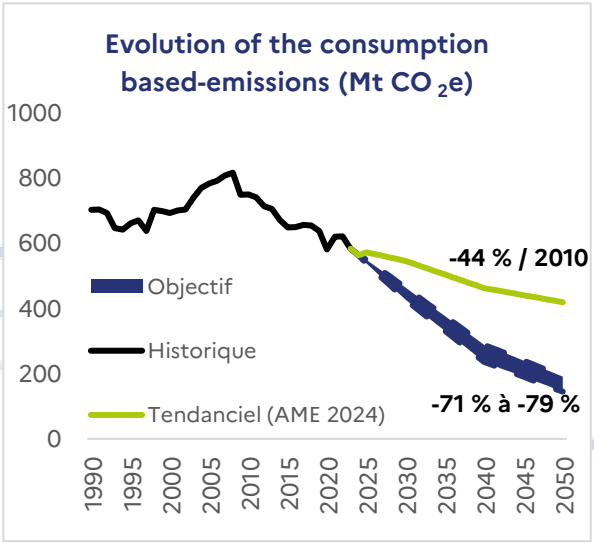
Appropriations: Arnaud Bouissou / Terra

BECOME THE FIRST COUNTRY TO FIX A CONSUMPTION-BASED EMISSIONS TARGET TO REDUCE OUR GLOBAL IMPACT AND DEVELOP OUR INDUSTRIAL POLICY

In 2024, the French consumption-based emissions is estimated at **8.2 tCO $_2$e/hab.** Transport accounts for 25% of the consumption-based emissions, food for 23% followed by housing (20%), capital goods and services.

It will have **to be reduced from -38% to -43%** in 2030 (i.e. between 426 and 464 Mt) and from **-71% to -79%** in 2050 (i.e. between 160 and 215 Mt) compared to 2010 (749 Mt).

Levers to reduce the consumption-based emissions require changes in production and consumption patterns, changes in trade policy, the decarbonisation of our trading partners and green reindustrialisation, supported by the following guidelines.



The main public policy guidelines:

- Reducing direct domestic emissions
- Encouraging responsible consumption and reducing overconsumption of certain capital goods
- Reduce imported emissions related to the French diet, while improving nutritional quality
- Developing mutualisation and the functional economy
- Creating the conditions to encourage citizens to better control their consumption-based emissions
- Encouraging all economic actors to better control the carbon content of their value chain
- Strengthening ecodesign and producing more sustainable goods
- Scaling up the repair
- Promote re-use and re-use
- Develop sorting and recycling
- Encouraging material sufficiency
- Promote the use of low-carbon materials and components
- Promoting the decarbonisation of EU value chains and reducing environmental leakage from imports
- Supporting a European position to align trade policy with environmental targets
- Support a strengthening of the Carbon Border Adjustment Mechanism (CBAM) to better tackle carbon leakage
- Protecting French agriculture by limiting environmental leaks and promoting local consumption
- Ending imported deforestation to preserve the climate regulator role of tropical forests and reduce imported emissions
- Promoting the production of durable goods, in particular through green reindustrialisation
- Encourage the adoption of imprinted approaches at international and European level as a complement to the territorial approach
- Unify and improve the methodology for calculating the consumption-based emissions

1. State of play and challenges

France's consumption-based emissions measures emissions associated with French consumption, whether produced in France or imported. While France's international commitments relate to its territorial emissions, **the Government has undertaken to reduce France's consumption-based emissions, taking into account imported emissions.** Decarbonisation must not be achieved through the massive use of high-carbon-cost imports.

According to the most recent estimate by the Department for Statistical Data and Studies of the Ministry for the Ecological Transition and INSEE,[217] **France's consumption-based emissions reached 563 Mt CO_{2e}, i.e., reduced to the total population, 8.2 t $CO_{2e/inhabitant}$ in 2024** (or 17.7 t CO_{2e} per household). It is about 1.5 times higher than territorial emissions. The consumption-based emissions consist of half domestic emissions and half imported emissions. The French consumption-based emissions increased towards the end of the 1990s before reaching its peak in 2008 (816 Mt CO_2e). **Since then, the French consumption-based emissions have decreased by an average of 2.3% per year and decreased by 31% in 2024 compared to 2008** (see **Figure 60**). This reduction is due to lower domestic and imported emissions. Over the same period, gross territorial emissions decreased by 31% (Citepa, Secten 2025).

The consumption-based emissions can be broken down into major consumption items. In 2024, transport accounts for 25% of the consumption-based emissions, food for 23%, followed by housing (20%). Services, both public and commercial, account for 22% of the consumption-based emissions and capital goods for 9%. An inventory by sub-item is detailed below.

It may also be broken down according to the geographical origin of the emissions: in 2024, 50% of GHGs are emitted in France and 50% are associated with imports. In 2023 (the last year for which the detailed geographical origin of emissions is available), 51% of the GHGs in the consumption-based emissions are associated with imports: 13% come from the European Union outside France, 11% from China, 3% from Russia and 3% from the United States. Figure 59 details these data in 2023. Income is also an important determinant of a household's consumption-based emissions. The consumption-based emissions of French households is growing with their income, but at a lower rate than the latter.[218]

In 2022, the average consumption-based emissions of a French citizen are 42% higher than the global average. However, it is **weaker than the majority of its European neighbors and developed countries.** In 2022, the French had an average consumption-based emissions of 9.1 t CO_2e/hab, compared to 13.2 t CO_2e/hab for Germany, 10.7 t CO_2e/hab for the EU, 21.8 t CO_2e/hab for the USA, 12.6 t CO_2e/hab for Russia, or 10.2 t CO_2e/hab for China.

The reduction of the consumption-based emissions at a pace consistent with the ambition of the Paris Agreement must be pursued. The projection of the French consumption-based

[217] *France's carbon footprint from 1990 to 2024, Manuel BAUDE, SDES and Sylvain LARRIEU, Insee, 16/10/2025*

[218] *https://www.tresor.economie.gouv.fr/Articles/2025/01/27/final-report-the-economic-issues-of-transition-to-climate neutrality*

emissions is uncertain, in particular because it depends in part on emissions abroad. Although less manageable than territorial emissions, monitoring and reducing the consumption-based emissions appear necessary, it is in particular an indicator to identify international GHG flows and carbon leakage.

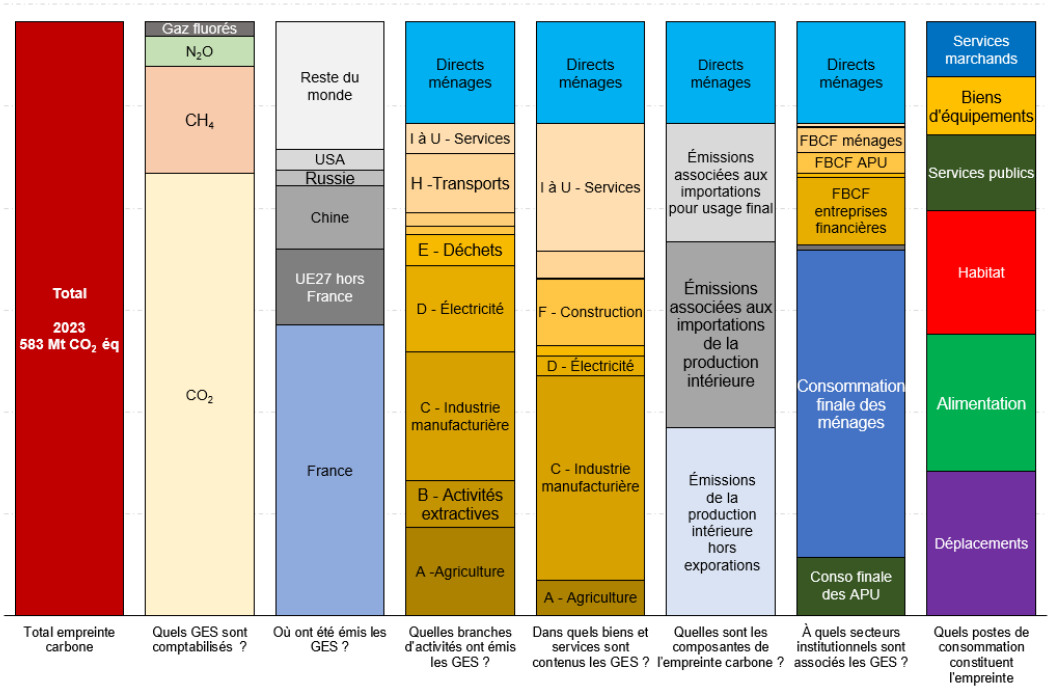


Figure: 65 *Decomposition of the French consumption-based emissions in 2023 according to different representations. INSEE-SDES 2025.*

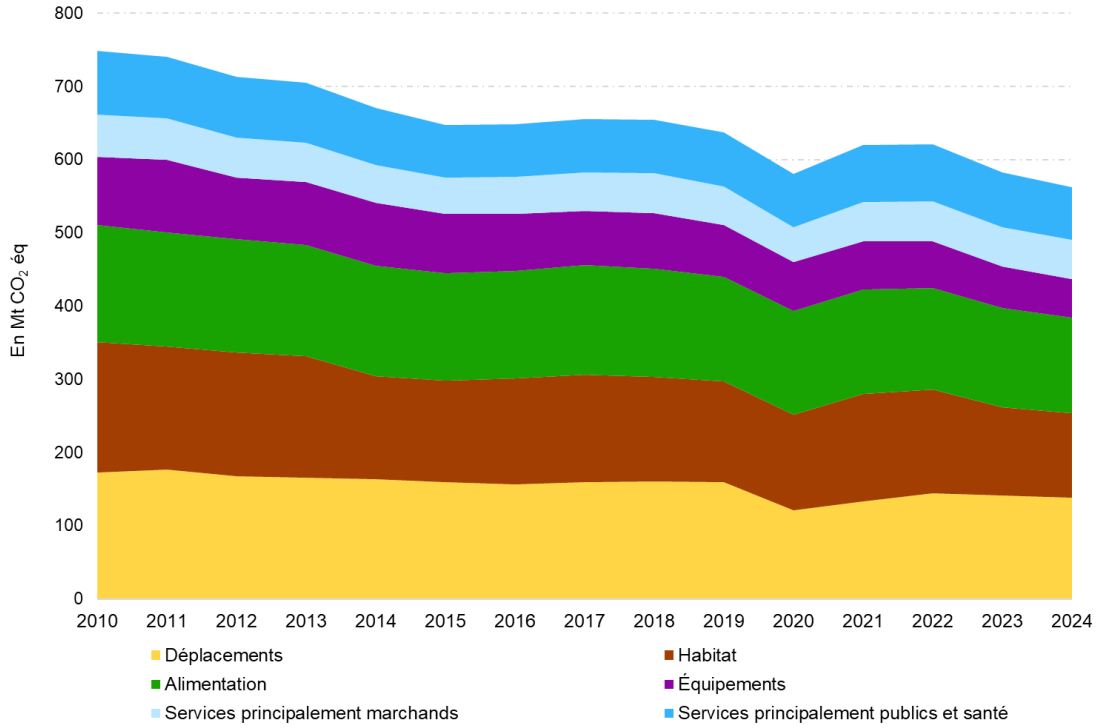


Figure: 66 *Evolution of the consumption-based emissions by consumption items. DGEC processing from INSEE-SDES 2025.*

SNBC 2 did not provide for a quantified consumption-based emissions target. On the other hand, it proposed many guidelines to reduce it. A number of these guidelines have been successfully followed, leading to a reduction in the consumption-based emissions in recent years. In particular, Guideline E-C 2: "Encouraging all economic actors to better control their consumption-based emissions" is consistent with several structuring measures at national and European level: the adoption of the Carbon Border Adjustment Mechanism (CBAM), the Regulation against Deforestation and Forest Degradation (EUDR), the Eco-design Regulation, the Battery Regulation, the generalisation of the inclusion of indirect emissions in greenhouse gas emission balance sheets (Decree No 2022-982 of 1 July 2022 on greenhouse gas emission balance sheets),[219] the generalisation of environmental labelling, the regulation of advertising on certain highly emitting products, and eligibility for certain aid for the purchase of vehicles and certain tax provisions conditional on the achievement of a minimum environmental score by new electric passenger cars.

1- The consumption-based emissions of food – state of play

The perimeter chosen for the consumption-based emissions of the food station includes agricultural goods, seafood, agri-food goods, part of the waste treatment and water supply, sanitation, cooking (gas, electricity) and collective catering (provided by market services or public services).

In 2024, the consumption-based emissions of food in France are estimated at 130 Mt CO_{2e},[220] representing 23% of the total consumption-based emissions of the French. This consumption-based emissions includes domestic agricultural emissions, but also those related to the agri-food industry, transportation, and imported emissions. Since 2010, the consumption-based emissions of food have decreased by 19%, but the share of imported emissions has increased from 42% to 46%.

Agriculture (crops and livestock) and fisheries account for 52% of the food consumption-based emissions. These emissions are embedded in goods produced by the agri-food industry (49% of the consumption-based emissions of food) and catering services (13% of the consumption-based emissions of food). Food waste accounts for around 4.2% of national emissions in 2022. Meat products account for 39% of the consumption-based emissions, beverages 19%, followed by dairy and cheese products with 17% and fruit and vegetables with 10%.[221]

Consumption of seasonal and local products, as well as production methods[222] and the fight against food waste also play a crucial role in reducing the consumption-based emissions. The transport of food, especially by air or refrigerated, significantly increases its consumption-based emissions.

[219] *https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000046006338*
[220] *France's carbon footprint from 1990 to 2024*, Manuel BAUDE, SDES and Sylvain LARRIEU, Insee, 16/10/2025
[221] *Accelerating the climate transition with a low-carbon, resilient and fair food system, HCC, January 2024*
[222] *Such as organic farming.*

In 2023, France imports 20% of its food, with an increase in food imports since 2000. The trade balance (in value terms) of the agri-food sector is in surplus, thanks in particular to exports of wines and spirits. France is self-sufficient for 19 sectors representing 76% of its consumption, but dependent on imports for fruits, vegetables, rice, soybeans, fish and fertilizers. Compared to world producers, **the emission intensity of French agricultural production is relatively low for crop production (wheat, maize) and certain types of livestock (particularly pigs).** [223]

The fight against imported deforestation is a key lever to reduce food-induced emissions, accounting for nearly 27 Mt CO2e per year in 2021. Products such as soybeans, palm oil, cocoa, beef, and coffee contribute to deforestation. The land consumption-based emissions, representing the area needed for the production of imported deforestation-risk raw materials, has been stable since 2012 and accounts for about 3.75 million hectares per year.

2- The consumption-based emissions of transport – state of play

The perimeter chosen for the consumption-based emissions of the transport substation includes the manufacturing and consumption of fuel, the production and maintenance of vehicles, land and air transport services, and emissions related to the construction of infrastructure.

In 2024, the consumption-based emissions of the transport sector in France are estimated at 139 Mt $CO_{2e,}$[224] representing 25% of the total consumption-based emissions. This consumption-based emissions have decreased by 20% since 2010, while domestic emissions have decreased by 18%. Imported emissions account for 37% of the total consumption-based emissions. In 2023, they are mainly from the European Union (10%), China (6%), the USA (3%) and Russia (2%). Direct emissions from vehicle use are highest at 64 Mt CO2e in 2024, followed by emissions from vehicle manufacturing (15%) and fuel production (14%).

French vehicle production is on average less emitting than international production, in particular because of the predominantly decarbonised electricity mix. However, global automotive production increased, but the share of French production fell from 5.7% in 2000 to 1.6% in 2023. France now produces 20% of new vehicles for its consumption, compared to 50% in the 2000s. In 2023, 55% of vehicles registered in France come from the EU, and 45% from China and Asia. 2024 shows an encouraging upward trend with almost 30% market share for French electric vehicles and a drop to 15% for Asian vehicles in the context of the entry into force in 2024 of the minimum environmental score as a condition for eligibility for certain aid for the purchase or rental of vehicles and certain tax provisions (SDES, RSVERO). The consumption-based emissions of vehicles depend on several factors:

[223] *The economic challenges of the transition to climate neutrality, Directorate General of the Treasury, January 2025*
[224] *France's carbon footprint from 1990 to 2024, Manuel BAUDE, SDES and Sylvain LARRIEU, Insee, 16/10/2025*

- **Engine power:** electric passenger cars have a consumption-based emissions up to 5 times lower than their thermal equivalents, the difference being all the more important as the battery is of reasonable capacity and designed with a low-carbon electric mix.
- **Manufacturing conditions:** the production of vehicles in carbon-intensive regions can double the consumption-based emissions of electric vehicles, which nevertheless remains lower than that of thermal vehicles over their lifetime.
- **Vehicle weights increased by** 30% between 1990 and 2019.

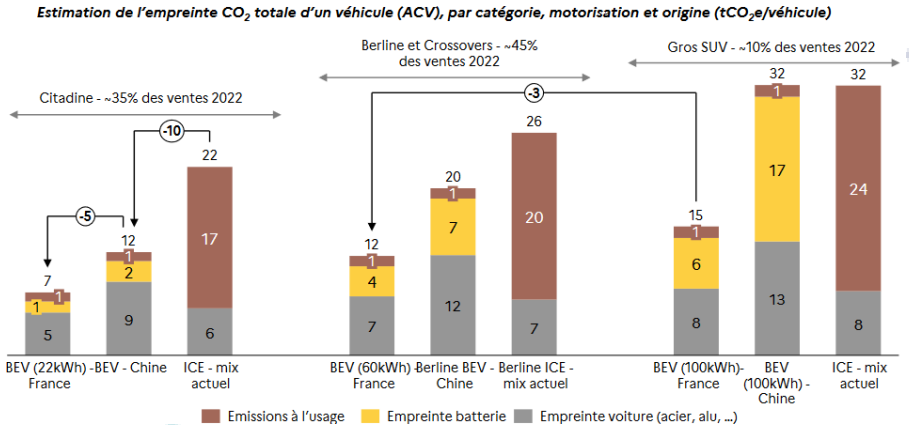


Figure: 67 *Estimation of a vehicle's life cycle consumption-based emissions (life cycle analysis) by engine and origin. BEV: 100% electric vehicle, ECI: Thermal vehicle - SGPE*[225].

3- The consumption-based emissions of housing – state of play

The perimeter chosen for the consumption-based emissions of the housing substation includes household emissions related to heating and cooling of dwellings (electricity, gas, heat, fuel oil), emissions related to construction, electricity consumption, as well as real estate, waste and miscellaneous services.

In 2024, **the consumption-based emissions related to residential housing**[226] **is estimated at 115 Mt CO $_{2e}$**[227] **and represents 20% of the French consumption-based emissions.** It decreased by 35% compared to 2010. Imported emissions account for 46% of the consumption-based emissions in 2024 and have increased since 2010 (when they accounted for 38%). The consumption-based emissions of the habitat are considered on a different and broader perimeter than in the territorial, production-centric approach, integrating the entire value chain of the building into the accounting.

[225] *https://www.info.gouv.fr/upload/media/content/0001/11/950c6a0584df9ede5949a0d6e5a1252159d20bc3.pdf*
[226] *The tertiary sector is incorporated into the service sectors.*
[227] *France's carbon footprint from 1990 to 2024, Manuel BAUDE, SDES and Sylvain LARRIEU, Insee, 16/10/2025*

According to the roadmap for decarbonising the building value chain (considered on a slightly wider perimeter than the SDES-INSEE perimeter by integrating the tertiary sector), the consumption-based emissions of the building's life cycle value chain results from several items:

- Direct emissions, related to energy consumption by households and businesses (49% of the consumption-based emissions) and fluorinated gases (5% of the total), which account for 54% of the consumption-based emissions (scope 1);
- Indirect emissions, with emissions related to the production of energy used by buildings (such as electricity production) accounting for 13% of the consumption-based emissions (scope 2), **as well as those related to the manufacturing of products, materials and components of buildings (scope 3) accounting for 33% of the consumption-based emissions and are imported at almost 60%.** New construction accounts for almost 80% of the consumption-based emissions of construction products, in particular with the high consumption of carbon-intensive and mostly imported materials.

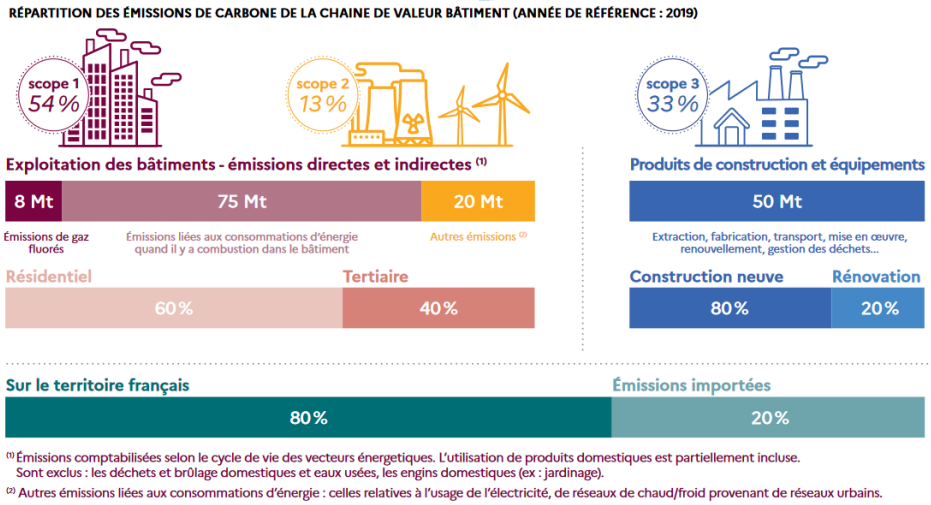


Figure: 68 *Decomposition of the consumption-based emissions of the building value chain in 2019 – Roadmap for the decarbonisation of the building value chain228.*

4- The consumption-based emissions of capital goods – State of play

The perimeter chosen for the consumption-based emissions of the equipment item includes the various objects, appliances, textiles, tools, digital equipment and furniture purchased by households.

In 2024, the consumption-based emissions of capital goods in France are estimated at 53 Mt $CO_{2e,}$[229] representing 9% of the total consumption-based emissions. This consumption-based emissions have decreased by 42% since 2010. Imported emissions account for the highest

[228] *https://www.ecologie.gouv.fr/sites/default/files/documents/8-3-Carbon footprint.pdf*
[229] *France's carbon footprint from 1990 to 2024, Manuel BAUDE, SDES and Sylvain LARRIEU, Insee, 16/10/2025*

share, with almost 80% of emissions, and this proportion has been relatively stable since 2010. Although French production "made in France" remains important, the production of manufacturing goods has fallen from 82% to 38% since 1965, explaining the high share of imported emissions.

The consumption-based emissions of capital goods come mainly from textile goods (21%), computer and electronic goods (12%), electrical goods (10%), chemical goods (plastics, paints, cleaning products, etc.) (10%) but also furniture, toys or sports goods. Some goods are particularly dependent on imports, such as textiles (87% of imported emissions) and computer equipment (91% of imported emissions). Conversely, the French luxury industry is mainly based on exports.

The production of capital goods reflects the lengthening of global value chains, with Chinese production serving French final demand, which has increased since 1965 to 7.3%. For capital goods, in 2023, 27% of the French consumption-based emissions comes from China, compared to 15% from the European Union.

The French express a growing criticism of mass consumerist logics. 77% of French people think that too much importance is given to material consumption, and 72% think that their way of consuming is harmful to the environment. 83% of French people find advertising too present and 77% believe it leads to excessive consumption.[230]

The textile sector, the main contributor to the sector's consumption-based emissions, illustrates the challenges of sustainable consumption. Only 19% of French people consider that their consumption of clothing exceeds their needs, whereas the French largely underestimate the volume of their purchases of clothing.[231] Nearly 48 pieces per year per person are placed on the market in 2023 and 93% of the textiles consumed in France are imported. 60% of clothes are worn less than 10 times before being forgotten or thrown away and less than 30% of the wardrobe is actually used. Consumption incentives are growing, with advertising spending in the sector having increased by 81% in 10 years, and 65% of purchases being influenced by promotions and social networks.[232] Economic actors and public authorities have a crucial role to play in steering consumption towards more sustainable practices.

5- The consumption-based emissions of services – state of play

The scope chosen for the consumption-based emissions of public services includes various services for the benefit of households with a public service dimension: health, education, public administration and defence, social protection services. Associated emissions are related to building construction and heating, electricity consumption, staff business travel and the purchase of supplies.

[230] *https://librairie.ademe.fr/société-et-politiques-publiques/8688-barometre-sobrietes-et-modes-de-vie-2-eme-vague.html*
[231] *Ibid*
[232] *https://www.info.gouv.fr/upload/media/content/0001/13/e829083bb3bb2de1ee4828057ed12a4cae223598.pdf*

The scope of the consumption-based emissions of market services includes research and development, media, sports activities and events, financial activities, hospitality and miscellaneous services. Emissions are related to energy consumption, land and air travel, as well as products and raw materials acquired for the operation of services.

In 2024, the consumption-based emissions of services is estimated at 126 Mt CO_{2e}[233] and represents 22% of the total French consumption-based emissions. The consumption-based emissions of mainly market services is estimated at 53 Mt CO_{2e} and that of mainly public and health services at 73 Mt $CO_{2e.}$ The total services consumption-based emissions decreased by 13% compared to 2010, a decrease mostly driven by public services. The market services consumption-based emissions are imported at almost 68%, compared to 55% for public services, a share that has increased since 2010 (61% and 53% respectively). In 2023, the majority of these imported emissions came from the European Union (24%), but also from China (23%), the United States (7%) and Russia (5%).

The consumption-based emissions of services consist mainly of emissions associated with the use of tertiary buildings (heating, cooking, … domestic hot water) and their construction, emissions related to the movement of fleets of service-specific vehicles (company fleets, … health vehicles) as well as capital goods necessary for the operation of services.

Emissions come from health services (hospitals, socio-medical institutions, retirement homes, 33%), public administration and defence services (vehicles, building operations, equipment purchases, 25%), market services (24%), educational institutions (13%), road construction and public buildings (11%).

[233] *France's carbon footprint from 1990 to 2024, Manuel BAUDE, SDES and Sylvain LARRIEU, Insee, 16/10/2025*

2. Strategy

a. Cross-cutting reduction levers

Reducing the consumption-based emissions depends on the carbon intensity of our imports and therefore on the decarbonisation of France's trading partners in the long term [234] **and on our economy's ability to reduce carbon imports by relocating** certain value chains and remaining competitive. The **reduction of territorial emissions (representing about half of the current consumption-based emissions) remains in any case unavoidable:** it is only through parallel action on our imported and domestic emissions (and therefore our exported emissions) that we will be able to meet the commitments of the Paris Agreement while limiting carbon leakage.

France's **consumption-based emissions reduction levers,** a number of which are at European level, have been developed with the support of the decarbonisation roadmaps of the most emitting sectors.[235] They shall relate in particular to:

- **The reduction of French domestic emissions in line with national carbon budgets, with a reduction in gross GHG emissions of around 50% in 2030 compared to 1990 and the achievement of climate neutrality in 2050.** The guidelines and measures to achieve these targets are dealt with in the relevant sectoral parts. SNBC also makes it possible to reduce emissions exported from France;
- **Regulatory or incentive measures at national and European level,** such as the strengthening of the Carbon Border Adjustment Mechanism (CBAM), the introduction and proper implementation of binding environmental and climate commitments in trade agreements, the introduction of tariff conditionalities to make the opening of the EU market conditional on proper compliance with environmental standards, the implementation of mirror measures to apply our environmental regulations to imports, and the facilitation of trade in green goods and services, will reduce the international trade consumption-based emissions;[236]
- **Supporting the decarbonisation of our trading partners**[237]. While our main partners have made carbon or climate neutrality commitments in various timeframes, tracking their trajectories will be key to achieving our targets. France, like other developed countries, will

[234] *The carbon intensity of imported goods depends on the carbon intensity of production processes.*
[235] *Notably the decarbonisation roadmap for the automotive sector, the decarbonisation roadmap for the building sector, the decarbonisation roadmaps for industry and the decarbonisation roadmap for the digital sector.*
[236] *Greenhouse gas emissions from international trade are estimated to account for between a quarter and a third of total global emissions.*
[237] *In 2023, 75% of French imported emissions came from trading partners outside the European Union. France's carbon footprint from 1990 to 2024, Manuel BAUDE, SDES and Sylvain LARRIEU, Insee, 16/10/2025*

continue to provide public funding to support developing countries in their implementation of the Paris Agreement;[238]

- Changing lifestyles and consumption patterns. **Citizens can take an active part in reducing the French consumption-based emissions** [239] (subjects developed in the Supplements section - I.D. 'Citizens' involvement'). At the individual level, by favouring climate-friendly **lifestyles and consumption, citizens can be key players in the low-carbon transition, acting directly on emissions (sufficiency of purchase, sufficiency** of use, change in food practices, consumption patterns of goods and services, mobility, housing patterns, etc.) or **by favouring products and services from responsible companies, and green investments for their savings, in order to steer production methods, imports and financing towards** solutions favourable to reducing the consumption-based emissions (in particular by favouring eco-responsible purchases and green investments for their savings). These actions will not be carried out without collective action by the State, businesses and local authorities to develop a framework conducive to the transition and, in particular, a more circular economy;
- **Reducing imported deforestation:** if the indicative consumption-based emissions budgets are currently defined on a gross consumption-based emissions perimeter (excluding emissions linked to the use of land and forests abroad), it **will ultimately reduce our net consumption-based emissions;**
- **The adoption of an approach through services,** which influence demand levels and the final consumption-based emissions. A strategy by consumption-based emissions sub-item (food, housing, transport, capital goods, services) is presented below.
- **Green reindustrialisation** taking advantage of our low-carbon electricity mix and ambitious green industry schemes at national and European level. Indeed, **the carbon intensity of French industry is better on average than that of the rest of the world, in particular thanks to its low-carbon electricity.**[240] Green reindustrialisation, by increasing the weight of French industry on global manufacturing goods markets, must also contribute to reducing global GHG emissions.[241] The impact of reindustrialisation on the consumption-based emissions depends on the sectors, given the difference in French emission intensity relative to

[238] *In 2023, France financed €7.2 billion in loans, grants, participations or guarantees for climate action, ranking among the most mobilised countries. https://www.tresor.economie.gouv.fr/Articles/2024/11/19/la-finance-climat-publique-francaise-à-les-pays-en-developpement-etat-des-places-et-enjeeux*

[239] *By constructing the carbon footprint, the allocation of emissions is allocated to final consumers, without them having all the levers to reduce it.*

[240] *By way of illustration, a billion euros of value added in manufacturing would emit 530 kt* CO_2e if produced in France compared to 1270 kt CO_2e on average in the rest of the world. https://www.tresor.economie.gouv.fr/Articles/2025/01/27/final-report-les-enjeeux-economiques-de-la-transition-à-la-neutralité-carbone

[241] *The reindustrialisation of France and the reduction in French imports do not necessarily coincide, particularly if reindustrialisation is export-oriented, B. Alvarez, C. Gallezot, C. Hida, G. Mouilleseaux (2025) 'Teachings of past industrial policies', Trésor eco*

abroad,[242] and the complexity of supply chains.[243] The impact would be particularly positive in the manufacturing industry.[244] With regard to the specific issue of relocations, their economic cost for businesses and consumers must be weighed against the challenges of sovereignty and resilience, as well as the cost of reducing emissions from supply chains and productions located abroad, based on mechanisms such as the CBAM, which aims to prevent carbon leakage.

b. Reduction levers by consumption sub-items

France's consumption-based emissions reduction levers are also broken down by consumption sub-items[245] (detailed strategy by sector in the annex):

- **Reducing the consumption-based emissions of the French food system** involves transforming the agricultural system to reduce production-related emissions, promoting sustainable, quality products, including local ones, and reducing food waste, limiting the consumption of carbon-intensive products,[246] mirroring EU regulations to imports, in order to combat environmental and health leakage and imported deforestation, decarbonising the distribution and catering sectors, and bringing value chains closer together to promote local consumption and processing.
- **Reducing the consumption-based emissions of transport** involves reducing direct emissions from the use of vehicles and the consumption-based emissions associated with their manubill, which is mostly imported, by decarbonising electricity production and industrial processes, reducing the weight of vehicles, increasing the rate of recycled raw materials and ecodesign, relocating certain components of the value chain (such as battery manufacturing), and extending the lifespan of vehicles and thus their reparability potential.
- **Reducing the consumption-based emissions of housing** involves reducing direct emissions from buildings through the decarbonisation of heating vectors, energy renovation and energy sufficiency, reducing emissions from construction/renovation, using low-carbon materials, optimising the sustainability of buildings, promoting the reuse and recycling of components and implementing the net zero artificialisation target.
- **Reducing the consumption-based emissions of capital goods** requires the transition to a circular economy and measures to limit the overconsumption of certain goods, such as the development of pooling and the functional economy, the promotion of sustainable products through ecodesign and repair, sustainable communication and consumer information, and the relocation of certain productions.
- **Reducing the consumption-based emissions of services** (merchants and public) involves decarbonising energy consumption in the tertiary sector, decarbonising transport and

[242] *The impact would be particularly positive for the manufacturing industry, the textile sector or the construction and services sector (https://www.insee.fr/en/statistics/7702892#tableau-figure8_radio1)*
[243] *Goods produced in France indirectly incorporate, via their components, imported emissions (~25% today).*
[244] *https://www.insee.fr/fr/statistiques/7702892#tableau-figure8_radio1*
[245] *The annual SDES and INSEE estimates disaggregate the footprint into 6 consumption items.*
[246] *Such as soy for animal feed, coffee or cocoa.*

construction, and promoting energy and building sufficiency. Public services will also contribute by respecting the State's decarbonisation trajectory (see Supplements – SPE 1 guidance) and leveraging public procurement. Analyses, which will be refined by SNBC 4, may be proposed following the publication of SNBC 3 for specific services such as health, tourism, culture or sport, which influence the demand of other sectors.

c. Indicative targets in terms of consumption-based emissions and results of the projections:

By 2030, modelling carried out on the SNBC3 reference scenario using the MatMat model[247] shows that France's consumption-based emissions could reach between **426 and 464 Mt CO_{2e}, a reduction of 38-43% compared to 2010 and between 145 and 191 Mt CO_{2e}, a reduction of 74%-81% in 2050.** The range materialises the influence of the decarbonisation of the rest of the world with global scenarios of 1.5 °C to 2 °C. These results are used to set the indicative carbon budgets of SNBC3. Delays in international decarbonisation could deviate the trajectory from this crossing point.

In 2050, **France sets an indicative target of reaching a consumption-based emissions of between 160 and 215 Mt CO2e, i.e. a reduction of -71% to -79% compared to 2010** (see Chapter II.B.7). The upper range corresponds to a target not to exceed an increase in global warming to +2 °C under the IPCC scenarios. The low range corresponds to the target proposed by the High Council for Climate to limit global warming to +1.5 °C. Returned per capita, the average consumption-based emissions of a French citizen could therefore reach between 2.3 and 3.1 t CO_2e/hab. An unfavourable international context (slow decarbonisation of the main trading partners leading to global warming around +3 °C in 2100) could complicate the achievement of this target, involving, inter alia, taking trade policy measures to green France's supply chains and imports.[248] Additional measures may be considered and adopted in the coming years to ensure that this target is achieved. In 2050, the share of imported emissions could remain high (between 51% and 63%), despite a lower share of imported products, reflecting a faster decarbonisation of France, especially since our imports mainly concern products with high carbon content whose production is low in the territory (e.g. non-ferrous metallurgy).

[247] *The MatMat model is developed and piloted by ADEME. https://hal.science/hal-04672116v1*

[248] *Such as the minimum environmental score for new electric passenger cars, which determines eligibility for certain aid for the purchase of low-polluting vehicles and certain tax provisions, and which since 2024 has incorporated carbon footprint criteria linked to the production and transport of vehicles.*

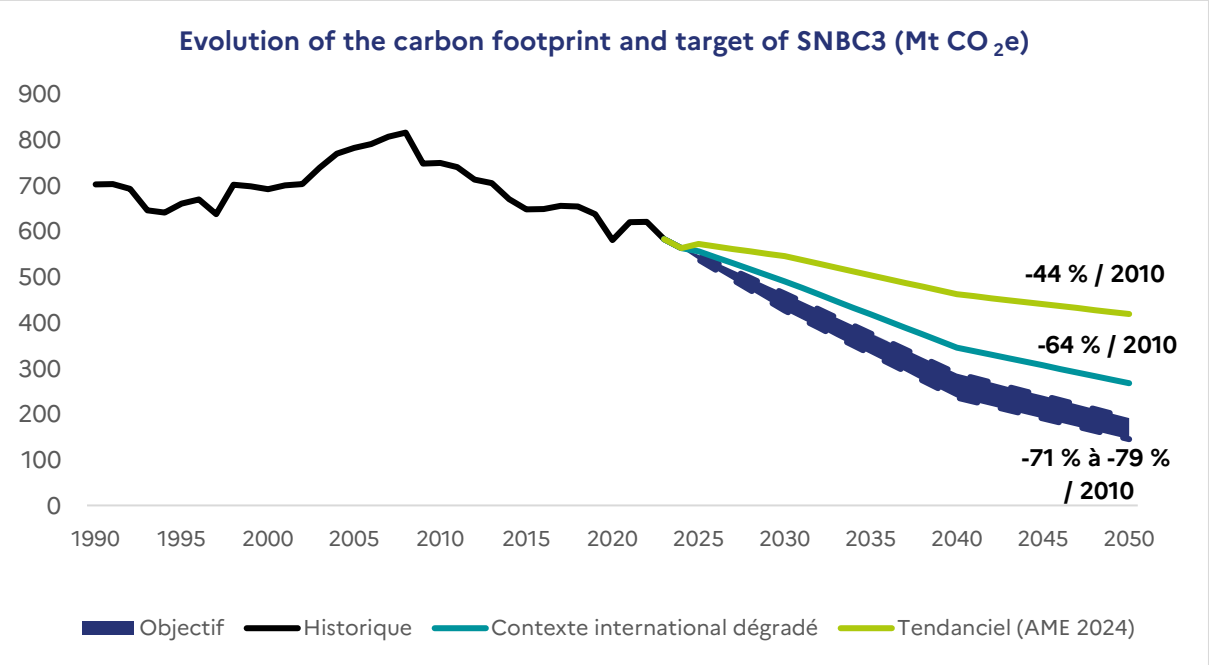


Figure: 69 *Evolution of the consumption-based emissions in the trend scenario and in the 'Target' scenario corresponding to two global scenarios 1.5 °C (the IEA Net Zero scenario) and close to 2 °C (the IEA Announced Pledges Scenario). The trend scenario corresponds to a scenario with current policies (national and global).*

d. Projections by consumption sub-items

By 2030, modelling carried out on the SNBC3 scenario shows that the consumption-based emissions of food could reach between **110 Mt CO_{2e} and 117 Mt CO_{2e}** (a reduction of 28% to 31% compared to 2010), the consumption-based emissions of housing **between 76 Mt CO_{2e} and 82 Mt CO_{2e}** (a reduction of 54% to 57% compared to 2010), that of transport **between 113 Mt CO_{2e} and 120 Mt CO_{2e}** (a reduction of 30% to 35% compared to 2010), that of capital goods between **45 Mt CO_{2e} and 52 Mt CO_{2e}** (a reduction of 43% to 51% compared to 2010), and that of services between **82 Mt CO_{2e} and 93 Mt CO_{2e}** (a reduction of 36% to 43% compared to 2010).

By 2050, modelling carried out on the SNBC3 scenario shows that the consumption-based emissions of food could reach between **69 Mt CO_{2e} and 77 Mt CO_{2e}** (a reduction of 52% to 57% compared to 2010), the consumption-based emissions of habitat **between 13 Mt CO_{2e} and 18 Mt CO_{2e}** (a reduction of 90% to 93% compared to 2010), that of transport **between 13 Mt CO_{2e} and 24 Mt CO_{2e}** (a reduction of 86% to 92% compared to 2010), that of capital goods between **15 Mt CO_{2e} and 23 Mt CO_{2e}** (a reduction of 75% to 84% compared to 2010). And that of services between **34 Mt CO_{2e} and 50 Mt CO_{2e}** (a reduction of 66% to 77% compared to 2010).

In 2030, the distribution per consumption item would remain close to the situation in 2023, with travel occupying 26% of the consumption-based emissions, food between 25% and 26%, housing 18%, equipment 11% and services 19% to 20%. In 2050, food would account for between 40% and 48% of the consumption-based emissions, followed by services between 24% and 26%, equipment between 10% and 12%, housing 9%, and travel between 9% and 12%.

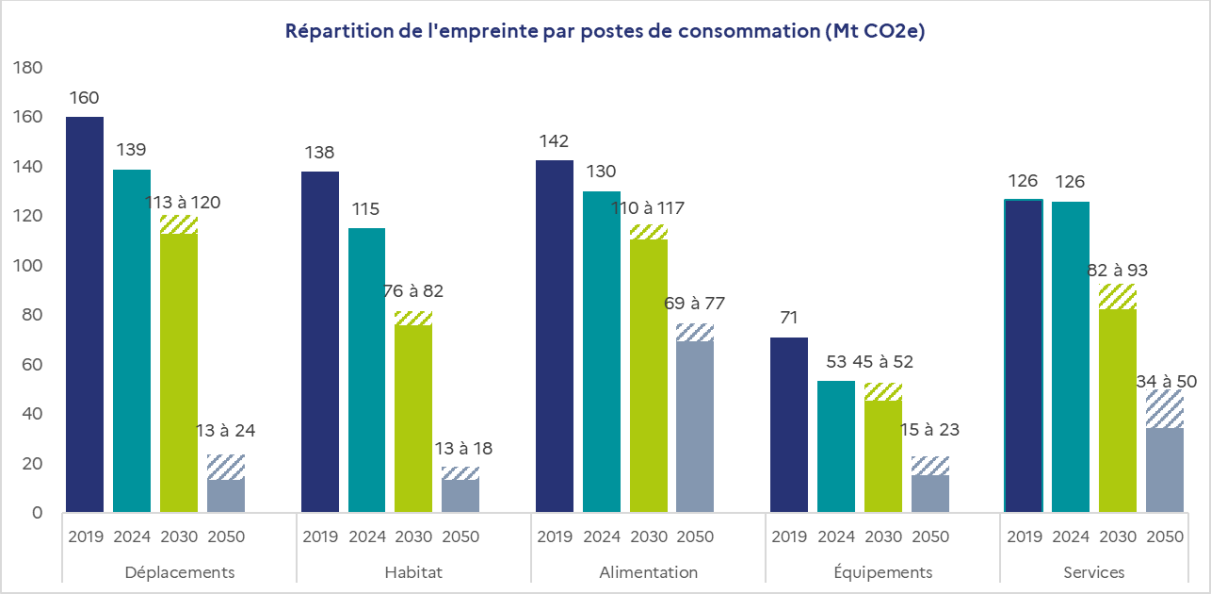


Figure: 70 *Distribution of the consumption-based emissions by major consumption items in 2019, 2024, 2030 and 2050. Consumption items follow the distribution key used by SDES and INSEE for the annual consumption-based emissions assessment.*[249]

The share of imported emissions in all consumption sub-items changes over time. In several sectors, the share of imported emissions is increasing, reflecting a faster decarbonization of our uses on the national territory. They could reach between 39% and 43% in 2030 and between 66% and 81% in 2050 (37% in 2024) in transport, between 41% and 45% in 2030 and between 43% and 53% in 2050 (46% in 2024) in the housing sector, between 42% and 45% in 2030 and between 40% and 46% in the food sector (46% in 2024), between 81% and 84% in 2030 and between 73% and 82% in 2050 (80% in 2024) for capital goods, and between 59% and 66% in 2030 and between 59% and 72% in 2050 (61% in 2024) in services.

[249] *Due to different methodologies between the forward-looking model and the retrospective model, differences exist, requiring the application of a statistical correction.*

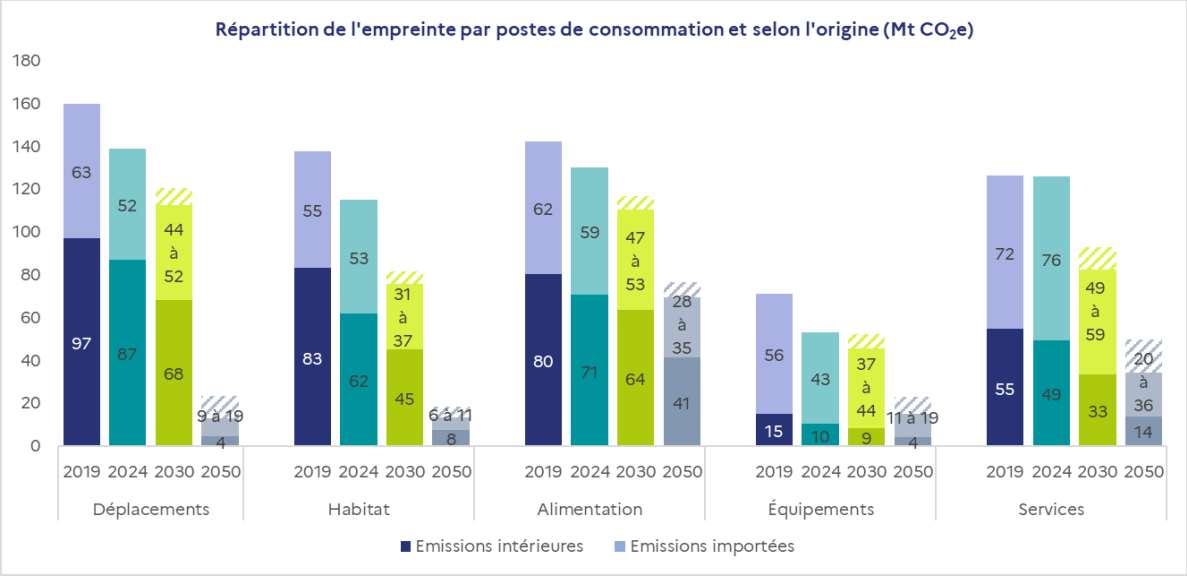


Figure: 71 *Distribution of the consumption-based emissions by major consumption items in 2019, 2024, 2030 and 2050 with a distinction by origin (domestic emissions and imported emissions). The hatched portion represents additional imported emissions in a "2°C" scenario compared to a "1.5°C" scenario.*

The modelling results make it possible to estimate indicative budgets in imprint by consumption items,[250] rounded to the nearest million tons of CO_2 and presented in the form of ranges representing sensitivity to the international context:

Average annual consumption-based emissions (in Mt CO_{2e})	Reference years			3rd carbon budget (2024 - 2028)	4th carbon budget (2029-2033)	5th carbon budget (2034-2038)
	2010	2019	2024	SNBC3	SNBC3	SNBC3
Transport	172	160	139	[129, 132]	[105, 113]	[73, 83]
Of which imported emissions	67	63	52	[50, 53]	[41, 49]	[29, 39]
Habitat	178	138	115	[102, 104]	[72, 78]	[50, 56]
Of which imported emissions	68	55	53	[46, 48]	[29, 35]	[19, 25]

[250] *Consumption items are similar to the SDES-INSEE publication, allowing them to be monitored over time. However, the breakdown into consumption items can vary considerably depending on the publications or the allocation choices considered. These allocations could be revised in the future, which could lead to relatively significant changes in carbon budgets.*

Alimentation	161	142	130	[124, 127]	[108, 114]	[94, 102]
Of which imported emissions	68	62	59	[56, 58]	[45, 52]	[38, 46]
Capital goods	92	71	53	[52, 54]	[43, 50]	[33, 41]
Of which imported emissions	71	56	43	[41, 44]	[35, 42]	[26, 34]
Services	145	126	126	[110, 114]	[80, 91]	[63, 77]
Of which imported emissions	82	72	76	[66, 70]	[47, 58]	[36, 50]

Table: 11 *Distribution of the 3rd, 4th and 5th indicative carbon budgets in SNBC 3 consumption-based emissions by consumption items.*

e. Follow-up of the strategy

The evolution of the consumption-based emissions and indicative carbon budgets can be monitored thanks to the annual estimates of the French consumption-based emissions of SDES and INSEE.[251] As the calculation methodology is constantly evolving, recalibrations may be necessary to ensure perfect compatibility between the methods. Moreover, the estimation of the consumption-based emissions is more uncertain than the estimation of territorial emissions and is not framed internationally. Additional analyses by SNBC 4 may update parts of the strategy in line with methodological developments and available data.[252]

[251] *A forthcoming publication by SDES, INSEE and ADEME will clarify the differences in methodologies used in several footprint models.*

[252] *For example, the level of the footprint was revised upwards over the entire historical series in the 2024 edition compared to the 2023 edition (deviations of 4% to 19% depending on the year). The change in the economic database (national accounts for French information and international Figaro input-output tables for global information replacing the French and EU input-output tables) explains between 38% and 89% of the revisions of results (excluding direct household emissions) between 2023 and 2024.*

f. Main targets related to the reduction of the French consumption-based emissions

Indicative consumption-based emissions target	Reduce the consumption-based emissions from -71% to -79% in 2050 compared to 2010 (i.e. between 160 Mt CO_{2e} and 215 Mt CO_{2e}, or reduced per capita, between 2.3 t CO_{2e}/hab and 3.1 t CO_{2e}/hab) **Of which indicative passage points:** *Power supply: between 69 Mt CO_{2e} and 77 Mt CO_{2e} in 2050* *Housing: between 13 Mt CO_{2e} and 18 Mt CO_{2e} in 2050* *Transport: between 13 Mt CO_{2e} and 24 Mt CO_{2e} in 2050* *Capital goods: between 15 Mt CO_{2e} and 23 Mt CO_{2e} in 2050* *Services: between 34 Mt CO_{2e} and 50 Mt CO_{2e} in 2050*
Indicative carbon budgets	2024 – 2028: Between 516 and 531 Mt CO_{2e} 2029 – 2033: Between 408 and 446 Mt CO_{2e} 2034 – 2038: Between 312 and 358 Mt CO_{2e}

Sensitivity **test: Reducing the consumption-based emissions is sensitive to the decarbonisation of the rest of the world, which may require additional action if decarbonisation is too slow**

- The evolution of the French consumption-based emissions is sensitive to the decarbonisation of our trading partners (see **Figure 63**). The carbon intensity of our imports depends on their production processes, energy mixes and global value chains. Thus, the pace of decarbonisation of the rest of the world has a direct influence on the French consumption-based emissions. In the consumption-based emissions assessment of the SNBC Reference Case, three contrasting global scenarios are used to modulate the carbon intensity of our imports. These scenarios are based on the IEA energy transition scenarios (STEPS, APS and NZE, WEO 2022), allowing for a global average warming between 2 °C to 3 °C (STEPS), 2 °C (APS) and 1.5 °C (NZE) by 2100.
- In 2050, the consumption-based emissions of the STEPS "Current Policies" scenario reaches 267 Mt CO2e with a significant share of imported emissions due to the achievement of the targets on the national territory (73%). The consumption-based emissions are therefore slightly more than 50 Mt CO_{2e} above the upper bound of the lens (215 Mt CO_{2e}). If the world does not deviate from this trend trajectory, the imprinted target cannot be achieved without leveraging additional (unmodelled) levers on our development aid policies, trade or consumption of imported goods. **These additional levers remain to be studied in detail.** They may concern:
  - Accelerating support for the decarbonisation of the rest of the world and our trading partners to reduce our consumption-based emissions and increase global climate ambition;

- Incentives for companies to green their supply chains. By way of example, and with unchanged consumption, a reallocation of all our imports to the least carbon-intensive importer in a very maximalist view would make it possible to reduce the consumption-based emissions in the 'Current policies' scenario from 90 to 130 Mt CO2e, and thus to achieve the target;
- Measures to redirect consumer goods towards more durable, better quality, locally produced goods would reduce the consumption-based emissions of the 'Current Policies' scenario by 30 to 90 Mt CO2e.

g. Key orientations for implementing this scenario

1- Reducing domestic emissions

- **Consumption-based emissions orientation: 1 Reducing direct domestic emissions**

The reduction in French domestic emissions in line with national carbon budgets, which is essential for reducing the consumption-based emissions, is detailed in the other chapters of the SNBC (see in particular Chapter III for sectoral emission reductions).

2- Reducing the French consumption-based emissions

- **Consumption-based emissions orientation: 2 Encouraging responsible consumption and reducing overconsumption of certain capital goods**

To reduce the environmental impact of the ultra-ephemeral textile industry, **the Government will support the introduction of an ecological malus, the calculation of which will depend on all or part of the score resulting from the environmental display of clothing sold in France.** This will make it possible to take account of the sustainability of industrial and commercial practices in the textile sector. Eco-modulation criteria on environmental impact and consumption-based emissions can gradually be extended to other products than textiles.

Sustainable public procurement is an essential lever to promote sustainable consumption. The anti-waste law for a circular economy (AGEC) requires the State, local authorities and their groups to acquire a share of their assets resulting from re-use and re-use (progressive annual percentages up to 2030). This obligation applies to 17 product categories: textiles, IT products and telephony, printing equipment, office furniture, street furniture, vehicles, transport equipment, large household appliances, etc. Buyers can also value their free purchases of donated goods.

It will be essential to involve the players in the distribution chain and ensure that the offer of eco-responsible products remains accessible to the consumer. A reflection may be initiated to encourage major manufacturers, major brands and online sites to integrate a section dedicated to the rental of property, repair and refurbished / second hand products.

- **Consumption-based emissions orientation: 3 Reduce imported emissions related to the French diet, while improving nutritional quality**

Dietary changes towards the diversification of protein sources will be accompanied in coherence with the National Strategy for Food, Nutrition and Climate (SNANC), with guidelines for an increase in the consumption of fruits, vegetables, legumes, nuts and whole grains and a limitation of the consumption of meats and charcuterie, especially imported. Consumption of sustainable, high-quality products will be encouraged (see Part III. Agri Guidance. Diets 1 and 2).

Food environments are also an essential lever. Large retailers, which market nearly 65% of food products in France,[253] are an important determinant of consumer choices. Various levers are at its disposal to encourage the consumption of durable goods: the targeting of marketing and promotional policies towards sustainable products, the geographical location of sites to get closer to places of consumption, the promotion of certain products rather than others on the shelves, or the evolution of its commercial policy (via margin levels or the rapprochement with local producers). The sector will be encouraged by various levers in this context, through the deployment of voluntary environmental signage supervised after a concerted development phase (see Part-Complements - I.D. 'Involvement of citizens'), measures to regulate advertising on the most emitting products (see Part-Complements - I.D. 'Involvement of citizens'), and transparency on the rates of sustainable and quality products in purchases. Out-of-home **catering, particularly collective catering,**[254] **is an important lever for influencing consumption by influencing food supply** (see Part III. Agri Guidance. Diets 2). **The development of bulk will be promoted** in order to achieve the target of 20% of large and medium-sized areas dedicated to bulk laid down in the anti-waste law for a circular economy, which also supports other environmental targets (in particular the reduction of plastic consumption).

- **Consumption-based emissions orientation: 4 Developing mutualisation and the functional economy**

The State will aim to support pooling approaches by removing existing constraints as much as possible. Sharing arrangements can be implemented in co-ownerships, local associations, online sharing platforms, works councils, or tool libraries. At company level, cooperatives for the use of agricultural equipment (CUMA) are an example in this area, with more than 255 000 equipment in operation. The sharing of machinery allows farmers to optimise their use and reduce the total number of equipment needed and thus the consumption-based emissions linked to their production. In the housing sector, the development of the functional economy of replacing the sale of a good with the sale of use will be supported.

- **Consumption-based emissions orientation: 5 Creating the conditions to encourage citizens to better control their consumption-based emissions**

The State will ensure the availability of supply and infrastructure and encourage changes in socio-cultural standards to enable every citizen to make a commitment to keeping his or her consumption-based emissions within the limits of his or her capabilities. The State will take particular care to provide citizens with tools to assist them in reducing their consumption-based emissions (see Supplements – Citizens' Guidelines 3, 4, 5 and 8).

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[253] *https://www.hautconseilclimat.fr/publications/accelerer-la-transition-climatique-avec-un-system-alimentaire-bas-carbone-resilient-et-juste/*

[254] *The legislative and regulatory framework introduced by the EGalim law and supplemented by the "Climate and Resilience" law provides for provisions relating to sustainable and quality supplies, the diversification of protein sources or the fight against food waste.*

With this in mind, specific work will be undertaken to promote the French consumption-based emissions trajectory in the tools for calculating the individual consumption-based emissions[255] and more particularly in Nos Gestes Climat.

Focus: Integrate SNBC 3 targets into consumption-based emissions calculation tools

The consumption-based emissions calculation tools make it possible to estimate the individual consumption-based emissions based on questions about lifestyle habits (consumption, leisure, heating, etc.). Work is ongoing to integrate a forward-looking dimension into the Notre Gestes Climat individual consumption-based emissions calculation tool by integrating an image of the SNBC 3 trajectory on the individual consumption-based emissions at different deadlines, in order to facilitate the projection of citizens in reducing their consumption-based emissions and the levers at their disposal.

The State will also continue to promote sustainable communication by investing in awareness-raising campaigns to encourage transition dynamics, sufficiency and the circular economy (see Complements section - Citizens orientation 4), as well as by improving the framework for advertising, for example for ultra-ephemeral fashion.

- **Consumption-based emissions orientation: 6 Encouraging all economic actors to better control the carbon content of their value chain**

Economic operators **have many levers to reduce their consumption-based emissions, both in terms of supply,** by monitoring and planning the reduction of their consumption-based emissions through diagnostic and reporting tools with the inclusion of scope 3 in the transition plans and required by the CSRD, optimising the use of resources, promoting the circular economy (longer life and use, reparability, combating planned obsolescence, etc.) and choosing suppliers engaged in sustainable approaches, **but also in terms of demand and the transformation of their business models** by promoting the purchase of eco-designed, reconditioned products, dimensional sufficiency (good sizing of equipment in relation to their conditions of use) or adopting a responsible marketing approach. Companies and industries will also continue to be encouraged to develop action plans to reduce their emissions across their supply chains. Evaluation tools may be made available to support manufacturers, distributors and service providers and help them improve their offer. More specific guidance can be found in the Enterprise section.

[255] *Continuing the work carried out by the Association for the Low-Carbon Transition: https://abc-transitionbascarbone.fr/wp-content/uploads/2024/04/Report-Carbon Footprint-personal _vDef-1.pdf*

3- Moving from a linear to a circular economy

Consumption-based emissions orientation: 7 Strengthening ecodesign and producing more sustainable goods

In order to reduce the carbon and material consumption-based emissions of capital goods throughout their life cycle and ensure that products placed on the market meet high sustainability criteria, **France supports companies in their eco-design approaches** through research and development funding programmes and grants (mainly managed by ADEME), as well as through the eco-design diagnosis for SMEs developed by ADEME and proposed by BPIFrance. The Ecodesign for Sustainable Products Regulation (ESPR) aims to reduce the environmental impact of products and services by imposing sustainability and transparency requirements throughout their life cycle on several product categories. A digital product passport will link information on the sustainability, origin and composition of each product placed on the market.

The State will continue to play a leading role **with the extension of ecodesign criteria in public procurement.** [256] Awareness and training of businesses and consumers on ecodesign principles will be stepped up to foster increased demand for sustainable products. In order to support consumer information on the sustainability of products and encourage ecodesign, the sustainability index has gradually replaced the reparability index since 2025.[257] **It will be a powerful tool to combat product obsolescence and extend the life of equipment.** The reparability and durability indices will gradually be extended to other products, including small appliances and soft mobilities. The services of the State, local and regional authorities and their groupings must take the repairability index into account when purchasing digital products that have them.[258] Another challenge will be to make consumption-based emissions comparisons and environmental claims between products more reliable by establishing a transparent methodology.

France will initiate reflections at European level to strengthen controls and sanctions against products that do not comply with ecodesign criteria placed on the market in order to ensure fair competition between economic actors, European and non-European.

Consumption-based emissions orientation: 8 Scaling up the repair

France is a pioneer in aid to speed up repair. In particular, the repair bonus, in force since 2022, makes it possible to obtain an immediate cash back to extend the life of its items at a certified

[256] *The Energy Efficiency Directive already provides for the promotion of the most energy-efficient equipment and the European Regulation 2024/1781/EU on ecodesign for sustainable products will open the door to other environmental challenges.*
[257] *In accordance with the law of 10 February 2020 on combating waste and for the circular economy.*
[258] *Article 15 REEN law.*

repairer.[259] **In order to speed up the development of repair, the list of eligible equipment may be gradually extended.**

On the repairers' side, training will be financed using the EPR channels and the reduced cost of labelling, and the procedures for repairers already labelled will be reduced. A single platform for payment of the bonus will be set up, and the repayment period reduced (maximum 15 days). These actions will increase the use of repair. The State will also invest in skills, education and awareness-raising (in order to promote repair professions), in particular by integrating prevention and maintenance into national education programs (work in progress to integrate repair issues into colleges).

- **Consumption-based emissions orientation: 9 Promote re-use and upcycling**

The development of re-use and upcycling will require the development of the second-hand market (particularly prevalent in the childcare, cycling and cultural consumer goods sectors).[260] **The State will thus support the development of the second-hand market, in particular through communication and awareness-raising campaigns** (e.g. the 'Save our resources' campaign).[261] In the housing sector, building stakeholders will be encouraged to incorporate, from the design stage, possible changes in the use of materials or structures in order to encourage their reuse.

- **Consumption-based emissions orientation: 10 Develop sorting and recycling**

The generalisation of sorting will make it possible to increase the stock of recycled raw materials and to speed up recycling via the EPR channels (see Part III. Waste Guideline 3). Increased incorporation of recycled raw materials into industry (see Part III. Industry orientation 9) will also support the development of the circular economy. In the transport sector, battery recycling and reconditioning will be supported to reduce the consumption-based emissions of battery production.

4- Promoting the use of low-carbon materials

- **Consumption-based emissions orientation: 11 Encouraging material sufficiency**

Building sufficiency will be encouraged to reduce the consumption-based emissions of the habitat, both in terms of building volumes, in terms of optimising the surface area to meet the needs of users, and in terms of material sufficiency per unit produced. The low-carbon culture will be encouraged for design teams to bring out new technical, organizational solutions with lower impact. **The development of shared space programs (e.g.** via coliving) will also be promoted, as will **the development of frugal architecture** (compact buildings, reflection on

[259] *The amount of the bonus depends on a list of products. In 2024, 165,000 acts of reparation were supported for €4 million of aid spent (out of €63 million annually programmed).*
[260] *One in two French people use the second-hand market (mainly for economic reasons but also to consume more).*
[261] *https://epargnonsnosresources.gouv.fr/*

uses, complexity of the building...), as well as the development of 'multi-use' in existing buildings.

A mass malus was introduced in 2022 in France to encourage sufficiency in the mass of vehicles, both in manufacturing by manufacturers and in choice by buyers. In addition, the revision of the rules for modulating manufacturers' emission targets so as no longer to place low-mass vehicles at a disadvantage will contribute to greater material sufficiency. With a trigger threshold currently at 1600 kg, the malus applies in 2026 from 1500 kg, including for 100% electric vehicles that do not reach the required minimum environmental score, but with a reduction of 600 kg. **The State will continue to support the internalisation of environmental externalities linked to the manufacturing of electric vehicles** (today via the eco-score conditionality applied in the context of acquisition aid schemes and certain tax schemes). The kilometric scale will be revised to less favour massive vehicles and to better bring it closer to the reality of uses.

Finally, the State supports the inclusion of consumption-based emissions criteria in taxation: reform of the method of calculating the benefit in kind, reform of the scale of accounting depreciation, trajectory of strengthening the CO2 penalty, the weight penalty, the incentive tax, the application of the minimum environmental score in the assessment of the annual incentive tax relating to the greening of fleets and the calculation of the benefit in kind.

Focus: actions of the Clean Mobility Development Strategy to reduce the consumption-based emissions of transport

Attached to the MEP, the Clean Mobility Development Strategy sets out actions to decarbonise mobility. Several actions are planned by the SDMP to reduce the consumption-based emissions of transport, including:

- make direct State aid to car manufacturers conditional on criteria relating to the consumption-based emissions and critical resources;
- revising the kilometric scale to less favour massive vehicles and to bring it more closely into line with actual usage;
- launch a study on the impact of SUV parking restrictions in certain cities in order to assess their relevance;
- develop intermediate vehicles between bicycles and cars in order to promote the use of vehicles that are more low-emission and low-emission

Consumption-based emissions orientation: 12 Promote the use of low-carbon materials and components

The use of low-carbon components that are not widely used today will also be promoted (geo-based, bio-based or reused materials). The generalisation of these approaches will require the removal of several obstacles: development of knowledge and research on these materials through the financing of R&D programmes, information and awareness-raising among manufacturers and the entire building value chain to promote these products, environmental exemplarity in public procurement or the implementation of experiments at national level.

Controlling the consumption-based emissions of new construction will also require a reduction in the carbon intensity of building materials. **On the national territory, manufacturing processes will decarbonise,** in particular via levers of material sufficiency (decrease in the level of clinker in cement) and process change (direct reduction for iron, carbon capture and storage for cement…).

The Environmental Regulation (RE2020) is a clear direction and framework for the environmental performance of buildings. The application of the RE2020 with milestones 2025, 2028 and 2031 will reduce the sector's consumption-based emissions from 10 to 20 Mt CO2e in 2050. Work to deploy the RE2020 to construction typologies (specific territory and industry) not yet subject to this regulation has been underway since 2023 to set energy and environmental performance requirements. This work will be completed in the near future. **The regulation will eventually have to cover all building typologies in line with the Energy Performance of Buildings Directive (EPBD).**

The CAP2030 project, led by a group of stakeholders in[262] the sector, will specify the co-construction of a common framework of reference. **Its results will feed into the voluntary efforts of project owners wishing to go beyond regulatory requirements and test new indicators.**

[262] *HQE-GBC Alliance, the Effinergie Collective and the Collectif des Démarches Quartiers Bâtiments Durables*

5- Reducing the carbon content of imported products

- **Consumption-based emissions orientation: 13 Promoting the decarbonisation of EU value chains and reducing environmental leakage from imports**

The decarbonisation of our **value chains is necessary to reduce the French consumption-based emissions. France will therefore seek to increase financial and regulatory incentives for companies to import decarbonised and environmentally friendly products, through environmental mirror measures such as the Carbon Border Adjustment Mechanism (CBAM) or the Zero Deforestation Regulation (EUDR).**

It may also pursue a target of facilitating trade in green goods and services, through the reduction of tariff and non-tariff barriers, in the context of bilateral negotiations and the continuation of discussions on these topics in multilateral fora such as the WTO. It may encourage the European Commission to renegotiate its existing trade agreements to include binding targets on compliance with the targets of the Paris Agreement, and may make its support for the signing of new agreements conditional on compliance with the commitments of its trading partners under the Paris Agreement. Finally, it may ask the Commission to negotiate tariff conditionality in its bilateral agreements, in order to make the opening of the European market conditional on compliance with certain sustainability standards.

France will continue to provide climate leadership in the global climate negotiations and will advocate for the alignment of all Multilateral Development Banks with the Paris Agreement. On the other hand, France will continue to support decarbonisation financing to countries in the rest of the world that may be trading partners under Article 9 of the Paris Agreement, in particular to the most vulnerable countries and low-income countries, by aiming, among other things, to accelerate the exit from coal and finance renewable energy to limit global warming to 1.5 °C. In particular, the Agence Française de Développement (AFD) has committed to align its activities 100% with the Paris Agreement, ensuring that no funded project harms[263] the climate. It will roll out a programme by the end of 2025 on the sustainability of international value chains. France will also continue to support technology development and transfer under Article 10 of the Paris Agreement as well as support for mitigation-friendly policies.

France, alongside the European Union, will continue to encourage its trading partners to democratise the measurement of greenhouse gas emissions and to set up carbon pricing systems, particularly through incentives under the CBAM.

[263] All AFD-funded projects must be compatible with the targets of the Paris Agreement, including in the economic and trade sectors. The French Development Agency (AFD) also supports the climate trajectories of developing countries by supporting the development and implementation of long-term national climate strategies, aligned with the targets of the Paris Agreement.

➨ Consumption-based emissions orientation: 14 Supporting a European position to align trade policy with environmental targets

France **works multilaterally to promote trade based on WTO rules** that allow trade disciplines to be reconciled with sustainable development. As regards bilateral negotiations between the EU and third countries, France **also ensures that trade agreements negotiated and concluded by the European Union are balanced, serve European and French economic and strategic interests, while contributing to environmental targets.** In this context, and at the instigation of France, the European Commission adopted in June 2022 a new approach to the provisions of the trade and sustainable development chapters of its agreements, which provides in particular for (i) raising the Paris Agreement to the status of an essential element of the agreements negotiated, and (ii) strengthening the monitoring of the implementation of trade and sustainable development commitments; (iii) strengthen the role of civil society and (iv) complement the dispute settlement mechanism by including the possibility of trade sanctions as a last resort for breaches of sustainability commitments.

France calls for this approach to be taken up systematically in all trade negotiations: it was fully implemented in the EU-New Zealand agreement concluded in 2023 and is supported by the Commission in the ongoing trade negotiations in 2026 (Thailand, Philippines, Malaysia, United Arab Emirates).

In this context, **France will continue to take a position at European level to ask for mirror measures compatible with WTO rules to be added** to European rules, whenever possible and justified, [264]**in order to limit environmental leakage linked to an increase in imports from lower-priced countries by ensuring that the standards that apply to European operators also apply to operators who are not entering the internal market.**

France will endeavour to encourage, in the context of the negotiation of trade agreements, the strengthening and securing of access to certain critical resources or materials, used in the main decarbonisation technologies, which are destined to be industrialised to meet the needs of the transition.

➨ Consumption-based emissions orientation: 15 Support a strengthening of the Carbon Border Adjustment Mechanism (CBAM) to better tackle carbon leakage

The Carbon Border Adjustment Mechanism (CBAM), which entered into force on 31 October 2023, is a key instrument of European climate policy. In a context of increased carbon pricing, **the CBAM will limit carbon leakage** by allowing European industry to invest in their decarbonisation while avoiding relocations or increased imports. In addition, by applying

[264] *The EU may apply mirror measures to third-country products for environmental or public health purposes where justified by substantiated scientific studies. Mirror measures already apply to certain products (import ban on beef when antibiotics have been used as growth promoters).*

carbon pricing to imported emissions, the CBAM also encourages foreign producers to decarbonise and partner countries to set up their own carbon pricing systems.

The CBAM currently covers six sectors highly exposed to carbon leakage (iron and steel, aluminium, cement, fertilisers, hydrogen, electricity)[265] accounting for about half of industrial emissions.

In order to further reduce emissions imported from France and strengthen decarbonisation incentives for French industry, France will be able to support the gradual extension of the CBAM to new sectors covered by the ETS. The CBAM will also need to be complemented by a partial retention of free ETS allowances for exports and the inclusion of certain processed products (e.g. automotive sector) in its perimeter. Such an extension will require the development of simplified methodologies for estimating the consumption-based emissions of highly processed products. France will actively contribute to this process to build an instrument and methodology that is both simple and robust. Finally, **France will support measures to reduce the risks of circumvention and the phenomena of redistribution of resources known as "resource shuffling"** [266]

The CBAM was evaluated in 2025 by the European Commission[267], which proposed several adjustments at the end of 2025[268].

- **Consumption-based emissions orientation: 16 Protecting French agriculture by limiting environmental leaks and promoting local consumption**

French production is on average relatively less emissions intensive than its imported equivalents, in particular crop production and certain types of livestock farming, but suffers from unfavourable price competitiveness for certain sectors. The agriculture and agri-food sectors are therefore at risk of carbon leakage, since the competition between our products could lead to European operators exiting the market in favour of competitors from third countries. In order not to indirectly increase France's consumption-based emissions, and in full compliance with its international commitments, **France undertakes to promote the necessary measures (mirror measures, tariff conditionalities) in order to apply to imported products the same level of climate requirements as those in force in the EU and thus prevent undesirable adverse effects linked to 'carbon leakage' phenomena. At the same time, it undertakes to support, in** particular, low-input production methods in order to limit the impact of the import of fertilisers or vegetable proteins. French agricultural sovereignty will also be maintained by

[265] *The CBAM also covers some of their precursors and around 20 products from the near downstream (tubes, pipes, tanks, screws, … bolts).*

[266] *Resource shuffling risk, to be clearly distinguished from voluntary circumvention, refers to a reallocation of third country producers' exports of their most decarbonised goods to the EU (under the CBAM incentive).*

[267] *https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en#more-information*

[268] *https://ec.europa.eu/commission/presscorner/detail/en/ip_25_3088*

ensuring the economic resilience of French farms, as a guarantee of their export competitiveness.

France **will thus ensure the systematic compatibility of trade agreements with our climate commitments in all trade negotiations on agricultural products,** a position that has been defended by France in the context of the negotiations of trade agreements by the EU, for example recently concluded with New Zealand (see Part IV – Consumption-based emissions Guideline 14).

- **Consumption-based emissions orientation: 17 Ending imported deforestation to preserve the climate regulator role of tropical forests and reduce imported emissions**

Through the Climate and Resilience Law, France has adopted several measures to limit imported deforestation, continuing the action taken under the National Strategy to Combat Imported Deforestation, to **end in 2030 the import of unsustainable forest or agricultural products contributing to deforestation in the cocoa, rubber, soya, palm oil, wood and its derived products, and beef and co-products sectors.** At European level, a new Regulation on the placing on the Union market and export of certain commodities and products associated with deforestation and forest degradation was published in June 2023. Under this Regulation, any operator or trader who places on the EU market or exports products that could be linked to deforestation and forest degradation (products of animal origin, wood, cocoa, soybeans, palm oil, coffee, rubber, etc.) must be able to prove that these products do not come from deforested or degraded land. **Traceability of supplies, transparency of information, accountability of all links in value chains and systematic risk analysis are key levers for achieving an end to deforestation by 2030, as the States committed themselves to by means of the New York Declaration on Forests.** Reducing the consumption of exotic or imported products may help to support this target. Implementing EUDR and reducing our dependence on soybean imports by meeting the targets of the plant protein strategy will help meet these targets.

In addition, research on methodologies to better take into account carbon storage and destocking related to land use, land use change and forestry (LULUCF) associated with France's final demand will be encouraged. They are, in fact, necessary to make a net assessment of the effects on the climate of the choices made by economic actors in France.

6- Promoting the production of durable goods, in particular through green reindustrialisation

- **Consumption-based emissions orientation: 18 Promoting the production of durable goods, in particular through green reindustrialisation**

Green reindustrialisation will be encouraged and promoted, taking advantage of our low-carbon electricity mix and ambitious green industry schemes at national (France 2030, Green Industry Act, Green Industry Investment Tax Credit) and European (Clean Industrial Deal, Net Zero Industry Act) levels.

France will continue to develop a welcoming policy favourable to green industrial development, creating the conditions for attractiveness and competitiveness to host low-

carbon projects and green innovation (see Part SNBC – Industry Guidelines 1, 2, 3 and 4), with a beneficial effect on global GHG emissions. This reindustrialisation, which is part of the SNBC 3 scenario, implies a slower decline in the territorial emissions of industry as set out in the targets set for industry on domestic emissions.

These dynamics will ensure the development of green industry and reduce the consumption-based emissions of France and the EU, while advocating a policy of maintaining or even reducing domestic consumption in line with the SNBC 3 scenario.

Through our exports, reindustrialisation can indirectly contribute to the decarbonisation of our trading partners while promoting our competitiveness and resilience.

At sectoral level, **France will support the relocation of certain strategic sectors whose emissions are now mostly imported.** In particular:

- **The target is to reach 1 million electric vehicles produced in France by 2030, as announced by the electrification plan in April 2026.** With this in mind, the competitiveness of electric vehicles produced in Europe will be preserved, with competitive electricity prices (see Part III. Industry orientation 4) and the strengthening of the CBAM (see Part IV. Orientation Empreinte 15). Aid for the purchase of electric vehicles and tax incentives, some of which are conditional on achieving the minimum environmental score, will help channel demand towards electric vehicles with the lowest consumption-based emissions.
- The relocation of battery production will be encouraged, in particular with European content requirements for battery cells and certain components of electric vehicles sold in the EU provided for in the European Automotive Industrial Plan. The installation of *battery gigafactories* will be able to directly power assembly plants and significantly reduce the life cycle consumption-based emissions of batteries.[269]
- With the dual target of reducing the consumption-based emissions and regaining sovereignty, the relocation of agri-food products with the lowest self-supply rate (soybeans, butter, fruit and vegetables, etc.) will be promoted, in line with the Farming, Fruit and Vegetables and Plant Protein sovereignty plans. New processing tools will be developed on the national territory to bring processing places closer to places of production (pasta and processed organic products in particular). The evolution of diets will also improve the rate of self-supply (via local and seasonal food, limiting the consumption of imported products), especially for non-relocatable sectors (e.g. rice or tropical fruits).
- Reducing French dependence on imported inputs for agricultural production and plant proteins for animal feed[270] by reducing their consumption[271] and promoting the relocation of low-carbon means of production (e.g. via electrolysers for the production of ammonia)

[269] *A battery produced in France is almost 44% less emitting than its Chinese equivalent and 25% less emitting than its European equivalent according to the Shift Project.*
[270] *The consumption of vegetable proteins for animal feed is mainly imported (two thirds of imported seeds and cakes, mainly from Brazil and Argentina), as is mineral nitrogen (three quarters imported, mostly produced from methane vaporeforming), with 80% produced from fossil gas.*
[271] *In particular by reducing the need for mineral nitrogen and increasing the protein autonomy of farms (see III.B).*

in line with the plant protein plan, and with the preparation of a 'Fertilisers' sovereignty plan.

In order to have a transversal and strategic vision on the relocation and possible reduction of the French consumption-based emissions and its contribution to global GHG emissions, an inventory could be published defining priority sectors to be relocated according to their potential to reduce the consumption-based emissions and the associated economic and sovereignty challenges.

7- Continue to promote the consumption-based emissions approach for better international ownership

- **Consumption-based emissions orientation: 19 Encourage the adoption of imprinted approaches at international and European level as a complement to the territorial approach**

The consumption-based emissions approach is a lever for reducing greenhouse gas emissions in an increasing number of EU policies (Battery Regulation, Ecodesign for Sustainable Products Regulation,[272] Anti-Deforestation Regulation …). **France will continue to support at European level, but also at national level, the development of new standards for products and services in order to reduce the European consumption-based emissions.**

To provide an analytical framework for the adoption of these standards, **France will support the definition of a European consumption-based emissions target and seek to establish cooperation with other leading European countries on the subject.**

More generally, France will also ensure that the issue of consumption-based emissions is taken up in international fora and negotiations (OECD, IEA, G7, UNFCCC, IPCC …), so that these approaches can be adopted more broadly as a complement to the approach to domestic emissions.

Focus: the link between reducing the consumption-based emissions at national and European level

While the European Commission has proposed a new emission reduction target for 2040, reflections are ongoing to assess the impacts on the consumption-based emissions. The State wishes to initiate a reflection (via the IGEDD) on the relationship between the national consumption-based emissions target and a European target on the same perimeter in order

[272] *The Battery Regulation provides for a GHG footprint assessment of battery production and sets a minimum standard for placing on the market. The Ecodesign for Sustainable Products Regulation allows sector-specific measures that include the carbon footprint as a criterion for placing on the market. The Anti-Deforestation Regulation creates a duty of care related to the import of wood products, as well as exported products or those produced in the territory for domestic consumption.*

to identify the conditions for setting a European consumption-based emissions target and the public policy tools to reduce it.

- **Consumption-based emissions orientation: 20 Unify and improve the methodology for calculating the consumption-based emissions**

Harmonisation of the methodology for calculating the consumption-based emissions, at European or international level, will be important for monitoring the reduction of imported emissions and developing efficient and appropriate public policies. At present, there is no international framework or standardised method for calculating the consumption-based emissions of a national economy, unlike territorial emissions covered by the Paris Agreement.

To date, the calculation of a country's consumption-based emissions is not governed by international or national standards or rules. At European level, Eurostat has published annually since 2021 an estimate of the consumption-based emissions of each EU country based[273] on international input-output tables produced with the support of the European Research Centre JRC. In France, **the SDES and INSEE publish annual estimates of the French consumption-based emissions** based on these data but with some methodological improvements. **France will support the introduction of a common European framework to calculate the historical consumption-based emissions,** but also the prospective consumption-based emissions, like the reporting of territorial emissions in the 2018/1999 governance regulation. This convergence between countries is already under way, under the aegis of Eurostat for the EU and the IMF at global level, in particular in the context of the *Data Gap initiative* launched by the G20 and remains a medium to long-term perspective.[274] In this context, it will also be necessary to monitor and ensure the homogeneity of consumption-based emissions calculation methods across sectors and scales (products, territories, national …).

Few prospective consumption-based emissions analyses exist at international level.[275] **France will continue to develop its expertise on the subject, in order to identify major areas** for methodological improvements and to estimate the impact of certain public policies. The publication of a methodological document on the improvement of retrospective and / or prospective consumption-based emissions calculation methodologies to improve modelling tools and converge the different calculation methodologies (macro / micro, global scope, … sectoral disaggregations), is planned in partnership with ADEME, SDES and INSEE.

[273] *CO2 only until 2023; all GHGs since 2024*
[274] *Indeed, the economic and environmental data used to estimate the footprint, which concern the European Union but also the rest of the world, suffer from certain shortcomings or inconsistencies that will not be able to be resolved without a substantive effort on the part of all the actors concerned, national statistical institutes and international organisations.*
[275] *France uses the MatMat model developed by ADEME and used to assess the carbon footprint of the Transition scenarios, to develop the SNBC footprint component.*