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ÉLECTRIFIONS LA FRANCE !

STRATÉGIE FRANCAISE ÉNERGIE CLIMAT

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TO EXEMPLARY PUBLIC SERVICES: PILOTING DECARBONATION AT THE HEART OF PUBLIC ACTION

Credit: Arnaud Bouissou / Terra

TO EXEMPLARY PUBLIC SERVICES: PILOTING DECARBONATION AT THE HEART OF PUBLIC ACTION

State services represent 2.5 million public officials. Public services (local authorities, public institutions, health, etc.) emitted 81 Mt CO_{2e} for 2021, representing approximately 12% of France's total consumption-based emissions.

The aim is to reduce the state's greenhouse gas emissions by 22% between 2019 and 2027 and by five by 2050.

Since 2020, the government has been implementing the Eco-responsible Public Services (SPE) approach in order to implement the means to achieve these targets.

The main public policy guidelines:

Strengthen the management of the State's greenhouse gas emissions balances (BEGES) in order to comply with its decarbonization trajectory	**Reduce energy consumption and GHG emissions of public bodies, in particular by accelerating the energy renovation of their buildings**	**Implement the other measures of the EPSSPE circular enabling the reduction of greenhouse gas emissions by State services**
• Provision of tools to support the production of greenhouse gas emission balances • Use of public procurement (contract performance criteria) as leverage to improve the implementation of the BEGES regulation • Further checks on compliance	• Compliance with the Energy Efficiency Directive • Provision of a fluid monitoring tool • Taking climate into account in the building renovation strategy • Removal of oil-fired boilers	• Transport (mobility plans, cycling, greening of the car fleet, etc.) • Training • Digital eco-responsible • Sustainable food and reduction of food waste • Reduction of waste quantity and better recovery • Sustainable Purchasing

1. State of play and challenges

State services account for 2.5 million public officials. GHG emissions from central and decentralized services (excluding defense and security activities) were estimated at around 10 Mt CO2e for 2019.[1] More broadly, also taking into account all public services (local authorities, public institutions, health, etc.) this estimates amounts to 81 Mt CO_{2e} for the year 2021,[2] i.e. around 12% of the total French consumption-based emissions. **State services therefore have a crucial role to play in achieving national decarbonization targets.**

Moreover, given the challenges at stake, the State must be exemplary on these issues. It is in this context that the Government introduced[3] the Eco-responsible Public Services (SPE) approach in 2020. This approach has made it possible to build governance and a community of decision-makers, all over the country, committed to meeting the challenge of the ecological transformation of public services (central government, decentralized services, operators and public institutions).

The State's Green Transformation Plan (PTE) for eco-responsible public services, presented on 28 March 2024, set a new ambition to support and facilitate the transition to action of all public officials. The measures of this plan were built with broad involvement of stakeholders, administrations, trade unions and civil society. **It is based on 15 concrete commitments** [4]to better travel, better feed, better manage public buildings, better produce and consume, and protect our ecosystems. It establishes the targets of reducing GHG emissions with a State consumption-based emissions by 22% between 2019 and 2027, reducing energy consumption in State buildings by 25% between 2022 and 2027 and dividing by five the emissions with a State consumption-based emissions by 2050 compared to 2019.

To ensure successful mobilization, training for senior managers and managers in the green transition was initiated in 2022 by the Interministerial Delegation of State Senior Management (DIESE). This 28-hour, 100% face-to-face training plan is unprecedented in Europe. In addition, it relies on a large community of scientists mobilized to deploy conference-debates. By the end of 2025, more than 200 heads of central government had been trained, as well as more than 13,000 senior government officials.

As part of the EPSSPE approach, the "Commissariat général au développement durable" (CGDD) worked in 2022 to develop a strategy for the decarbonization of State services in conjunction with all the business departments concerned. This strategy provides for the State

[1] *https://www.ecologie.gouv.fr/sites/default/files/documents/Strategie_décarbonation_Etat_VF.pdf on a perimeter of 1.7 million civilian agents*
[2] *https://www.statistiques.developpement-durable.gouv.fr/lempreinte-carbone-de-la-france-de-1990-2023?rubrique=&dossier=1286*
[3] *First circular of the Prime Minister of 25 February 2020*
[4] *The implementing rules are set out in Circular SG/6425 of 21 November 2023 on the State's ecological transformation plan.*

to commit to a trajectory of reducing its emissions by 80% by 2050[5] compared to 2019, in line with the State's PTE, which constitutes a proportionate contribution to France's decarbonisation target.

The measures outlined in the strategy are structured around five areas: transport, buildings, purchasing and resources, food and working methods. They are consistent with the target of reducing GHG consumption-based emissions by 22% by 2027 compared to 2019 and dividing them by five by 2050.

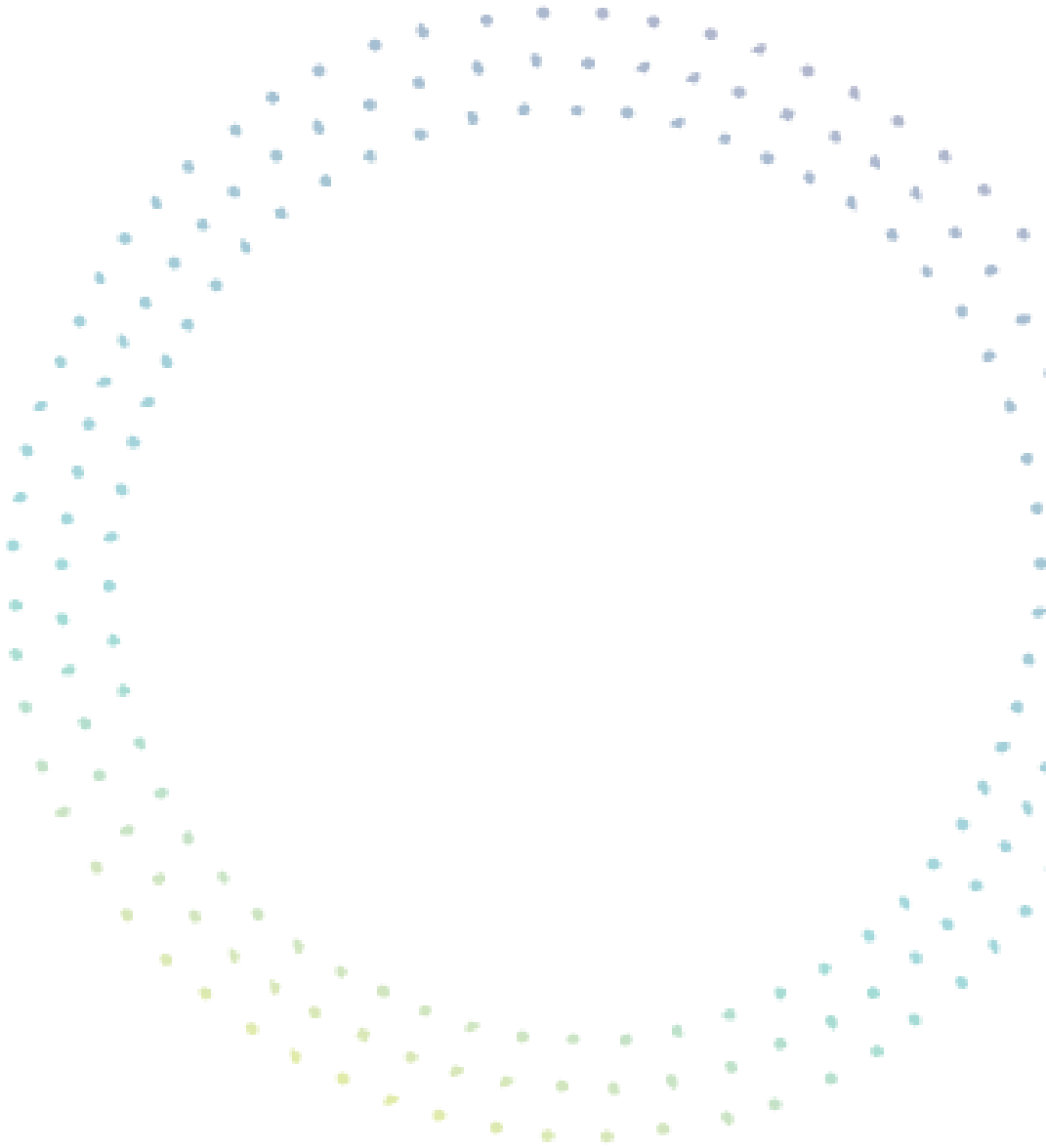
To secure the results to be achieved, the ecological transformation of the State is based on a method that associates and accompanies all ministerial centers and regional prefectures (the 'Territorial Administration of the State' perimeter). Transformation plans are developed and adapted to each department and territory. The responsible "green public services", present in each Ministry and each prefecture of the region, coordinate the implementation of the measures. An accompanying guide brings together all the tools to achieve the targets of the circular of 21 November 2023 and identifies the reference pilot Directorate-General to help remove the blockages on each measure.

***Figure: 1** Targets to divide by 5 the GHG emissions of state services by 2050*[6]

In order to support the State services in their target of decarbonisation, the State proposes tools. In particular, since 2024, the CGDD has been offering a digital tool to help government

[5] This objective concerns emissions from State services, according to the BEGES scope, i.e. scopes 1, 2 and 3.
[6] *Circular No 6425-SG of 21/11/23, Annex 2*

departments carry out their GHG emissions balances:[7] Low-carbon state. To this end, the Low-Carbon State shall draw up an inventory of each administration's greenhouse gas emissions in accordance with the ADEME methodology: centralisation of source data collection, automation of data processing and emissions calculation according to a harmonised methodology for all perimeters and transparent.



[7] *In accordance with Article L.229-25 of the Environmental Code and the circular of 21 November 2023*

2. The Strategy

a. Main targets

Consumption-based emissions	Reduce greenhouse gas emissions from government departments by 22% in 2027 compared to 2019 and divide them by five by 2050.
Energy consumption	Reduce by 25% the energy consumption of State buildings in 2027 compared to 2022 and reduce by 1.9% each year the energy consumption of the State and operators compared to 2023 consumption.
Training	Train public officials in the green transition by 2027.
Circular on Eco-responsible Public Services	Ensure the implementation of the actions and the achievement of the targets of the 15 measures of the EPSSPE circular to reduce GHG emissions from State services.

b. Main orientations of public policies

- **EPS SPE Guideline: 1 Strengthen the management of the state's greenhouse gas emissions balance sheets in order to respect its decarbonisation trajectory**

To support the implementation of greenhouse gas emission assessments (BEGES) by the State services and its public institutions, the circular on commitments for the ecological transformation of the State for environmentally responsible public services **of 21 November 2023 provides (measure 2) for** the design and deployment of an **interministerial tool.** Since 2024, this tool ('**Low Carbon State')** has entered its final phase of design and is being tested by the eco-responsible public service managers of the various ministries and prefectures of the region. **It will be updated and improved regularly.**

The regulatory obligation for all State departments to implement and publish BEGES every three years will be continued and small public establishments not required by the rules will be encouraged to implement BEGES as well. To this end, the administration will also make available a tool to support the implementation of the transition plan part of the BEGES, so that each State department can simulate the GHG reduction induced by the application of the circular ('calculator – low-carbon simulator').

The State will also go through the prism of public procurement to improve the implementation of this regulation, by imposing, as a condition of mandatory performance of public contracts, compliance with the BEGES regulation (communication of an BEGES (emissions report and transition plan or its equivalent via the CSRD (Corporate Sustainability Reporting Directive))) on all obliged undertakings (measure 7).

EPSSPE 2 guideline: Reduce energy consumption and GHG emissions of public bodies, in particular by accelerating the energy renovation of their buildings

The State and its operators occupy approximately 190 000 buildings. The reduction of the final energy consumption of public bodies by 1.9% each year (compared to 2023 consumption) and the annual energy renovation of 3% of the surface area of their buildings to a high level of energy performance, as set out in the Energy Efficiency Directive (EED, 2023/1791/EU), aim to achieve the national energy consumption reduction and greenhouse gas emission reduction targets. A digital platform will be made available to public bodies to enable them to have a better knowledge of their property assets and energy consumption (IPPER: Public Inventory of Heritage, Energy and Renovation).

In addition, the circular EPSSPE proposes several measures to calculate and reduce energy consumption. **The State will have to ensure that they are properly deployed and implemented:** mandatory connection to an interministerial fluid monitoring tool,[8] compliance with the various regulatory obligations to reduce consumption, taking climate into account in the building renovation strategy (reduction of occupied areas, energy sufficiency, removal of oil-fired boilers by 2029, renewable energy production system, integration of circular or bio-based materials, phasing out of the most emissive fluorinated gases, etc.). They will have to be continued and extended, in particular in order to replace existing gas boilers.

EPSSPE guideline 3: Implement the other measures of the EPSSPE circular (greening of the car fleet, sustainable purchases, etc.) enabling the reduction of greenhouse gas emissions by public services

In general, of the 15 measures in the EPSSPE Circular, several address issues that reduce GHG emissions. **The State will endeavour to implement and monitor the application of these various measures.**

- **Implement transport-related emission reductions:**
  The circular deals extensively with measures within government departments to reduce transport-related greenhouse gas emissions. The State must ensure that they are implemented and monitored: implementation of employer mobility plans, deployment of teleworking, carpooling, development of cycling and installation of specific parking spaces, modal shift from plane and car to train, encouragement of the use of public transport and active mobility, reduction and transformation of the State car fleet (greening and limiting the weight of vehicles).
- **Implement the emission reductions linked to the other challenges of the EPSSPE circular:**
  The State will also have to implement the other measures of the circular dealing with the climate, such as on eco-responsible digital technology (re-use, increase in the duration of use, energy efficiency), sustainable food through the diversification of protein sources by

[8] *Electricity, gas, oil, heating network, water*

developing in particular the vegetarian offer and the purchase of organic, quality or sustainable products[9] and reducing food waste, reducing the amount of waste and better recovery, or sustainable purchases through the mandatory inclusion of environmental criteria in public procurement.

- **Provide training for public officials on the green transition:**

  As stated in the EPSSPE circular, the State will have **to continue training its public officials in the ecological transition in order to achieve the target of 100% of officials trained in 2027.** This training has so far focused mainly on senior managers. Beyond awareness-raising, the needs of professional training will also be addressed. Training public officials in the green transition is a key lever to achieve the above-mentioned decarbonisation targets. It anchors climate and energy issues by strengthening the ability of agents to integrate the imperatives of sufficiency, energy efficiency and adaptation into their daily practices. This increase in competence promotes the coherence of public policies, improves the operational effectiveness of the actions undertaken and contributes to the dissemination of a common culture of the green transition. It is also essential to anticipate regulatory and technical developments, and to support the transformation of management, purchasing and mobility patterns within administrations.

For all these themes, the State will continue to provide and strengthen, if necessary, the means necessary to achieve these targets. An annual follow-up will be carried out and made public on the Ministry's[10] website.

[9] In accordance with the provisions of the law of 30 October 2018 for the balance of trade relations in the agricultural and food sector and a healthy, sustainable and accessible diet for all, supplemented by the law of 22 August 2021 on combating climate change and strengthening resilience to its effects.

[10] https://www.ecologie.gouv.fr/politiques-publiques/plan-transformation-ecologique-letat-services-publics-écoresponsables-spe

B. MOBILIZATION OF COMPANIES

ACCOMPANYING BUSINESSES FOR A DECARBONISED AND COMPETITIVE ECONOMY

Credit: Arnaud Bouissou / Terra

ACCOMPANYING BUSINESSES FOR A DECARBONISED AND COMPETITIVE ECONOMY
Businesses play a major role in national decarbonisation targets. According to the SGPE,[11] they account for 50% of the green planning action levers needed to halve our gross emissions between 1990 and 2030. In addition, the private sector needs to raise €40 billion in additional investment needs by 2030.[12] The State supports the decarbonisation of companies through the implementation of national and European regulations, targeted support through thematic working groups (e.g. via the National Industry Council) and the provision of tools, support mechanisms or spaces for dialogue (social dialogue, roadmap for the decarbonisation of economic actors). At European level, the implementation of transparency and audit obligations on climate information under the CSRD will help inform investment and management decisions related to the climate transition. Businesses must also promote low-carbon consumption patterns, within an increasingly tightly regulated commercial communication framework.
The main public policy guidelines:
• Ensure that companies comply with their climate transparency obligations, ensuring that ambition and simplification are reconciled. • Encourage companies to strengthen the credibility of their transition plans by relying on recognised methodologies and SNBC. • Structuring, optimising and improving the visibility of aid to companies on decarbonisation. • Preserving the competitiveness of companies in a low-carbon model. • Ensure proportionality of rules for small and medium-sized enterprises (SMEs) and specific support for small and medium-sized enterprises (SMEs). • Better integrate environmental planning issues into the courses certifying company directors and executives. • Initiate a reflection on strengthening the eco-conditionality of aid to companies to ensure compliance with their obligations to contribute to climate change mitigation. • Develop sustainable communication, ensure transparency of business climate claims and fight greenwashing.

1. State of play and challenges

The ecological **transition will not be possible without the full involvement of economic actors. Their interest is threefold: limit their own impacts and risks, sustain their business and help deploy solutions.**

[11] *SGPE (2024), Embracing a Lifestyle Transition*
https://www.info.gouv.fr/upload/media/content/0001/11/1b76b10c54e34e8baf17b96cc9f051d4ed5e16f5.pdf
[12] *Multiannual strategy for financing the green transition 2 (2025) (link)*

Companies face major physical risks, such as increasing climatic hazards, which threaten the sustainability of sites and disrupt logistics chains, as well as the collapse of biodiversity, increasing the strain on access to natural resources. Moreover, **environmental crises also expose companies to new risks linked to the green transition,** such as stricter regulations, damage to their image, loss of market share, and difficulties in accessing finance and insurance. It is therefore **crucial for them to engage in green transition and long-term planning approaches to limit these risks and ensure their sustainability in a context of climate change.**

It has also become essential for companies to reduce their dependence on energy and material resources, the availability of which is compromised by the environmental crisis and geopolitical instabilities. The price fluctuations and the risks of additional costs associated with these tensions are already tangible: an 18% increase in industrial production costs was observed between 2021 and 2024.[13]

While the benefits of this transition appear in the long run, some benefits, such as resource savings and increased energy efficiency, **are immediately noticeable.**

The preservation of French economic competitiveness in a world increasingly affected by these challenges, **as well as the fulfilment of France's commitments on the international scene, depend to a large extent on accelerating the green transition of companies.** This implies, for French people public authorities, **encouraging the necessary profound change in business models, which has already been initiated by companies.**

To achieve our climate targets, the instruments deployed by the public authorities are intended to increase the low-carbon- share of investments made by the private sector, to promote the achievement of France's climate targets. This is notably the aim of the transparency obligations introduced by the Corporate Sustainability Reporting Directive (CSRD) and the European Green Taxonomy. Standardisation and auditing of climate information will help to better steer finance towards the transition, providing investors with robust and comparable data. The introduction of a European due diligence (CS3D)[14] incorporating the obligation to adopt and implement a climate transition plan reinforces this momentum. These texts are currently being renegotiated in order to improve their proportionality.

As regards financial institutions, the Financial Services Sustainability Reporting Regulation (SFDR), in force since 2021, requires investors to measure and report their climate change risks and adverse climate impacts. This requirement also affects portfolio companies, which must provide investors with accurate information on the risks and negative impacts of their business on the climate. **A revision of the SFDR Regulation is planned for 2026 in order to clarify and simplify it.**

[13] https://www.insee.fr/fr/statistiques/8261328#documentation
[14] *Corporate Sustainability Due Diligence Directive*

As regards, more specifically, French people financial sector, the transparency regarding the sustainability of market participants provided for in **Article 29 of the Law on energy and climate, makes it possible to obtain information on key topics, in particular the strategies for contributing to the national and international climate targets of those players.** The reports published under this article, submitted annually on the public Climate Transparency Hub (CTH) managed by ADEME, are subject to an annual analysis by ADEME,[15] thus enhancing transparency and financial sector engagement in the fight against climate change.

Since 2021, when the previous SNBC (SNBC 2) was adopted, **many companies have refined their carbon accounting and developed decarbonisation transition plans. France has a strong and pioneering national policy**[16] **on the subject,** including **the regulation of greenhouse gas emission reports (BEGES) strengthened in recent years** [17]with the inclusion of indirect emissions, the design of a more comprehensive transition plan, the increase of the ceiling on penalties, the conditionality of access to certain public aid,[18] etc. Work has been carried out to improve as much as possible the interoperability between BEGES reporting and CSRD reporting. **To ensure a sufficient level of ambition, companies' transition plans will eventually need to be consistent with SNBC's trajectories.** A first step in this direction was put in place through Article 66 of the 3rd amending finance law of 2020, which requires certain companies that benefited from a State shareholding under the France Recovery Plan of 2020, to adopt decarbonisation trajectories consistent with the sectoral carbon budgets defined in the SNBC in force at the time (SNBC 2). The companies concerned complied with this regulation by integrating SNBC trajectories into their sustainability reports.

France's decarbonisation policy also relies on exchanges with economic actors to support them in the design of decarbonisation roadmaps (roadmaps provided for in Article 301 of the Climate and Resilience Law, roadmaps for the sectoral strategic committees of the National Industry Council, roadmaps for the 50 most emitting industrial sites). They will continue in order to achieve targets and commitments shared between the State and economic operators (see Part-SNBC – I.D.2).

Social dialogue within companies between management and trade unions is also a lever to be mobilised to improve their environmental ambitions and the implementation of the SNBC. This issue has been taken into account by the Climate and Resilience Law, which introduces the environmental consequences of the company's activity as a mandatory topic for

[15] See the latest report: "Analysis of the 2024 reports for the financial year 2023"
[16] Greenhouse gas emissions balance sheets for large French companies have been mandatory since 2010
[17] Decree No 2022-982 of 1July 2022, Law of 23 October 2023 on green industry, the Finance Law for 2024
[18] Article 29 of Law No 2023-973 of 23 October 2023 on green industry and Article 235 of Law No 2023-1322 of 29 December 2023 on finances for 2024

discussions in the Social and Economic Committee (SEC).[19] The environment is also one of the seven areas of application of Corporate Social Responsibility (CSR).

To implement the low-carbon transition policy for companies in practice, France has set up **a number of voluntary or compulsory schemes to support and evaluate the action of companies** engaged in decarbonisation initiatives:

- **Early companies have been engaged in decarbonising their business in recent years through the Accelerate Climate Transition (ACT) initiative developed by ADEME.[20] It supports French and international companies in their low-carbon transition,** thanks to two methodologies to build and evaluate companies' climate transition plans. At the beginning of 2026, more than 3,000 French and international companies had carried out an "ACT Pas-à-Pas" support[21] or had been evaluated with "ACT Evaluation[22]" or ACT Core.[23] In France, thanks in particular to the financial aid schemes provided by ADEME, since 2021 more than 945 French companies have been able to follow an ACT Pas-à-Pas approach, and more than 63 have been able to be evaluated thanks to ACT Evaluation.
- **Since 2021, the Banque de France has been developing a 'climate indicator' based in part on the ACT method.** This climate indicator aims to support companies in their mitigation and adaptation strategy by assessing their climate trajectories, related actions and the climate risks they face. **It will focus on companies covered by the new EU rules on sustainability reporting (the CSRD Directive) and will draw heavily on the data derived from them.**
- **In addition to the previous arrangements and to accompany, point by point, voluntary undertakings wishing to decarbonise by respecting French people trajectories and the recommendations of this SNBC up to 2050, a guide to SNBC's application to organisations will be published in parallel with SNBC 3.** [24]

[19] *Article L. 2312-8 of the Labour Code extends the general powers of the CSE, the mission of which is to 'ensure the collective expression of employees enabling their interests to be taken into account on a permanent basis in decisions relating to the management and economic and financial development of the undertaking, the organisation of work, vocational training and production techniques, in particular with regard to the environmental consequences of such decisions'.*

[20] *Approach created in 2015: https://actinitiative.org/*

[21] *ACT Pas-à-Pas is a method that aims to equip companies in the construction of their transition plan. It is therefore aimed at companies that are less mature on the subject and do not yet have a transition plan but already have at least a complete inventory of their emissions, following the completion of a BEGES.*

[22] *ACT Evaluation is a method to assess the relevance and credibility of business transition plans as a whole and deliver an associated three-dimensional score. ACT Evaluation is aimed at companies that are already mature on transition topics and have already built and implemented a decarbonization strategy.*

[23] *The ACT Core Methodology is an evaluation framework to analyse the credibility of companies' climate transition plans. It was designed to be applied on a large scale, in particular through the use of public data.*

[24] *During the national consultation on the SNBC 3 project held between November and December 2024, a draft voluntary SNBC corporate declination guide was submitted to the public (https://concertation-strategy-energie-climat.gouv.fr/sites/default/files/2024-11/3.%20Guide%20SNBC%20entreprises_0.pdf)*

Finally, companies can drive the green transition by promoting products or consumption patterns with a lower impact in terms of greenhouse gas emissions, air, water, soil pollution, waste generation and the use of raw materials. Their **commercial communications** thus play a daily and powerful role in influencing consumer behavior and, beyond that, their imaginations and lifestyle desires.

Several French regulations provide a framework for commercial communications in the context of the green transition: framing of climate neutrality claims[25], mandatory CO_2 emission class marking and display for vehicles[26], climate contract scheme[27].

Work on climate claims is continuing at a sustained pace also at European level, including Directive (EU) 2024/825 to empower consumers for the green transition through better protection against unfair practices and better information, and the proposed Green Claims Directive. The first, adopted on 28 February 2024 and currently being transposed, will further frame climate neutrality claims for products and services as well as future environmental claims. The second, currently being in "trilogue", could provide a better framework for the use of carbon credits and climate claims by companies.

[25] Since 1 January 2023, claims of climate neutrality of products and services are framed by Article 12 of the Climate and Resilience Law.

[26] Advertisements for vehicles are required to communicate the importance of soft and active modes of travel, and to make visible the greenhouse gas emissions of vehicles, pursuant to the Mobility Guidance Laws (Article 75) and the Climate and Resilience Law (Article 7). The Climate and Resilience Law also makes it mandatory to display the energy label in advertisements for household appliances.

[27] The voluntary commitment scheme for climate contracts, resulting from the 'climate and resilience' law, aims to reduce commercial communications relating to products with a negative impact on the environment and to change advertising practices towards more responsible communication (Article 14).

2. Strategy

a. Presentation of the strategy

Businesses are key to achieving France's green transition targets, accounting for 50% of the action needed to halve our gross emissions between 1990 and 2030.

Accelerating the green transition of companies involves mobilizing several strategic levers, with a proactive and structured approach.

The State will support companies, particularly small and medium-sized enterprises (SMEs), in the application of climate regulations by means of specific tools, methods and guides to help companies integrate sustainable practices and take advantage of the regulatory framework to make it a sustainable development opportunity.

The ecological transition of economic actors comes at a cost and the State has provided increasing support in recent years.[28] It is now necessary to improve the structure, optimisation and visibility of such aid to ensure easy and efficient access to the necessary resources. In the context of a constrained budget and in order to maximise the impact of aid, **some grants may be subject to an eco-conditionality criterion and others may be reworked to improve efficiency.**

Moreover, in this context, the low-carbon investment shock necessary for decarbonisation encourages the mobilisation of private funds. 'Mixed' instruments such as the State-led Energy Saving Certificates (EECs), which benefit both the private and public sectors, also enable targeted transfers incentivising the decarbonisation of uses. Thus, the reorientation of private financing flows is supported not only through the carbon price, the greening of taxation, the substitution of green spending for brown spending, and targeted subsidies, but also by the development of an appropriate regulatory framework and an ecological planning dynamic aimed at coordinating the actions of the various actors.

Finally, the State will encourage the development of sustainable communication within companies and local authorities and limit the impact of commercial communications of the most carbon-intensive products and services on consumer behavior, in particular by promoting the climate contract scheme.

b. Main targets

Strengthening and simplifying transparency obligations	Achieving 100% compliance with BEGES regulations (currently 58%)[29] by 2030.

[28] *In 2022, the IGF identified nearly 340 schemes to support the green transition of businesses proposed by the main operators in the State, for a total amount of nearly €1.7 billion.*
[29] Rate calculated on 1 January 2026

	Improve the interoperability of reporting (BEGES, CSRD, CS3D) to avoid duplication and effectively implement the CSRD and CS3D directives without creating undue burden. Enable an increasing number of companies to align their transition plans with SNBC. Promote the VSME voluntary standard[30] for- small and medium-sized enterprises as a single ESG reporting standard in order to avoid the multiplication of ESG questionnaires.
Information and training for companies	All categories of companies benefit from clear and centralised information on their obligations on the CSR Portal, the tools at their disposal to comply with them and the aid available, with particular attention to VSEs, SMEs and mid-caps. Enabling companies to benefit from a comprehensive green transition training offer for their agents and managers.
Eco-conditionality	Conditioning certain public aid to companies on compliance with their environmental obligations.
Climate-related claims	Allegations amounting to greenwashing on climate topics are prohibited and sanctioned.

c. Main orientations of public policies

- **Company Guideline: 1 Ensure that companies comply with their climate transparency obligations, ensuring that ambition and simplification are reconciled**

To meet their regulatory obligations, companies are required to communicate different energy-climate data. These often have to be communicated in different documents or on different platforms, sometimes in a decorrelated manner and without necessarily having a holistic approach.[31] While these climate transparency obligations all have their usefulness and relevance in the decarbonisation of companies, **a reflection on their rationalisation is needed**

[30] *The Voluntary Standard for non-listed micro-, small- and medium-sized quantities (VSME) are European sustainability reporting standards established to help micro-enterprises and SMEs better understand and communicate their environmental, social and governance (ESG) impact.*

[31] Not intended to be exhaustive: tertiary decree (OPERT platform), energy audit (ADEME platform dedicated to regulatory audits), ETS 1 reporting (ICPE platform) and 2, BEGES (dedicated ADEME platform), implementing decree 29 LEC (ADEME CTH platform), CSRD reporting etc.

at both European and national level, so that companies can devote more time to implementing their actions rather than carrying out reporting exercises. **The 'tell us once' principle will thus be deployed as far as possible in the energy-climate reporting processes organised by the State.**

To support the implementation of regulatory transparency obligations related to the green transition of companies, the State will take a proactive approach to avoid two major pitfalls. The first pitfall is that of passive compliance, where companies fulfill their obligations in a logic of compliance and not strategic steering of the transition. The second pitfall is that of excessive complexity, where processes perceived as difficult, time-consuming and costly can discourage companies, leading them to see the ecological transition as a brake rather than a lever of competitiveness.

To overcome these challenges, the State will deploy effective support tools and appropriate incentives to make green transition approaches accessible, relevant and beneficial for businesses. The establishment of the CSR Portal by the State[32] (which will be strengthened in the coming years) or the publication of a guide to the application of European sustainability reporting standards by the Accounting Standards Authority are part of this approach.

- **Company Guideline: 2 Encouraging companies to strengthen the credibility of their transition plans by relying on recognised methodologies and SNBC**

The adoption by companies of decarbonisation targets aligned with recognised decarbonisation trajectories[33] is growing rapidly. Moreover, corporate **transition** plans **are becoming** increasingly important in reporting obligations (BEGES, CSRD). **The growing interest of investors in these topics[34] leads to the multiplication by different actors** (investment funds, consulting firms, environmental associations, etc.) **of methodologies for assessing the environmental performance of companies.** Transparency and methodological consistency, which are regarded as criteria of high importance in the assessment of evaluators, are not always ensured.[35]

Moreover, **a strategic gap persists between the international decarbonisation trajectories and the national sectoral trajectories of SNBC** (particularly due to different assumptions about the carbon intensity of the electricity mix), **requiring a differentiated approach and local adaptations.** This lag raises difficulties for many companies.

[32] https://portal-rse.beta.gouv.fr/

[33] *This is mainly an alignment with the global trajectories of the International Energy Agency (IEA) and validated by the Science Based Targets (SBTi) initiative. This consensus is driven by the international dimension of the activities of many large companies and global policy frameworks calling for the harmonisation of emission reduction strategies.*

[34] *In the first quarter of 2024, European sustainable funds raised $11 billion (more than a quarter of the total, $41.2 billion), more than double the previous quarter's subscriptions*

[35] *The annual Rate The Raters survey shows that the black box aspect of these methodologies does not put investors or companies themselves in confidence (90% of investors and companies surveyed consider methodological transparency to be a criterion of high importance in their assessment of evaluators).*

In this context, **the State undertakes to provide companies with a transparent methodology and tools/guides to build and evaluate transition plans aligned with environmental challenges and regulatory requirements:**

- **ADEME's ACT methods**[36] **for** building and evaluating companies' climate transition plans meet these criteria and can be adopted by private actors in addition to existing methodologies. In particular, the ACT Pas-à-Pas and ACT Evaluation methodologies ensure optimal consistency with the reporting of the CSRD Directive, thus avoiding redundancies.[37] **The State will actively support the development and dissemination of these ACT methodologies.**
- **Beyond these global methods, the State wishes to enable voluntary companies to build their decarbonisation trajectories by supporting them** in appropriating national trajectories and the levers to be used **or to assess their consistency with national climate ambition. In this context, a *'National Guide to voluntary declination of SNBC among organisations'*, co-built by the various departments of the State concerned, will be published concurrently with SNBC 3.**
- **Furthermore, the discussions initiated by the State with the ACT teams of ADEME and the Banque de France** (climate indicator) **will be continued in order to integrate SNBC trajectories into their methods and thus enable voluntary undertakings to assess the consistency of their transition plan with SNBC.**

Company Guideline: 3 Structuring, optimising and improving the visibility of aid to companies on decarbonisation

Many support schemes or services for the green transition of companies exist, offered by the main State operators[38] through several platforms (general survey of aid to companies,[39] personalised advice to companies,[40] etc.). **Having a** detailed, comprehensive and up-to-date **list of aid for the green transition of companies and strengthening coordination between operators are two necessary levers to ensure the aid continuum and user journey across all transition phases.** The work undertaken for the deployment of the 'Green transition for businesses'[41] platform (which specifically aims to identify transition aid for businesses, through a personalised pathway) has made it possible to establish inter-operator cooperation on this subject. They will be prosecuted.

[36] ACT *Methodologies:* https://actinitiative.org/en/act-methodologies/ ACT supports French and international companies in their low-carbon transition through two methodologies
[37] *See the mapping work with CSRD carried out for* ACT Step by Step *and* ACT Evaluation *respectively.*
[38] *In 2022, the IGF identified nearly 340 schemes to support the ecological transition of companies proposed by the main State operators, for a total amount of nearly €1.7 billion (Inspection Générale des Finances, 2023, 'Review of aid for the ecological transition').*
[39] *Platforms "les-aides.fr" (CCI), platform "aides-entreprises.fr" (DGE, CMA)*
[40] *Platforms "advisors-entreprises.service-public.fr" (DGE, DGEFP), "bpifrance-creation.fr" (Bpifrance)*
[41] *https://mission-transition-ecologique.beta.gouv.fr/*

In addition, the State will endeavor to draw up a doctrine for the design and development of aid, based on an impact assessment of existing schemes and feedback from beneficiaries, which would make it possible to identify virtuous schemes for decarbonisation and public expenditure, to make a clear distribution of aid between operators on the basis of their expertise and to implement ex-post evaluation indicators in a systematic manner.

- **Company Guideline: 4 Preserving the competitiveness of companies in a low-carbon model**

Businesses, especially the most vulnerable, will be supported in the transition of their business models and in preserving their competitiveness. Targeted accompanying measures may take into account the specificities of the different sectors concerned in order to encourage companies to make the investments necessary for the low-carbon transition. The instruments mobilised will make it possible, in particular, to increase the profitability of low-carbon assets in relation to carbon-based assets.

By providing a favorable framework and appropriate incentives, the green transition will be encouraged while ensuring the sustainability and growth of businesses in the national territory.

- **Company Guidance 5: Ensure proportionality of rules for small and medium-sized enterprises (SMEs) and specific support for small and medium-sized enterprises (SMEs).**

Small and medium-sized enterprises (SMEs), as key players in the economy, play a crucial role in the green transition. However, they have limited human and financial resources to fully engage in these issues, despite their often overt willingness to do **so.** In order to overcome these constraints and to ensure that these issues are taken into account by as many companies as possible, **the State undertakes to provide specific support to these companies, in particular the smallest ones: information on their obligations (CSR Portal), facilitated access to tools and accompanying devices for the measurement of their emissions and the implementation of transition plans, promotion and dissemination of the European voluntary standard VSME to VSEs and SMEs, visibility of the support and resources available (see Part Complements - I.B - Enterprise Guideline 3).**

Moreover, in this transition period, access to finance for VSEs, SMEs and small midcaps is important and needs to be maintained[42] **and strengthened.** In addition to direct public support schemes, this concerns all existing tools and includes in particular green and impact loans and energy savings certificates (EEC).

[42] *For example, funding for the implementation of the ACT Pas à Pas accompaniments and the ACT evaluation of the ADEME*

- **Company Guidance 6: Better integrate environmental planning issues into the curricula certifying company directors and executives**

Strengthening the training and support of economic actors is crucial to integrate environmental issues into professional practices and promote an effective ecological transition of companies by facilitating employee engagement and overcoming obstacles to action. Many public (ADEME, Ministries, etc.) and private actors (Climate fresco,43 2tonnes, Carbone4, etc.) are developing this type of training on environmental issues. **By supporting the upskilling of leaders and ensuring broad access to quality training, companies can transform their behaviour and adopt more sustainable practices. This vital momentum to create an environment conducive to change will be encouraged.**

The State will have to engage in a dialogue with the pilots of certified ecological transition training courses for administrators and managers and ensure that ecological planning issues are properly taken into account in these courses.

- **Company GuidanceGuideline 7: Initiate a reflection on strengthening the eco-conditionality- of aid to companies to ensure compliance with their obligations to contribute to climate change mitigation**

The current budgetary challenges make the cross-compliance of aid to undertakings all[44] the more relevant.

While recent progress can be reported in this area, in particular with the Green Industry Act,[45] existing eco-conditionalities remain limited to the need to support the ecosystem and to the physical and transitional risks faced by businesses. In this context, the question of the extension of the share of expenditure subject to environmental requirements and the calibration[46] of requirements can be raised, with an incentive aim. **The State will consider strengthening the eco-conditionality of aid to companies, in particular to ensure compliance with climate regulations, but also with a view to rationalising public expenditure for the benefit of companies most committed to the ecological transition.**

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[43] In 2023, the Fresque du Climat estimated that around one third of participants were in companies, i.e. 400 000 employees five years after the creation of the workshop – Les Echos, 2023, 'The Fresque du climat becomes a viral phenomenon in companies'.

[44] 'Eco-conditionality' refers here to the general principle of making the payment of public aid conditional on compliance with environmental criteria. Many scenarios exist as to the choice of the scope of the aid concerned, the associated amounts, the criteria selected and the modalities of their application and are intended to be discussed in this section.

[45] Article 29 of Law No 2023-973 of 23 October 2023, known as the 'Green Industry Law', and Article 235 of Law No 2023-1322 of 29 December 2023 on finances for 2024.

[46] The eco-conditionality arrangements for existing public support are mainly based on demonstrating the positive impact of a project (e.g. France 2030 aid), adopting good practices (e.g. CAP eco-schemes) or complying with regulations.

Company Guidance 8: Developing sustainable communication, ensuring transparency of corporate climate claims and tackling greenwashing

The State will support the development of sustainable communication within companies and **ensure that the impact of commercial communications is limited,** in particular those with an adverse impact on the environment. The alignment of the regulatory framework and the current ethical framework with the guidelines of our environmental strategies is the subject of ongoing work.

Directive 2024/825 adopted in 2024 at European level **is expected to**[47] **enter into force on 27 September 2026.** In particular, it will provide a **better understanding of environmental claims on products and services.** The legal framework is strengthened by adding new commercial practices that are prohibited in all circumstances, including 'affirming, *on the basis of greenhouse gas emissions compensation, that a product has a neutral, reduced or positive impact on the environment in terms of greenhouse gas emissions'*. Furthermore, a commercial practice may also be misleading if it involves an environmental claim relating to future environmental performance without being supported in particular by clear, target, publicly available and verifiable commitments set out in a detailed and realistic implementation plan and regularly verified by an independent third party expert. **France will thus have to ensure that these new regulations are implemented and complied with.** As such, the DGCCRF will be responsible for monitoring and collecting any reports on offenders.

The proposed Green Claims Directive aims to **regulate the use of carbon credits and climate claims by companies.** It is still under negotiation. **France will continue to play an important role in the negotiations to achieve a balanced and ambitious text.**

[47] *Directive (EU) 2024/825 of the European Parliament and of the Council of 28 February 2024 amending Directives 2005/29/EC and 2011/83/EU to empower consumers for the green transition through better protection against unfair practices and through better information https://eur-lex.europa.eu/eli/dir/2024/825/oj?local=en*

C. MOBILIZATION OF LOCAL AUTHORITIES

ACCOMPANYING CLIMATE TRANSITION OF TERRITORIES

Credit: Arnaud Bouissou / Terra

ACCOMPANYING CLIMATE TRANSITION OF TERRITORIES

Local and regional authorities, which operate freely at all scales, are key players in achieving France's green transition targets. According to the SGPE, they have in their hands 25% of the green planning levers needed to halve our gross emissions between 1990 and 2030.

The ecological transition of the territories is based on ambitious and coherent planning with SNBC 3 (territorial diagnostics, strategic targets and action programmes) and coordination by the local authorities of the various actors in the territory to implement actions contributing to the targets of SNBC 3.

The main public policy guidelines:

- Strengthen coherence between community policy documents and SNBC 3
- Supporting local authorities in identifying and implementing sufficiently ambitious actions on climate transition (through regional COPs, PCAETs, etc.)
- Improve monitoring of the climate transition at different territorial scales (in particular with indicators to monitor the implementation of the COP and PCAET roadmaps)
- Ensure the decarbonisation of the functioning of local and regional authorities and the tasks falling within their remit (monitored in particular by the BEGES)
- Improve support and financial incentives for local authorities in their decarbonisation process (to prioritise their mitigation-friendly financing, mobilise investment aid for the green transition, etc.)

1. State of play and challenges

Increasing national climate ambition implies close collaboration between the State and local and regional authorities to ensure that mitigation is effectively, coherently and ambitiously integrated into territorial public action, and to ensure that these territorial strategies make a good contribution to national targets, taking into account the specific local characteristics and challenges of each territory. **Through SNBC, the State thus provides a national framework which local and regional authorities, as coordinators of the ecological transition on their territory, apply according to their specific characteristics and activities.**

All the scales of local authorities are concerned - regions, departments, municipalities and their groupings.

Local and regional authorities, which operate freely, have many levers to define and implement climate policies. Their action in the territories is crucial.

They are an essential relay for local actors and citizens, mobilised through animation schemes or through the financial support of local initiative projects (for example: production of decarbonised and renewable energy). Their role of animation and coordination of the climate transition in the territories is essential to operate a multi-stakeholder cooperation and thus bring a dynamic of territorial climate transition federating the actions of all local actors.

They are **responsible for spatial planning, urban planning, mobility and housing, areas on which several national guidelines of the national low-carbon strategy are based:**

- **With regard to planning:** urban densification and the fight against urban sprawl, as well as several levers listed below, cover spatial planning in a cross-cutting way;
- **As regards mobilities:** the return to cities of 'short distances', the development of public transport, the development of active modes (biking, walking …) and the optimisation of urban logistics flows;
- **In terms of energy sufficiency and efficiency,** the densification of urban areas and in particular collective housing also makes it possible to pool the energy expenditure of the built envelope and also makes the development of collective energy networks at district level more efficient: heating or cooling networks;
- **For the buildings sector:** the renovation of public buildings, and indirectly, of the various stocks, as well as the sufficiency in the construction of new buildings. From the scale of housing to that of the city, the principles of bioclimatic planning, by designing urban forms that rely on natural ventilation and luminosity, make it possible to better adapt the district to the climate without higher energy expenditure on air conditioning. Local authorities can also take strong action to renovate: to the social landlords with whom they are associated, by piloting urban renewal actions or the rehabilitation of private housing, or by organising the decarbonisation of heating systems, through the development of district heating networks and local renovation aid;
- **For the waste sector:** material and energy recovery of waste, massive development of selective sorting, improvement of waste water treatment;

- **For the forest sector:** the implementation of the measures provided for in the 'Target for êt' report[48] to ensure forest renewal (see Part-SNBC - III.G). The role of local authorities is multiple: ensure sustainable management and adapt stands to climate change as forest owners, encourage the sustainable management of private forests in their territories in particular for properties below the regulatory threshold of 20 ha, develop financing tools to support local projects, and participate in the animation of the territory for the implementation of sustainable forest management targets as defined in the Regional Forest and Timber Programmes (RFTPs) and the documents for territorialisation of ecological planning. Mayors also play a key role in implementing the strategy to protect forests against fire in the light of their powers: risk prevention (preventive information for their population, control of urbanisation among others), taking risk into account in the planning and equipment of the territory (in particular creation and maintenance of equipment for the defence of forests against fire - DFCI), preparation for crisis management (municipal and inter-municipal safeguarding plans), police power (Article L. 2212-1 of the General Code of Territorial Local authorities) and control (in particular legal obligations of brush cutting). Thus, local authorities and their groups are a major player in the defence of forests against fires;
- **For food:** collective catering, in particular school catering (sustainable and high-quality supplies, vegetarian menus), waste management (related to food waste), urban planning and agricultural land, short-term purchasing (vegetable belt and urban metabolism), combating food insecurity (via social action centres). The target of territorial food projects is to bring the actions linked to these different competences into line with a coherent vision of the transition to healthy and sustainable food for all;
- **The sanctuarisation and development of carbon sinks in and around the city:** protection and development of carbon sinks, soil renaturation, development of diversified plant strata, (re)creation of wetlands, etc.;
- **For all sectors:** environmental clauses in public procurement and the implementation of the land sufficiency policy.

All these levers give a strategic role to local authorities in setting up **action plans.**

Regions, inter-municipalities (EPCI)[49] and municipalities are responsible for territorial planning, through the preparation of regulatory documents (PCAET[50], SRADDET[51], SAR[52], SRCAE[53], SDRIF[54], PADDUC[55], PLU(i)[56], etc.). **These documents are central to the declination of national**

[48] https://agriculture.gouv.fr/rapport-objectif-foret
[49] *Public Establishment for Inter-municipal Cooperation*
[50] *Climate Plan Air Energy Territorial*
[51] *Regional Planning, Sustainable Development and Territorial Equality Scheme*
[52] *Regional Planning Scheme*
[53] *Regional Climate, Air and Energy Scheme*
[54] *Map Director of the Ile-de-France Region*
[55] *Sustainable Development and Development Plan for Corsica*
[56] *Local Inter-municipal Urban Plan*

climate targets within the territories.[57] The planning documents enable local authorities to adopt a long-term, iterative strategic approach (the regional planning plans reflecting the regional executive's strategic territorial vision and the PCAETs must be updated every 6 years) and aligned with the SNBC's national climate targets, as is the case with the relationship between them (the targets and general rules of the SRADDET/SAR/SRCAE take SNBC into account; PCAETs must be compatible with the rules of the SRADDET/SAR/SRCAE and take into account its targets).

Beyond the setting of targets, the success of ecological planning depends on its ownership and implementation by the territories, and their rallying around concrete actions and operational projects, adapted to the specificities of each territory. Through the action plans contained in the local planning documents, local authorities carry this strategic and operational vision. With a view to acceleration and continuous adaptation, the work of the territorial COPs has made it possible since 2023 to amplify the efforts already carried out. These regional COPs, co-facilitated by the prefects and presidents of **the regions, made it possible to ally all local and regional authorities, government departments and representatives of the economic and associative sectors to take ownership of the planning exercise,** to take their share of the national targets and to translate them into concrete projects at the level of each citizen's living area. The recurrent nature of the COPs will make it possible to continuously deepen commitments on all aspects of the green transition and to broaden the number of actors allied. This **work complements the governance of energy planning,** reinforced in the territories by the so-called 'climate and resilience' and 'accelerating renewable energy production' laws.[58] The work of the COPs may ultimately feed into reflections on the preparation or revision of planning documents, depending on their updating schedule.

One of the challenges of the territorialization of the ecological transition is, for local authorities, to achieve a long-term vision, to maintain continuity in territorial policies, over periods that exceed those of mandates.

To implement these policies, **the State has significantly increased the resources dedicated to financing and engineering support for ecological transition actions in the territories,** in particular those carried out by local and regional authorities.

2. The Strategy

[57] *With the exception of overseas collectivities governed by Article 74 of the Constitution*
[58] *For example, with the establishment of regional energy committees or the setting of regional targets for the development of renewable energy on a proposal from the regional energy committees and after consultation with the relevant regional councils.*

a. Presentation of the strategy

Self-governing local authorities are key to achieving France's green transition targets, accounting for 25% of the green planning levers needed to halve our gross emissions between 1990 and 2030.

The strategy to accelerate the territorialisation of SNBC is based in particular on the provision of data and tools enabling local authorities to identify and fully mobilise their potential in order to be part of SNBC's long-term trajectory.

These elements relate to the various stages crucial to the design of a plan or strategy by local and regional authorities:

- **Definition of targets**, based, in the long term, on consolidated and harmonised territorial inventory data and indicative territorial trajectories for the declination of the SNBC.
- **Definition of the action plan, by making it easier to estimate the potential effects of the action plan,** making it a permanent forum for dialogue within the territories and pre-selection of structuring actions on climate change mitigation and adaptation.
- **Monitoring and evaluation mechanism ,** by providing data and a tool for centralising indicators of the green transition.

Beyond these developments relating to the individual stages, a strong challenge is also to ensure coordination and consistency between the various stages constituting a territorial plan.

The State will continue its support, particularly financial support, to local authorities in their decarbonisation, to facilitate, beyond design, the deployment of concrete actions in the territories.

b. Main targets

PCAET Regulation	Aim for a 100% compliance rate with the PCAET regulation in 2030 for obligated inter-municipalities (currently 81% of obligated).[59]
BEGES regulation	Attempt to achieve 100% compliance with BEGES regulations by 2030 for obligated authorities (currently 43% of obligated authorities).[60]
SNBC trajectories	Align the GHG reduction targets of the SRADDETs, SARs and, where applicable, the SRCAEs, as they are revised or updated, with the SNBC 3. Ensure that PCAETs are compatible with the rules of the SRADDET, the SAR or, where applicable, the SRCAE and that the targets of the

[59] *Rate calculated on 1 March 2026.*
[60] *Rate calculated on 1 January 2026.*

	SRADDET, the SAR or, where applicable, the SRCAE are taken into account.
PCAET Action Programmes	Lead ambitious and operational actions by local and regional authorities in the field of ecological transition through their PCAET and CRTE[61], aligned with SNBC 3.
Regional COPs	Establish by the regional COPs regional ecological planning roadmaps, aligned as regards mitigation with SNBC 3, in consultation with the State, the Regional Council and all local authorities and stakeholders in the region.

c. Main guidelines of public policies

Territorialisation guideline 1 : Strengthen coherence between community policy documents and SNBC 3

Local and regional authorities and their respective public institutions are required to take into account the National Low-Carbon Strategy in their planning and programming documents that have a significant impact on greenhouse gas emissions.

Therefore, in order to achieve our climate targets collectively, **local and regional authorities will have to set targets that are sufficiently ambitious and consistent with the new national targets, taking into account historical emissions and the specific characteristics of the territories.**

With this in mind, **in order to facilitate the preparation of local authorities' territorial diagnoses, the definition of targets and the construction of their territorial strategy, the Government will step up its action to:**

- **Consolidate and harmonise territorial GHG inventories**, through the provision of national reference operational guidelines to carry out homogeneous and interoperable territorial GHG inventories on a regular basis. Citepa will be responsible, for each region, by carrying out audits of the inventories carried out, for ensuring compliance with a set of territorial GHG inventories used, in particular, for PCAETs (verification of the methodology used and its adequacy with national recommendations).
- **Update the regional GHG Mondrians, or any document in place thereof,** with the targets of SNBC 3 and, subsequently if necessary, in case of adjustment of the national trajectory.
- **Provide indicative territorial trajectories of SNBC's levers for 2030 and 2050 at EPCI level,** in particular by updating these trajectories in the light of SNBC 3 and deploying these trajectories for the overseas territories. These tools aim to provide, as a basis for local

[61] *Contracts for the Success of the Ecological Transition*

discussion, a tangible vision of the levers of the strategy and the way forward at the territorial level, with indicative territorial targets consistent with national targets.

- **Publish an SNBC 3 breakdown guide in planning documents** such as SRADDETs and PCAETs, particularly for local authorities and decentralized services. This note will aim to support local authorities in bringing their planning document into line with SNBC 3 and will, in particular, summarise various orientations of SNBC 3 that may be used there.

Territorialisation guideline 2 : Supporting local authorities in identifying and implementing sufficiently ambitious actions on climate transition (through regional COPs, PCAETs, etc.)

Given the wide variety of levers at the hands of local and regional authorities, the analysis of the ETACPs[62] adopted by inter-municipalities and the territorial approaches[63] taken shows a variable consideration at local level of the challenges of the climate and energy transition.

To help local authorities identify and implement operational actions that are ambitious and aligned with their mitigation targets and strategy, the State undertakes to:

- **Provide local authorities with data and a baseline methodology to ex-ante assess potential GHG gains from their strategic programmes and monitor their mitigation progress.** This ex-ante GHG quantification of the actions provided for in the territorial strategies of the local authority planning documents makes it possible to guide the decisions taken. It makes it possible to identify the most effective actions to reduce emissions from the territory, thus facilitating the adjustment of local authorities' action plans and roadmaps.
- **Continue the momentum of the COPs allowing a renewed and regular forum of expression for territorial actors on green transition topics.** This renewed forum of expression will make it possible to ensure accountability and regular monitoring of progress towards collectively agreed targets and to create an iterative dynamic regarding the solutions and actions that these actors choose to take in view of their specific territorial characteristics, as well as the financial means that local and regional authorities choose to allocate to these actions. The COPs must also make it possible to integrate the territorialisation of SNBC with the territorialisation of other national strategies such as the National Biodiversity Strategy or the National Climate Change Adaptation Plan (PNACC), in order to ensure an inclusive and coordinated vision of ecological planning. The mitigation component of the Regional COP Roadmaps needs to be aligned with SNBC 3.
- **Guide local authorities in taking into account the directions of this SNBC. To this end, the Government will propose a set of common indicative actions that may be present in the PCAETs.** These actions will cover all emitting sectors (agriculture and food, transport, energy production, residential and tertiary buildings, waste, industry, carbon sinks). These will be

[62] *Report on the contribution of PCAETs and SRADDETs* to green and energy transition policies, submitted to Parliament, March 2022 https://ecologie-preprod.ate.e2.rie.gouv.fr/sites/default/files/publications/Report_article_68_LEC_compressed.pdf
[63] *Review of COP 1 – 2024,* *https://www.info.gouv.fr/upload/media/content/0001/13/52fde6108a068408b53768bf5305d8d75a277f21.pdf*

the most structuring actions[64] for climate change mitigation and adaptation, taking into account the new climate change planning documents. They will be adapted to a large typology of EPCI and can be carried by local authorities and/or other actors in the territory (to allow EPCIs to easily grasp their role as coordinator of the ecological transition in their territory). These developments can be achieved through a revision of the PCAET rules to facilitate and improve the integration of mitigation into the action programmes of the next generations of PCAETs.

Local authorities will be encouraged to implement and refine their action plan, in an iterative process involving the various actors in their territory, taking into account the expected results and the results achieved.

- **Territorialisation guideline 3 : Improve monitoring of the climate transition at different territorial scales (in particular with indicators to monitor the implementation of the COP and PCAET roadmaps)**

Given the timescales of the planning documents for climate transition carried out by the various levels of local authorities (PCAET, SRADDET/SAR/SRCAE and the roadmaps of the regional COPs), **effective management of territorial policies must involve reinforced and continuous monitoring** of these approaches to monitor compliance with and achievement of the targets set, the commitment and implementation of the various actions, the resources deployed, etc. This monitoring makes it possible to adapt to changes, optimise resources and thus constantly improve local authorities' actions.

These steps must therefore be accompanied by assessment and evaluation steps to take stock of the progress made, the progress still to be made and to prepare any changes to be planned to improve the territory's ecological transition dynamics.

To improve, simplify and standardize the monitoring carried out, the State will make available to local authorities data, monitoring tools and centralisation of climate transition indicators at regional level but also at EPCI level.

The State also undertakes to revise the PCAET regulations to facilitate the monitoring and evaluation of PCAETs by local authorities, in particular through a set of indicators deemed strategic given their effects on reducing emissions and the dynamics of climate transition.

[64] *Some examples of structuring actions that could be envisaged in EETPs: 'Develop and improve the supply of public transport (regular and on-demand), shared uses (carpooling and car-sharing) and the use of cycling and walking', 'Improve the sobriety, energy efficiency and decarbonisation of the industrial facilities of the local authority or municipalities (waste treatment, water treatment, etc.)', 'Maintain and restore the local wetlands and their functionalities', 'Encourage agro-ecological practices and organic farming in the local area', 'Renovate the residential building stock linked to the local authority, including summer comfort, and replace fossil-fuelled boilers and non-performing wood-fired heating equipment with a renewable heating system, taking into account air quality issues'.*

For its part, the State will monitor at national level the climate transition dynamics of the territories, in particular through indicators, some of which result from the aggregation of territorial data.

- **Territorialisation guideline 4 : Ensure the decarbonisation of the functioning of local and regional authorities and the tasks falling within their remit (monitored in particular by the BEGES)**

In addition to their role in their territories, **local authorities must also carry out the ecological transition of their own activities.** This is why local and regional authorities with more than 50 000 inhabitants are also subject to the BEGES rules mentioned in the section on rallying businesses.[65] They must therefore publish every 3 years their greenhouse gas emissions balance sheet and a transition plan to reduce them on the perimeter including their assets and competences. Since 2020[66], local and regional authorities subject to the BEGES and PCAET obligations may, in the year of validation of their PCAET, be exempted from the separate publication of their BEGES if all the information requested in it is included in the PCAET.

The rate of compliance with this BEGES regulation for local authorities has increased in recent years but remains insufficient (43% in 2025 compared to 18% in 2021). **The State will support EPCIs obliged to BEGES in order to raise awareness of this regulation and the methodological solutions[67] available to them with the aim of significantly improving the compliance rate.** The inclusion of BEGES in the year of publication of the PCAET should be further recommended in order to produce a more coherent document and to pool the analytical and drafting work.

- **Territorialisation guideline 5 : Improve support and financial incentives for local authorities in their decarbonisation process (to prioritise their mitigation-friendly financing, ally investment aid for the green transition, etc.)**

Local and regional authorities have different financial levers, the orientation and use of which must be optimised in order to strengthen the implementation of green transition actions and thus accelerate the green transition in their territories.

The rebalancing of investments by local and regional authorities, prioritising investments that are conducive to climate change mitigation, and reducing certain investments that have an unfavourable or neutral impact on climate change mitigation, is a key lever to meet national climate neutrality targets, as highlighted in SPAFTE 2025.[68] The gradual introduction of an obligation to assess the environmental impact of local and regional authorities' investment

[65] *Article L229-25 of the Environmental Code.*
[66] *Entry into force of Law No 2019-1147 on energy and climate*
[67] *The BEGES regulatory methodology includes parts specific to local and regional authorities: https://www.ecologie.gouv.fr/sites/default/files/documents/methodo_BEGES_decli_07.pdf*

[68] *Multiannual strategy for financing the green transition and national energy policy – 2025 https://www.tresor.economie.gouv.fr/Articles/2025/10/24/publication-of-the-second-edition-of-the-multiannual-strategy-of-financing-of-the-transition-ecological-and-of-the-political-energetic-national-spafte*

expenditure from 2025, pursuant to Article 191 of the 2024 Finance Law, will improve the information available to the authorities concerned. In this respect, bringing the multiannual investment plans of local authorities into line with climate targets seems relevant in order to promote budgetary arbitrage and local policy choices adapted to each territory, reconciling an increase in low-carbon investments with the preservation of financial sustainability. This investment effort is carried out in a context of control of public accounts, and can be based on the efficiency of investment expenditure, as well as the moderation of operating expenditure.

The State has significantly increased the resources dedicated to the financing and engineering support of climate transition actions in the territories, in particular those carried out by local authorities. In particular, the Green Fund set up from 2023 makes it possible to amplify support for action by local and regional authorities, in addition to the greening of local and regional authorities' investment support allocations. In 2025, a specific envelope of the Green Fund was entirely dedicated to the PCAETs to support local authorities in the implementation of their PCAETs. This measure of the Green Fund, renewed in 2026, aims to reward EPCIs that have adopted their PCAET (including some EPCIs on a voluntary basis), to support them financially in the implementation of their PCAET actions but also to encourage them to adopt ambitious PCAETs for the green transition. Projects and actions financed may cover many sectors (for example: building for renovation, energy for the development of renewable energies, mobility for the renewal of vehicle fleets, etc.) but also helping local authorities to have access to engineering.

Among the other levers for financing the ecological transition, the Caisse des Dépôt Group, through the Banque des Territoires (State public institution), also provides major financial support to local authorities to support them in carrying out their projects in favour of climate change mitigation.

The European institutions financially support certain low-carbon projects of local and regional authorities in France, for example through the Structural Funds or the European Investment Bank.

Finally, **depending on their financial capacity and their indebtedness, some local authorities benefit from financial tools enabling them to ally additional private financing,** in particular through bank loans or green bonds. Their development will make it possible to increase investment by local authorities in favour of the low-carbon transition (see complements part I.G – Economic Guideline 1).

The State will thus support local authorities in activating the various financial levers, particularly public ones, in order to optimise and improve their use to accelerate the ecological transition of the territories.

D. IMPLICATION OF CITIZENS, SOCIAL TRANSFORMATION AND JUST TRANSITION

MAKE EACH CITIZEN AN ACTOR OF THE ECOLOGICAL TRANSITION OF OUR COUNTRY

Appropriations: Jef Bonifacino/ Terra

MAKE EACH CITIZEN AN ACTOR OF THE ECOLOGICAL TRANSITION OF OUR COUNTRY

Citizens will have to take an active part in the low-carbon transition. Almost a quarter of the emissions reductions by 2030 are *ultimately* based on individual decisions, via changes in consumption practices, their modes of transport, or the adaptation of their diets.

To enable the transformation of citizens' lifestyles, **the levers mobilised will** include, in particular, the promotion of sustainable socio-cultural standards, support for responsible communication, and education and awareness-raising for citizens. The low-carbon transition will take into account everyone's capacities, aiming for a just and inclusive transition.

The main public policy guidelines:

Mobilising citizens towards the green transition in a just transition logic	Driving citizens' green transition through communication, culture and citizen participation
• Take into account the room for manoeuvre of each individual when drawing up environmental public policies • Articulating transition and social justice, in particular by targeting aid to the most modest	• Carrying a clear and accessible message around low-carbon transition issues • Developing and mobilising sustainable communication to guide consumers • Fostering citizen participation approaches on the low-carbon transition

Supporting citizens in their own low-carbon transition throughout their lives

- Educating the environment and sustainable development from an early age in schools
- Supporting citizens' education on decarbonisation challenges and solutions from an early age and throughout their lives
- Get involved on an individual scale to reduce your consumption-based emissions

1. State of play and challenges

While the climate measures taken by the State, local authorities or businesses will inevitably lead to significant changes in our daily lives in the medium and long term, **citizens can also take an active part in the low-carbon transition.**

While these **practices ultimately fall within the individual sphere, they are far from being determined solely by individual preferences:** economic and geographical constraints restrict the scope of possibilities and collective norms influence individual behaviour. Moreover, citizens' consumption-based emissions is dependent on many socio-economic factors (income, geographical origin …).[69] In this context, it appears necessary to clarify and implement the social conditions for achieving the green transition. **To be successful, planning will have to give everyone the opportunity to be both a beneficiary and a contributor to the collective project through their actions.** A project was started in 2023 by the SGPE in this context with the publication of a first scoping note[70]. This project will make it possible to define the main orientations of SNBC 3.

The green transition must be achieved as part of a just transition aimed at getting all French people on board and helping the most vulnerable to take part in the collective project, by targeting aid to these groups or by redistributing revenues from ecological taxation. It must also be seen as a lever for greater social inclusion by better aligning the green transition with the targets of combating poverty and social inequalities.[71]

In 2025, **French people had an increasingly developed ecological awareness and to varying degrees, and adopted practices aimed at limiting the impact of their lifestyle on the environment,** according to the 'Sufficiency and lifestyles' barometer published by ADEME.[72] Environmental degradation is among the top concerns of French people, a stable place since 2019 despite the economic and geopolitical crises. They also agree with almost 77% that we "tend to place too much emphasis on material consumption".

Environmental and climate issues have become increasingly important in the public debate and media coverage of environmental issues has intensified. Since the 1990s, the time spent on the environment in JTs has tripled[73] and several commitments and events have punctuated this development.[74] At the same time, the State spent almost €40 million on the

[69] *These developments are addressed in the chapter on the carbon footprint.*
[70] *https://www.info.gouv.fr/upload/media/content/0001/11/3c0b369b1e252d2ff00a1f3851640b1011a18c65.pdf*
[71] *https://solidarites.gouv.fr/publication-of-the-rapport-faire-de-la-transition-ecologique-un-levier-de-linclusion-sociale*
[72] *https://librairie.ademe.fr/society-and-politics-publics/8688-barometer-sobrietes-et-modes-de-vie-2-eme-vague.html*
[73] *https://www.info.gouv.fr/upload/media/content/0001/11/3c0b369b1e252d2ff00a1f3851640b1011a18c65.pdf*
[74] *These include the signing of a 'Charter for journalism commensurate with the ecological emergency' by more than 150 signatories, the addition of an environmental clause in ARCOM conventions, FranceTV's commitments and Radiofrance's 'turnaround'.*

communication[75] campaign on the green transition in 2024,[76] with expenditure increasing over the period 2022-2024. Despite the deployment of these levers, the barometer of social representations of climate change published by ADEME shows that **30% to 35% of French people continue to believe in 2024 that climate change is a 'natural phenomenon as the Earth has always known it'** or deny the reality of climate change, a trend that appears to be on the rise.[77] At the same time, **disinformation on climate issues is on the rise internationally.** Moreover, 42% of French people recognise that their way of life has a 'strong' impact on the environment. At the same time, the market shares of SUV models more than tripled in sales of new passenger cars between 2010 and 2022 and almost half of air passengers say they do not intend to reduce their use of aircraft in the future.[78] Almost 83% of French people also consider that advertising is too present everywhere, all the time in our lives and that it drives excessive consumption (77%).

2. The Strategy

a. Presentation of the strategy

Citizens will take an active part in the low-carbon transition. According to the SGPE,[79] almost a quarter of emissions reductions by 2030 are *ultimately* based on individual decisions, via changes in consumption practices, their modes of transport, or the adaptation of their diets. In addition, citizens must make 35% of the additional investments by 2030[80]. Beyond the impact on greenhouse gas emission reductions, these changes are accompanied by many co-benefits, on health, employment, costs or resilience. **The implementation of SNBC will require the implementation of a just transition:** structural, proportionate, progressive, social and redistributive, taking into account the capacities of each to implement it without overestimating their room for manoeuvre.

The levers to support the transformation of lifestyles by 2030 and 2050 are as follows:

- **Changing the environment in which citizens' and consumers' choices are made.** The State will ensure the availability of the supply and infrastructure necessary to adopt sustainable behaviour and allow access to low-carbon options, whether in terms of transport, energy or

[75] *Work remains to be done to consolidate the total expenditure.*
[76] *Examples are the campaigns relating to the energy efficiency plan, the ADEME campaign 'Let's ask ourselves the right questions before buying'.*
[77] *ADEME, Daniel Boy RCB Conseil 2024, 25th wave of the barometer - Social representations of climate change, Report, pp 11*
[78] *https://www.info.gouv.fr/upload/media/content/0001/11/3c0b369b1e252d2ff00a1f3851640b1011a18c65.pdf*
[79] *SGPE (2024), Embracing a Lifestyle Transition*
https://www.info.gouv.fr/upload/media/content/0001/11/1b76b10c54e34e8baf17b96cc9f051d4ed5e16f5.pdf
[80] *Multiannual strategy for financing the green transition 2 (2025)*
https://www.tresor.economie.gouv.fr/Articles/6b64d7f3-74ec-4eff-888a-2874d79778ec/files/b47f39f5-e281-470b-bd4a-32ce2fc80043

consumption. **The sectoral and cross-cutting guidelines of SNBC 3 aim to create this framework.**

- **The evolution of socio-cultural norms through narratives and cultural productions, but also an improved media treatment of environmental issues** to contribute to a better understanding and greater involvement of citizens.
- **The orientation of consumers towards more environmentally friendly choices .** To this end, the State will create the conditions for a significant change in the commercial communication practices of companies, in order to limit their impact. The development of consumer information devices will also make the less impactful alternative offer more legible and desirable: environmental display, reparability and durability indices, labels.
- **Accompanying citizens throughout their lives to train, raise awareness and accompany them on a daily basis in the ecological transition.** This includes education on the environment and sustainable development from an early age, support for continuing training on environmental issues in companies (see Section I.B – Enterprise Guideline 6) and public services (see Section I.A – EPSGuidance 3), and the deployment of training tools for citizens (collectively or independently) and lifelong support in a transition to lifestyles. Digital tools to support citizens in their transitions will help mobilise citizens, such as the 'J'agis' tool deployed by the General Secretariat for Ecological Planning.
- **Taking into account the capacities of each individual to implement the low-carbon transition in a just transition logic.** Every citizen will be able to get involved at their own scale to reduce their consumption-based emissions, by taking simple steps and getting involved locally. The State will support the most modest in the transition of their lifestyles, focusing on reducing inequalities.

b. Main orientations of public policies

1- Mobilising citizens towards the green transition in a just transition logic

➨ **Citizens' Guideline: 1 Take into account the room for manoeuvre of each individual when drawing up environmental public policies**

Integrating human rights, gender equality and just transition principles into climate policies is essential to ensure a fair and inclusive system transformation. All state and non-state actors, both nationally and internationally, must be mobilised to this end. **France will thus promote climate policies and solutions that leave no one behind.** The latest report of the National Council for Policies to Combat Poverty and Social Exclusion[81] on the social impact of the green transition highlights the low accessibility of less impactful alternatives and, where they exist,

[81] *See Chapter 4, 'Empowering consumers? Costs and availability of less impactful alternatives for the environment', Sarah Thiriot*

their additional cost compared to the initial product. Sustainable consumption is currently not systematically accessible (materially or financially) to a very large part of the population. **France will ensure that just and differentiated transition criteria are integrated into the development of environmental public policies,** taking **into account individual capacities and leeway, and that priority is given to supporting citizens in need.** In particular, while some solutions appear to be cost-effective in the long term, the starting bet is sometimes not accessible. **The State will aim to help trigger these investments.**

- **Citizens' Guideline: 2 Articulating transition and social justice, in particular by targeting aid to the most modest**

Beyond the environmental challenge, the green transition also raises issues relating to equity and social cohesion, all the more so in a context of rising energy costs. **The green transition is also an opportunity to reduce inequalities.** In particular, renovation, which reduces household energy consumption and associated greenhouse gas emissions, is also an issue of individual comfort and public health: feel better at home, in your home. Households with modest and very modest incomes are most exposed to the consequences of poor housing, in particular the impact on health and the budget (energy expenditure). **The government supports and finances the renovation of housing to reduce energy poverty with increased support for the most modest households.**

The Government is committed to making the green transition an opportunity to improve the quality of life of the poorest, for example by:

- Improving housing conditions with better insulation of their habitat;
- Improving their health by reducing air, water and soil pollution and offering more sustainable food products;
- Reducing their dependence on fossil fuels and their energy bill through aid for the purchase of clean vehicles, such as leasing aid, and less emitting heaters;
- Developing alternatives to the car for their travels via new infrastructures and services of public transport, cycling and carpooling.

2- Driving citizens' green transition through communication, culture and citizen participation

- **Citizens' Guideline: 3 Carrying a clear and accessible message around low-carbon transition issues**

The societal transformations brought about by SNBC 3 involve building a desirable imaginary of a low-carbon society. The aim is **to make the transformations in the social dynamics of the strategy desirable and tangible** by highlighting the many co-benefits of achieving climate neutrality (health effect, lower household bills, virtuous … social standards). In particular, cycling culture, the circular economy, sharing and changing diets should be made attractive **through new inspiring and engaging ecological narratives. Culture is an essential vector for sharing the "materialized imaginations".**

The State **will continue to bring a clear and accessible message around these transition challenges** and to mobilise citizens in favour of decarbonisation, sufficiency and the circular economy by seeking to adapt the message and the communication channels to the various targets, while maintaining a fair balance between the mobilisation of citizens and the part to be taken in public policies.

Work will be undertaken to provide public authorities with reliable monitoring tools and to assess quantitatively and qualitatively the media treatment of environmental issues in the media and the monitoring of climate disinformation, in particular through support for the Ecology Media Observatory. Following on from the States-General for Information, media literacy, changes in the ethical framework (ethics committees) and ARCOM's reinforced missions will make it possible to combat climate disinformation effectively and to better address environmental issues in the news media.

- **Citizens' Guideline: 4 Developing and mobilising sustainable communication to guide consumers**

Commercial communications play a daily and powerful role in influencing consumer behaviour and, beyond that, their imaginations and lifestyle desires. **The State will ensure that the volume of advertising messages by type of product is better documented, allowing the deployment of more effective voluntary commitment schemes because they are better monitored, and will consider stronger regulations on certain high-impact products (e.g. fossil fuels and particularly polluting vehicles, as provided for by law, but also ultra-ephemeral fashion)** (see complements part I.B - Enterprise Guideline 8).

Environmental labels will continue to be used as decision-making tools for consumer choices, especially when they are worn by public authorities such as the European Ecolabel.

A new environmental display tool, deployed from 2025 on textile products and then on food products, will help consumers to identify products with a lower environmental impact by indicating the resources used and the pollution generated, thus promoting more environmentally friendly choices. Consideration will be given to possible extensions of the tool.

- **Citizens' Guideline: 5 Fostering citizen participation approaches on the low-carbon transition**

Insofar as lifestyles can undergo profound transformations, the involvement of citizens will also involve participatory democracy and the creation of spaces and time for deliberation (debating, consultation, … participatory workshops) at the initiative of local and regional authorities or associations. **The State will support the establishment of such spaces for dialogue at all levels,** and will help to establish them around the implementation of new public policies, with particular attention to the involvement of all social groups, in particular the most vulnerable. These approaches will be particularly relevant in the context of land-use planning (see Part I.E - Guideline on land-use planning 5).

3- Supporting citizens in their own low-carbon transition throughout their lives

Citizens' Guideline: 6 Educating the environment and sustainable development from an early age in schools

Much progress has been made in recent years with regard to environmental education and sustainable development through the inclusion of climate, biodiversity and environmental issues in school curricula, the designation of an E3D school,[82] and the election of eco-delegates in all middle and high school classes.

Inscribed in the Education Code since 2013, this mission of the School has been further strengthened by the measures taken by the National Education since the years 2019-2020, by the provisions of Article 5 of the Climate and Resilience Law[83] in 2021 and by the action plan adopted by the Ministry of National Education in 2023 'The School, first place of the commitment for the ecological transition'.

Actions have also been included in national action plans and thematic strategies: Water Plan, National Biodiversity Strategy, National Climate Change Adaptation Plan, National Sea and Coastal Strategy, etc. **However, structural measures also remain to be undertaken to ensure the widespread deployment of education for sustainable development and to provide ESD implementation with more resources.** The progression of the E3D label continues: 27% of schools according to the 2025 Annual Review, **with the target of reaching 100% of schools with an E3D label by 2030.**

It will also be necessary to ensure a better link with extra-curricular and extra-curricular times in a spirit of educational continuity and to ensure a better link with higher education.

Citizens' Guideline: 7 Supporting citizens' education on decarbonisation challenges and solutions from an early age and throughout their lives

In addition to the State's commitment to the training and acculturation of civil servants (see Part I.A – EPSSPE 3 Guideline) and businesses (see Part I.B – Enterprise Guideline 6 complements part) on environmental and climate issues and the State's strategy to train French people in key transition professions (described in the 'Employments and skills' section), **the State will disseminate consumer education tools and encourage partnerships with stakeholders in education for the environment and sustainable development, in order to enable the education of all citizens outside the school environment and at all ages of life.**

These tools and partnerships will be implemented at territorial level by local actors and will be implemented in a complementary way with the framework of education for sustainable development in schools, when they are aimed at the youngest. The actions implemented may

[82] *School or Institution in Global Approach to Sustainable Development.*
[83] *https://www.legifrance.gouv.fr/jorf/article _jo/JORFARTI000043956982*

also be part of a shared framework with other national strategies incorporating citizen mobilisation guidelines (National Climate Change Adaptation Plan, National Health and Environment Plan, National Biodiversity Strategy, Water Plan, etc.).

Highlights of the year on the green transition can be mobilised to widely deploy these schemes and make them visible to as many people as possible (European Mobility Week, European Sustainable Development Weeks, World Environment Day, etc.).

- **Citizens' Guideline: 8 Get involved on an individual scale to reduce your consumption-based emissions**

At the individual level, by focusing on climate-friendly lifestyles and consumption, **citizens can become key players in the low-carbon transition by** acting directly on emissions and their consumption-based emissions (sufficiency, food practices, consumption patterns of goods and services, mobility, housing patterns, etc.). In addition to these actions directly affecting emissions from the SNBC sectors, citizens also have the **power to influence French people economy,** and **to direct production methods and financing towards** solutions favourable to the reduction of greenhouse gas emissions (in particular by favouring eco-responsible purchases and green investments for their savings).

To make it easier for every citizen to take action commensurate with their abilities and to raise awareness of their impact, the General Secretariat for Ecological Planning, in partnership with ADEME and OFB,[84] designs and develops 'J'agis'[85] **a digital service (website and mobile application) enabling everyone to have access to concrete, place-based solutions to better act on the ecological transition,** commensurate with their resources, constraints and capitalising on inspiring local initiatives.[86] **The State will continue to support the development and provision of tools to support** the ecological transition at the level of the citizen, **adapted to the way of life of each person. It will also be a matter of strengthening citizen engagement pathways, in particular through the deployment of green civic service.**

In particular, the action levers summarised below will be promoted and accompanied.

	Examples of actions that can be taken at individual level
Transport	- Focus on sustainable tourism, including low-carbon mobility during tourist stays - Focus on the least energy-intensive modes of transport (collective transport, active mobility, etc.)

84 French Office for Biodiversity.
85 https://jagis.beta.gouv.fr
86 What financial aid am I eligible for? Where to buy local near my home? Is the electric car relevant to me? How can we save energy or water?

	- Focus on a light vehicle with good environmental performance and adapted to its use
Building	- Renovate your home, preferably through a global renovation, thanks in particular to the aid available - Opt for highly energy-efficient systems using low-carbon energy for both heating, cooking and domestic hot water production - Set its set temperature for heating and air conditioning, control its consumption of hot water and cooking, favour passive cooling solutions
Agriculture / Food	- Changing your eating habits to reduce the carbon impact of your diet (supplying local, seasonal, sustainable, low-processed products thanks in particular to short supply chains, diversifying protein sources, etc.) - Reduce waste and food waste (adopt appropriate food preservation measures, give priority to distributors and restaurateurs with anti-food waste labels, avoid the purchase of packaged products through bulk sales, etc.) - Putting in place the composting of its food waste[87]
Forest-wood	- Behaving responsibly in the face of forest fire risks and increasing the culture of self-protection Adopt a sustainable and adapted management of private forests through the development of sustainable management documents framed by the forest code (simple management plan, model management regulation, code of good silvicultural practices) - For new construction or home renovations, favour wood products by favouring wood from local sectors and sustainably managed forests Optimize the valorization of wood products (direct end-of-life wood products to suitable valorization channels, etc.)
Waste and goods	- Enter a "Zero Waste" approach: prevent waste creation (avoid single-use products, favour reusable and long-lived products, limit waste, etc.) - Focus on low-carbon products throughout their life cycle (prioritise the purchase of products from circular economy sectors, etc.) - Control its consumption of goods (avoid over-equipment by assessing its needs before any purchase, extend the life of its products, etc.)

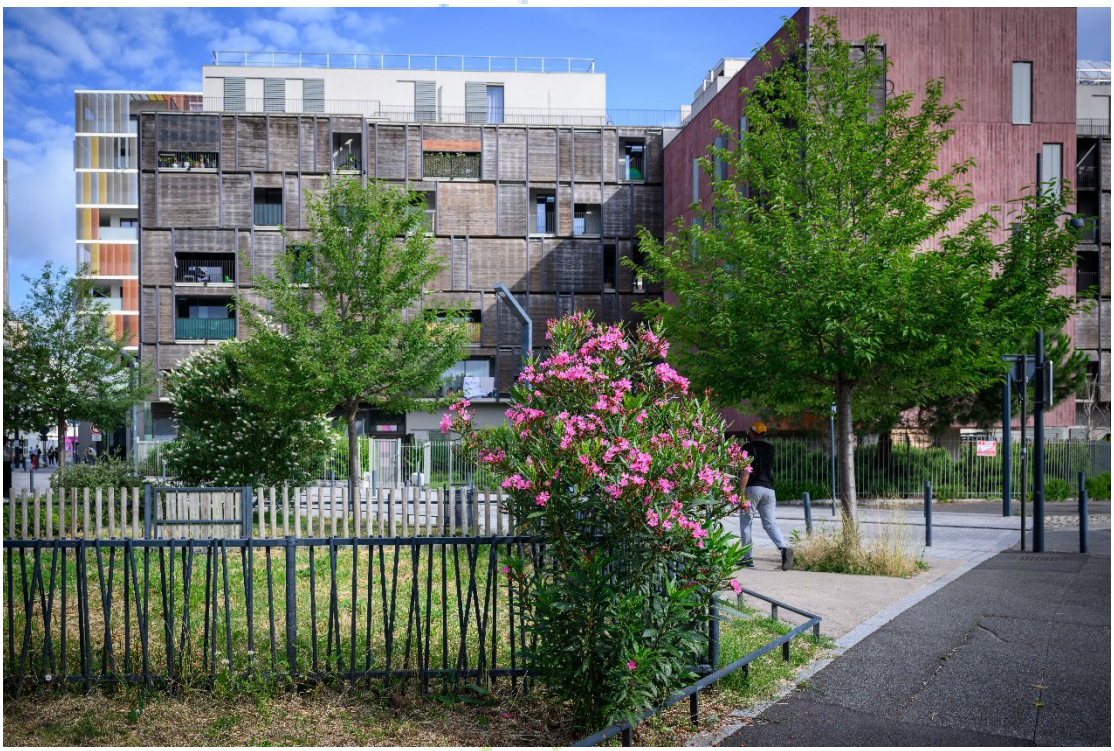
[87] *Biowaste accounts for one third of the content of the French residual waste bin. The law provides that all individuals have a practical solution for sorting their bio-waste at source as of 1 January 2024.*

	- Prefer the repair of a defective product to its replacement (at a repairer labelled 'Qualirépar' to take advantage of the repair bonus on several products or by approaching a collaborative repair association) - Extend the lifetime of its digital equipment (duration of use and number of lives)
Energy production	- Move towards decarbonised energy for self-consumption (produce renewable electricity yourself, for example by installing photovoltaic panels on the roof of your home, participate in citizen and cooperative renewable energy projects, in coordination with the Multiannual Energy Plan (MEP) in the Overseas Territories) - Adopt low-energy behaviour and opt for high-performance equipment (postpone part of its electricity consumption to off-peak periods, favour the least energy-consuming solutions)
Transverse	- Training on green issues (approximately local or online initiatives)[88] - Participate in local environmental life for example in associations (repair, … shared gardens) or citizen councils of the ecological transition

[88] *For example, the National Centre for Distance Learning (CNED) provides free 'B.A.-BA of climate and biodiversity' training.*

E. SUSTAINABLE PLANNING OF TERRITORIES

MOBILIZATION OF LOCAL AUTHORITIES, STATE AND PRIVATE ACTORS FOR SUSTAINABLE PLANNING OF TERRITORIES



Credit: Arnaud Bouissou / Terra

MOBILIZATION OF STATE, LOCAL AUTHORITIES AND PRIVATE ACTORS FOR SUSTAINABLE PLANNING OF TERRITORIES

Sustainable land use planning covers a large part of SNBC's sectors and in this sense is essential to combat global warming.

It must make it possible to structure spaces by achieving a zero net artificialization of them, to rethink the act of planning, to organise low-carbon uses and to optimise carbon capture.

The main public policy guidelines:

- Bringing a new vision of spatial planning to the national level
- Support and improve the integration of climate change mitigation issues into urban planning documents
- Achieving the zero net artificialization target by 2050
- Supporting innovation in low-carbon planning and fostering the sharing of practices between operators
- Accelerating the green transition of planning through participatory ideation and cultural urban planning
- Optimising natural carbon capture at national level through spatial planning

1. State of play and challenges

Spatial planning is understood here as all the actions planned and implemented by public and private actors that structure the space and organise its uses, with the aim of meeting the current and future needs of society in terms of housing, mobility, living environment, economic development, energy, protection of natural resources and access to services (education, health, justice). In this sense, it covers a large part of SNBC's fields of activity. Development is envisaged at all scales: from the group of dwellings, to the municipality up to the national level.

The act of planning is responsible for GHG emissions, in particular by the artificialization of soils[89] **and by the technical biases and materials used.**[90] These issues are accounted for primarily at the time the construction works are carried out.

Indirectly, planning is also an important emission factor. Planning choices have an impact on emissions from the transport sector, in particular by the remoteness of places of residence, places of activity and leisure or by the ability of equipment to accommodate decarbonised mobility. For **the building sector,** the density of development and the ability to pool resources have a significant effect on energy-related emissions. All these emission factors are to be considered over the entire depreciation period of development investments, i.e. 50 to 100 years.

The roadmap for decarbonising the development sector, published at the beginning of 2023 pursuant to the Climate and Resilience Law (Article 301), identifies, inter alia, levers and actions to be implemented.[91]

Planning is at the crossroads of France's transformation challenges and must therefore respond to many challenges related to the ecological transition but also economic, social and societal challenges.

With this in mind, **the target of zero net artificialization in 2050 is structuring** and makes it possible to integrate the challenges of strengthening carbon storage capacities by requiring soil renaturation and preserving non-artificial soils, the challenges of limiting urban sprawl and extending distances travelled, and protecting biodiversity and water. France has thus set itself the target of achieving 'net zero artificialization' by 2050, with an intermediate target of halving the consumption of natural, agricultural and forestry areas between 2021 and 2031 compared with the consumption of the previous decade.

2. The Strategy

[89] *Emissions from land take are accounted for in the LULUCF sector.*
[90] *Associated emissions are accounted for in the industry sector.*
[91] *https://www.ecologie.gouv.fr/sites/default/files/documents/230228_7027_MTE-%20SyntheseDecarbonation_CLE_BATweb.pdf*

a. Presentation of the strategy

Low-carbon planning is a powerful and structural lever for the country's decarbonisation, which requires a considerable change of paradigm: moving from an urban development logic by extension to an urban renewal logic. 80% of the urbanized spaces that will exist in 2050 are already built. **A significant share of GHG emission reductions depends on existing development actions that optimise land use and re-examine needs and uses:** conversion of mobility infrastructure to accommodate decarbonised mobility, development of heat networks, urban renewal, renaturation and greening of public spaces, brownfield recycling, rehabilitation of buildings, limitation of housing vacancy, transformation of business premises into housing, etc.

Development is a value chain bringing together several ecosystems of public and private actors, strongly oriented by local authorities, in particular the municipal block, and the State. It faces **a threefold challenge:**

- **To evolve its economic model** (based on cheap land and therefore on operations in urban extension, less expensive than projects of reconstruction of the city on the city),
- **Maintain a strong innovation capacity** for low-land and low-carbon overall operations, and increase its capacity to intervene in the existing urban fabric in a targeted manner;
- **Responding to the housing and mobility needs of French people,** taking into account changes in lifestyles, the ageing population and their expectations regarding the living environment.

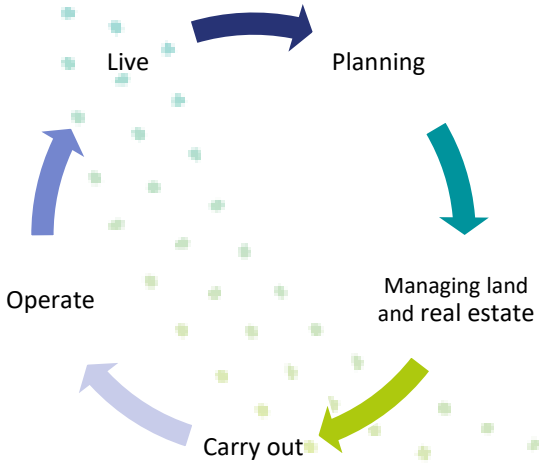


***Figure: 2** Schematic representation of the development value chain*

Finally, **by its very substance, spatial planning faces a major challenge, which is to reconcile the long duration of development (due to the** incompressible deadlines for design, consultation and implementation of projects) **with the urgency of transitions.** While the development time is at least 10 years (the decisions taken today to guide the development of the city will have visible effects only in 10 years) and the development life cycle is at least 50 years, the plans for the territories envisaged must be designed and planned to be still

appropriate in more than 25 years, to ensure a carbon-neutral lifestyle by 2050 and beyond, and adapted to a global warming potential of +4 °C and the events resulting therefrom.

b. Main orientations of public policies

Planning guideline 1 : Bringing a new vision of spatial planning to the national level

In the context of decentralised spatial planning, spatial planning policy is now fragmented between sectoral public policies: housing, mobility, energy, etc. Local authorities stress both the contradictory injunctions of the targets assigned to them, an unbalanced territorial formalisation and a lack of support to implement their projects. Some of our citizens express sometimes unmet needs for equipment, services and the maintenance of economic activity, which are reflected in concern about the future of their daily lives and in a sense of downgrading and abandonment. This can be politically and financially costly.

SNBC, and more broadly ecological planning, through its systemic approach puts spatial planning at the center of the game: climate neutrality and adaptation to climate change require new infrastructure and redevelopment, while meeting the needs of French people. Moreover, a condition for the success of the reindustrialisation ambition lies in a spatial planning policy integrating the mobility and housing issues of employees as well as the issues of resource protection.

The State undertakes to reflect on a new spatial planning policy based on:

- **A new stance,** with a repositioning of the State in terms of planning and the renewal of its support, with the aim of reconciling climate challenges, the economy, agriculture and the protection of biodiversity;
- **A new governance:** while preserving decentralised spatial planning, the target is to enable planning stakeholders to act, with a differentiated territorial approach capable of reconciling sectoral public policies by relying on territorial relays such as territorial COPs, decentralised services and operators;
- **A new method:** after having defined a spatial planning project in a participatory manner, it is a question of mobilising, within a constrained budgetary framework, the most efficient levers to maximise the impact transforming development projects so that, beyond their constructive characteristics, they structure new low-carbon lifestyles at their scale.

To this end, the State will draw up, within an inter-ministerial framework, a State roadmap for spatial planning.

Planning guideline 2 : Support and improve the integration of climate change mitigation issues into urban planning documents

The designers of territorial and urban projects spatialize the challenges of the ecological transition on the territory. Their choices and design proposals impact GHG emissions during the development and then the life of the territories. **Strengthening the integration of green transition issues into design tools would allow them to be better taken into account when drawing up territorial urban planning documents and urban and territorial projects.** The State will also pursue:

- The development of tools for assessing the GHG impact of sustainable actions by a local authority in the planning of its territory (see Section I.C – Territorialisation Guideline 2);
- Facilitating networks bringing together the professional spheres of urban planners and planners with experts in the green transition.

Planning guideline 3 : Achieving zero net artificialization by 2050

The State provides for the continuation of incentives and financial and engineering support for local authorities towards the goal of zero net land take and the definition of a pathway to reduce land take that promotes decarbonisation.

Reducing the rate of artificialization is indeed a structuring lever for SNBC and for the planning value chain. The aim is to focus on land recycling and the mobilisation of existing buildings (optimising already urbanised areas with the use of vacant premises, recycling brownfield sites, the principle of pooling the use of buildings and equipments, the transfer and densification of pavilion areas, *renaturation of unused areas)*. The business model has been amended: brownfield sites, as well as urban renewal operations, may have higher acquisition costs and often require prior investment for demolition and remediation of sites.

To offset these additional costs, the State undertakes to:

- **Ensure and perpetuate measures relating to sustainable development, such as the brownfield measure, within the green fund or other financial arrangements** in order to balance the economic balance sheet of urban recycling development operations that remain loss-making despite the intervention of local authorities with balancing subsidies, **and the measure to accompany soil regeneration.**
- **Encourage local authorities to adopt land strategies,** with the support of public land establishments and the mobilisation of systems for the unbundling of land and built property (solidarity real lease, building/rehabilitation lease), to regulate land prices in sectors where development projects will be needed in the medium and long term, in order to meet housing and economic sovereignty needs in particular.
- **Continue reflection work on the financing of the net zero artificialization,** drawing inspiration from the current mission on the taxation of the net zero artificialization entrusted to the IGF and the IGEDD.

Operations to recycle wasteland or to intervene in existing ones are often complex. **To facilitate their emergence, help local authorities design them and speed up their implementation, these operations may be the subject of partnership development project contracts (PPAs).** PPAs enable the creation of an *ad hoc* contractual framework, endowed by the State with project engineering capacity and financial support, and at the initiative of local authorities, a legal framework aimed at simplifying and speeding up administrative procedures.

In addition, the State undertakes to pursue national programmes such as Action Heart of Town or Small Town of Tomorrow, which make it possible to reconquer declining centralities.

Planning guideline 4 : Supporting innovation in low-carbon planning and fostering the sharing of practices between operators

Low-carbon planning is a new challenge for planners. **In the first place, the State encourages local authorities, planners and developers to use carbon-balance assessment tools at the level of the planning operation or urban island, to guide choices towards low-carbon solutions** both from the point of view of the planning act and throughout the period of use of the development.

The public development institutions (EPA) of the State, thus have an environmental performance roadmap, with several targets contributing to the low carbon trajectory (use of bio-based materials, recycling / upcycling of construction materials, etc.). **By monitoring and pursuing these targets, the State supports the practice of decarbonised planning.**

In addition, **innovative low-carbon development programmes and exchanges between actors in the value chain to capitalise on feedback and foster the sharing of good practices will be continued.** In particular, **the State undertakes to pursue:**

- Connecting stakeholders in the development value chain, particularly within the framework of the National Network of Planners (RNA), which makes it possible to share good practices between planners and encourages the State to identify the technical and legal difficulties they encounter.
- Piloting programmes such as 'Ecoquartier', neighbourhoods with positive energy and low carbon (E+/C-) and national calls for projects such as the Sustainable City Demonstrators (DVD – France 2030) that support low-carbon innovations and develop benchmarks and tools for assessing the carbon balance of projects that will guide the choices of designers and development operators.
- Facilitating incubators for innovative urban projects, such as Lab2051, which covers cross-cutting expertise topics leading to publications, co-constructed with the ecosystem of professionals, on topics related to the decarbonisation of the planning sector.

Planning guideline 5 : Accelerating the green transition of development through participatory ideation and cultural urban planning

The development operations are part of territorial projects aimed at meeting the current and future needs of the inhabitants. However, climate neutrality, adaptation to climate change and the recovery of biodiversity presuppose changes in lifestyles and the relationship that inhabitants have with the territory. These transitions, sometimes at odds with the current practices of citizens, can be perceived as suffered when imposed by a public policy framework. **The use of foresight and the ideation of representations of desirable futures makes it possible,** through narratives and cultural productions (see complements part I.D - Citizens Guideline 3), to make these transitions desirable and effective.

The imagination of the living environment and territorial planning by 2050 requires involving representatives of civil society and residents in participatory approaches (debate, citizen consultation, participatory workshops, consultations, etc.) to outline 2050 territorial projects.

The continuation and capitalisation of participatory ideation approaches and the networking of their holders are a necessary lever for accelerating the green transition in development.

In this perspective, tools such as the 'Territory Workshops' implemented by the DGALN, or action research approaches such as POPSU transition[92] or initiatives to tell the stories of desirable futures carried out by actors such as urban planning agencies, or CAUE[93] deserve to be continued and supported, to the benefit of sustainable territorial projects. **The promotion of experiments and the dissemination of good cultural urban planning practices make it possible, in particular, to transform the act of planning positively.**

Planning guideline 6 : Optimising natural carbon capture at national level through spatial planning

The development and preservation of natural carbon sinks, which allow carbon to be absorbed and sequestered over time, is a necessary condition for achieving climate neutrality. **Spatial planning policies have a role to play in ensuring the development and preservation of these carbon sinks.**

The following targets will be pursued:

- **Encourage particularly ambitious development operations in** terms of the use of local bio-based materials, greening and renaturation;
- **Integrate fire risk prevention into urban planning,** with a majority of fires starting at the interface between the urbanised area and forests and unforested areas;
- **Preserving and maintaining natural carbon sinks** by avoiding the artificialisation or conversion of wetlands, grasslands, wooded areas and preserving marine ecosystems, in particular through the development of a coherent and resilient network of well-managed protected and strong protection areas (according to the SNAP);[94]
- **Facilitate compensation for the residual environmental impacts of development operations** by securing compensation capacities outside operations;
- Within the areas already urbanised, **sanctuarise nature areas in cities and develop them, in particular by means of renaturation measures,** with a view to restoring ecosystems. The carbon capture capacities of living soils and plant strata must be combined with all the environmental and social co-benefits derived from functional urban biodiversity: freshness, regulation of the water cycle, depollution, improvement of the health and well-being of citizens, quality of everyday landscapes, etc.

The State will continue to support renaturation actions in spatial planning by:

- Sustaining the measures for the renaturation of towns and villages;

[92] *https://popsu.archi.fr/program/popsu-transitions*
[93] *Council for Architecture, Urban Planning and the Environment*
[94] *National Strategy for Protected Areas*
https://www.ecologie.gouv.fr/sites/default/files/documents/DP_Biotope_Ministry _strategic-protected areas_210111_5_GSA.pdf

- Promoting the planning and mapping of renaturation projects in framework documents such as Plan Canopée;
- Continuing to implement the priority actions of the 2024-2030 Nature in Cities Plan, which provide a framework for the preservation and development of nature spaces in cities and their ecosystem services, including their carbon storage capacity. The actions of the Plan must be used to rethink the urban fabric to integrate in cities a nature that is beneficial to the preservation of biodiversity and urban societies (adaptation to climate change, improvement of the living environment).

F. RESEARCH

CONTRIBUTION OF THE SCIENTIFIC RESEARCH SECTOR TO CLIMATE CHANGE MITIGATION

Credit: Juliette Pavy / Terra

CONTRIBUTION OF THE SCIENTIFIC RESEARCH SECTOR TO CLIMATE CHANGE MITIGATION

Scientific research has a key role to play in addressing climate and environmental change and contributing to the understanding and development of mechanisms to deploy the green transition.

It should enhance knowledge generation on mitigation solutions to be implemented, mature technologies/systems and technological breakthroughs. Research in the humanities and social sciences will also be structuring to support the societal transformations necessary for a just, sober and sustainable transition.

The main public policy guidelines:

Training in higher education	Research
• Supporting training on green transition challenges in higher education and research	• Tackling climate disinformation through scientific communication • Supporting basic and applied research on climate change mitigation • Intensify incremental research on mature solutions and invent longer-term technological breakthroughs • Mobilizing the human and social sciences to activate the levers of societal transformation essential for the success of the ecological transition

1. State of play and challenges

Scientific research has a key role to play in addressing climate and environmental change and contributing to the understanding and development of mechanisms to deploy the green transition.

For decades, climate scientists have been characterising, quantifying and anticipating anthropogenic climate change through their research, which is summarised in IPCC reports,[95] focusing on the impact it has and would have in the future on continental and marine ecosystems and on our societies. This research has reached an important level of maturity and confidence. **However, the latest IPCC report identifies gaps that need to be addressed** to improve predictions of climate change, its expected impacts on the environment, people and society, **and the assessment of the effectiveness of mitigation and adaptation measures. To address this, research needs to refine the existing knowledge base and tools in the various fields of climate science.**

To achieve France's climate neutrality by 2050, in particular by respecting the Paris Climate Agreement, **national research organisations and higher education and research institutions are at the forefront.**

In 2022, the Ministry of Higher Education and Research (MESR) prepared a Biodiversity Climate Plan[96] to support each research actor in this transition. This plan provides in particular that French research organizations work together to identify the levers and put in place the conditions for the success of the ecological transition in their institutions. The MESR put forward three priorities: training on the challenges of ecological transition and sustainable development, carbon accounting, and the development of a Master Plan on Sustainable Development and Social Responsibility (SD DD&RS), which includes both strategic guidelines and a roadmap setting out all the actions they intend to take in the field of ecological transition, for all the institutions covered by the MESR. In 2024, 16 French organisations collectively committed to contribute through their research activities and changes in their operations to meet the challenges of the ecological transition for sustainable development.[97]

2. The Strategy

[95] *Intergovernmental Panel on Climate Change*
[96] *https://services.dgesip.fr/fichiers/Plan_climat_MESR_4.pdf*
[97] *Their declaration commits its signatories to: Program and implement a research strategy that takes into account all its social and environmental impacts; Support the production and dissemination of knowledge and innovations that bring solutions in line with societal challenges; Develop and implement a policy of social responsibility for our organisations; Lead the transformation of our organisations by mobilising our working groups; Be exemplary in the implementation of the objectives of the State's ecological planning by our establishments; Share annually the progress and transition actions implemented within our institutions; Develop international partnerships and interdisciplinary work on sustainability issues https://www.enseignementsup-recherche.gouv.fr/sites/default/files/2024-01/d-claration-commune-des-dirigeants-onr-pdf-31422.pdf*

a. Presentation of the strategy

The contribution of the scientific research sector to climate change mitigation **will be mainly through:**

- **Training on climate change issues in higher education and research;**
- **Strengthening the production of knowledge on the evolution of the climate and the terrestrial and maritime environment in order to anticipate future changes as** well as possible and to assess in an integrated and systemic way **the mitigation solutions to be put in place, but also adaptation** solutions;
- **stepping up research into mature technologies/systems (batteries,** nuclear, renewable energy, agroecology, urban planning, etc.) to support the deployment of these adaptation and mitigation solutions rapidly;
- **The invention of technological breakthroughs** that will contribute to achieving climate neutrality in 2050, incorporating the question of the transfer and replication of these technologies in emerging and developing countries;
- **support for research in the humanities and social sciences on the just, sober and sustainable transition** to support the necessary societal transformations;
- **The reduction of emissions from the research sector through the implementation of a national approach to control the environmental consumption-based emissions linked to research activities** (the CNRS estimates the emissions of its activities at 14.7 t CO_2e per agent in 2022[98]) based on the sectoral and transversal guidelines of the National Low-Carbon Strategy and the Climate-Biodiversity and Ecological Transition Plan for Higher Education and Research.

The challenges of the transition require an exceptional effort to pool interdisciplinary research forces so that solutions can emerge that can be deployed quickly on a global scale.

b. Main orientations of public policies

1- Training in higher education

➨ **Research orientation: 1 Supporting training on green transition challenges in higher education and research**

Higher Education and Research (ESR) has embarked on a transformation process in favour of the green transition, one of the targets of which is to train the citizens and actors of tomorrow who will have to respond to these challenges, in particular through training on climate change (mitigation, but also adaptation). This concerns both the initial training of students and the lifelong training of teachers and teacher-researchers and all ESR staff:

[98] *https://www.cnrs.fr/en/actualite/le-cnrs-calcule-son-second-balance-carbone*

- The Ministry of Higher Education and Research recommends teaching at least 30 hours of basic knowledge on climate change, biodiversity, resources and just transition issues.[99]
- Climate-related acculturation will be offered to the entire teaching staff and could be made compulsory for new entrants, but also, as far as possible, for school staff. The training of teachers and teacher-researchers dedicated to training students will also be perpetuated.[100]
- The integration of the green transition (including climate change and adaptation) into curricula and disciplines will continue to be promoted. Almost 95 % of higher education institutions now offer awareness-raising activities on the green transition and at least 67 % graduate training.[101] **The aim will be to provide all schools with a foundation of knowledge and skills for the green transition,** which can be a prerequisite for obtaining an undergraduate degree, and to support the co-construction of educational content, by systematising teacher training for the green transition.[102] This target can be based on the feedback from the major training plan for public officials on the green transition. The green transition has also been integrated into the core curriculum of several public service schools.
- The ESR is also committed to meeting the skills needs of trades on the green transition and climate challenges, promoting the stepping stone to jobs in the green transition. To respond to this, a mapping of training in the ESR (FRESQ) is underway and will make it possible to compare the skills expected to respond to green jobs and the evolution of jobs that will have to integrate the green transition. The State will also support the development of specialised training in tension occupations (see Part H – Jobs, Training and Skills).

2- Research

Research orientation: 2 Tackling climate disinformation through scientific communication

Climate disinformation is a major impediment to collective adherence to low-carbon transition policies. It fuels skepticism, delays the implementation of necessary measures and weakens confidence in science. **Scientific research has a major role to play through scientific communication, to raise awareness of issues related to climate change, to develop educational tools and training for a wide audience, and to develop transdisciplinary approaches combining climate science, social sciences and communication.** Research also has a role to play in monitoring media coverage of environmental issues in the media and in monitoring climate disinformation (see Part I.D - Citizens Orientation 3).

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[99] *See the scoping note 'Training undergraduate students in the green transition for sustainable development', sent to school leaders in July 2023.*
[100] *See the ESR Ministry's guidance note 'Training teachers and teacher-researchers in the green transition for sustainable development', sent to school leaders in September 2024.*
[101] *This finding is differentiated by sector, with only 9% of health education programmes offering it.*
[102] *https://www.uved.fr/fileadmin/user_upload/Documents/pdf/Note_Preconisations_Training_TEDS_EC_Version_final_September_2024.pdf*

Research orientation: 3 Supporting basic and applied research on climate change mitigation

France will continue to support research organisations and scientists carrying out work aimed at better understanding climate change and clarifying the various decarbonisation pathways, in particular through programme No 190 of the annual performance project of the general budget 'Research in the fields of sustainable energy, development and mobility'.

The Thesis Prize of the Ministry of Ecological Transition [103]aims to reward research work in the field of environment and climate change, encouraging high-quality academic research and promoting the integration of scientific knowledge into public policies. **It will be sustainable in order to promote scientific excellence and strengthen concrete actions, including for climate change mitigation.**

In May 2025, the Ministry of Overseas Territories and the CNRS signed a financing agreement on the development of knowledge of the effects of climate change and adaptation solutions for overseas territories involving the University of Réunion.

Research orientation: 4 Intensify incremental research on mature solutions and invent longer-term technological breakthroughs

The mitigation challenge mobilises research on the decarbonisation of energy and its uses, urban or rural, on increasing carbon storage capacities linked to the use of land, natural environments and oceans or even on geoengineering technologies where the acquisition of knowledge is necessary to assess their induced risks and their effectiveness. **The challenge for the next 10 years is to develop disruptive technologies and massively deploy existing technologies, improving them and ensuring consistency and acceptability of choices.**

The research will be continued and accompanied. The **France 2030** National Investment Programme is defined by two cross-cutting targets of spending 50% of its expenditure on decarbonising the economy, and 50% on emerging innovation-driven actors, without spending unfavourable to the environment (within the meaning of the Do No Significant Harm principle). These are significant amounts of money for successful green transitions in the 2030 timeframes of which mitigation is part. This is a significant effort, which does not concern all sectors but which has the virtue of bringing together, in particular via the PEPRs,[104] French research forces around issues relating to the ecological transition. Similarly, half of the research funded by the **ANR** [105]or Europe can be considered to address the challenges of the green transition.

As regards the much-needed exploratory research that will emerge from the technological or systemic disruptions of 2050, the France 2030 'research at risk' programme launched at the

[103] *https://www.ecologie.gouv.fr/prix-these-du-ministère-transition-ecologique*
[104] *Priority research programmes and equipment.*
[105] *National Research Agency.*

end of 2023 is a promising approach that will have to be evaluated after 3 or 4 years of implementation.

Research will also be based on the IRT / ITE (Institutes for Technological Research and Institutes for the Energy Transition), the **Carnot Institutes, competitiveness clusters** and **strategic sector contracts and committees.**

The main research themes have recently been coordinated by the new programme agencies, including APED (Programme Agency for Decarbonised Energies) entrusted to CEA and CBSD (Climate, Biodiversity and Sustainable Societies) entrusted to CNRS, or Agralife, entrusted to INRAE.

Horizon **Europe** also aims to strengthen the EU's scientific and technological bases while boosting the competitiveness of its industry.

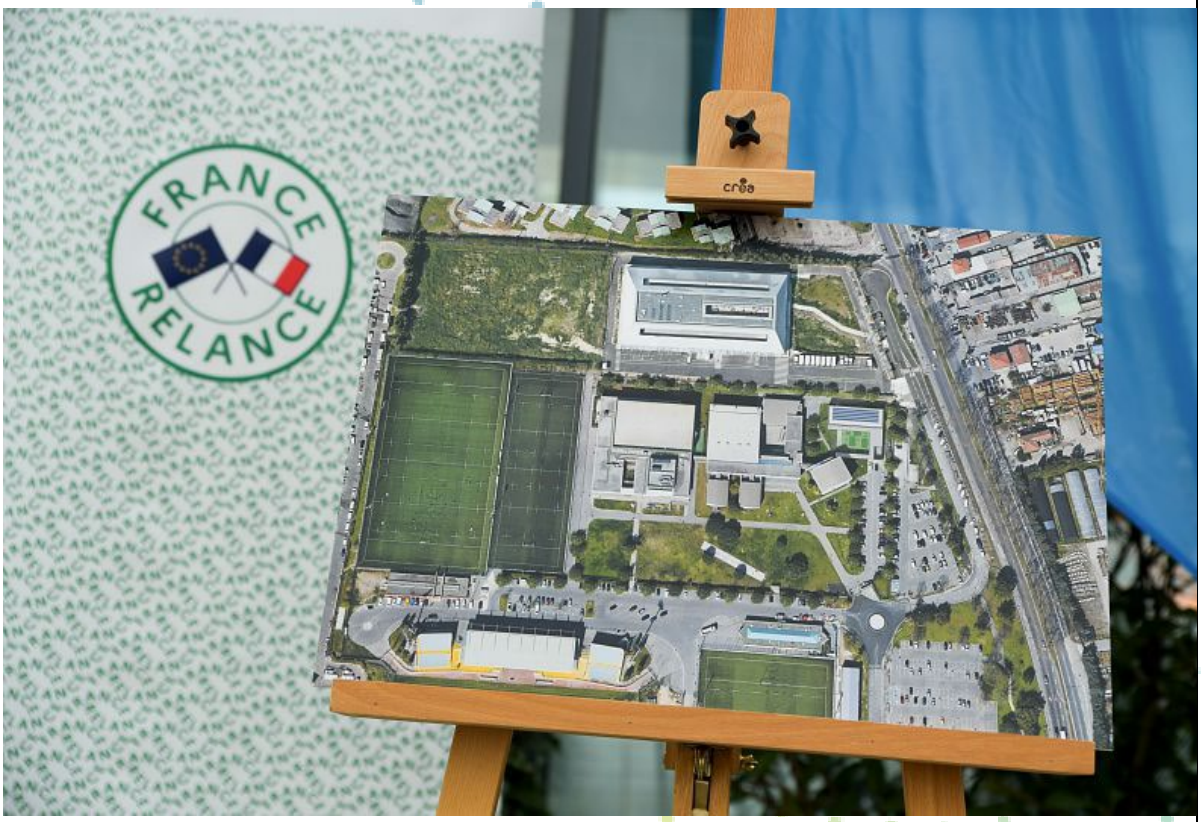
An important challenge will also be to support the transfer of knowledge and research results to stakeholders (companies, managers, etc.).

- **Research orientation: 5 Mobilizing the human and social sciences to activate the levers of societal transformation essential for the success of the ecological transition**

The expected time lag between the rapid transformations required of societies and the less immediate perception of their effects by actors **requires a very strong involvement of the humanities and social sciences to identify and help build the frameworks and levers for action that make possible, acceptable and appropriate the measures to be taken and to characterise the associated vulnerabilities and risks.** It is a question of thinking about transformation rather than optimising the existing one, and of imagining new governances to manage this transition in all regions of the world. **For the two challenges of climate change – mitigation and adaptation – the human and social sciences must be called upon to underpin the terms of a new relationship between humans and nature, identify vulnerabilities and manage risks, think about social and economic transformations and draw lessons from the policies that have won the accession.**

G. ECONOMIC POLICY

MOBILIZATION OF ALL ACTORS TO FINANCE A JUST TRANSITION



Credit: Damien Carles / Terra

<table>
<tr><th colspan="2">MOBILIZATION OF ALL ACTORS TO FINANCE A JUST TRANSITION</th></tr>
<tr><td colspan="2">Achieving the targets of the green transition will require +€82 billion$_{2024}$/year of additional gross investment in 2030 compared to 2024.

The State will mobilise a wide range of public policies to ensure the efficient mobilisation of private and public funding for these investments in a just transition approach.</td></tr>
<tr><td colspan="2">The main public policy guidelines:</td></tr>
<tr><td>Mobilising all actors to finance the green transition</td><td>Mobilize a wide range of public policies to ensure greening of funding</td></tr>
<tr><td>• Develop the multiannual strategy for financing the green transition and the distribution of the burden of effort between the various actors
• Relying on regulatory levers to mobilise all actors
• Supporting the development of sustainable finance and mobilising household savings
• Giving multi-annual visibility to economic actors</td><td>• Mobilising public-private partnerships and hybrid financing, including EWCs
• Continue financing low-carbon projects
• Unifying revenues from carbon pricing and improving the tax structure for carbon and decarbonised energy</td></tr>
<tr><td colspan="2">Ensuring a just transition</td></tr>
<tr><td colspan="2">• Implement measures to support the low-carbon transition of households, including the most modest, businesses and local authorities</td></tr>
</table>

1. State of play and challenges

A strong need for investments for the low-carbon transition in the short and long term

Achieving the targets of the green transition requires significant funding needs, primarily private but also public. In 2024, according to the SPAFTE 2025, **climate investments, both private and public, amounted to €113 billion, down €3 billion compared to 2023** (a decrease partly explained by economic conditions and mainly driven by efficient construction and energy renovation). **In 2024, among the €113 billion $_{2024}$ of low-carbon investments, the public sector directly invested €17 billion $_{2024}$, while the private sector invested €96 billion $_{2024}$.**

Decarbonisation **will require additional gross private and public investment that could amount to around €82 billion/year in 2030** [106]compared to 2024 according to SPAFTE 2025,[107] [108]over a limited scope.[109] They will have to double compared to 2024. The ramp-up of electric vehicles would reduce brown investments in thermal vehicles by around €27 billion per year in 2030. Additional investment needs are allocated to €13 billion per year for the public sector, €40 billion per year for businesses and €29 billion per year for households.[110] **To reach our 2030 climate targets, the low-carbon investment shares of each actor should increase significantly.**

[106] *The projected low-carbon investment needs, estimated at +€110 billion $_{2022}$/year in 2030 compared to 2021 in SPAFTE 2024, are revised to at least +€82 billion $_{2024}$/year in 2030 compared to 2024 in SPAFTE 2025. This update is notably due to (1) the update of the figures on the basis of the latest version to date of the reference scenario of SNBC 3, (2) the comparison with the historical investments of 2024 rather than 2021, and (3) the conversion of €2022 into €2024.*

[107] *On a restricted perimeter.*

[108] *These investment needs are estimated on the basis of a bottom-up and sectoral approach describing a pattern of investments in gross fixed capital formation and consumption of low-carbon durable goods, enabling the objectives of SNBC 3 to be met. The needs are mostly calculated in current euro and do not allow for the internalisation of price changes as a result of macroeconomic mechanisms.*

[109] *Of the €113 billion $_{2024}$ low-carbon in France in 2024 (see Figure 1), €34 billion $_{2024}$ relates to sectors for which investment needs are not shown here (€21 billion $_{2024}$ relates to low-carbon items in the new construction of buildings, which are likely to decrease with the achievement of the objectives of reducing artificialisation, and €13 billion $_{2024}$ relates to items for which we do not have an estimate of needs at the time: for example, the construction of new railway lines and urban public transport, or railway equipment).*

[110] *These estimates do not determine the distribution between the private and public sectors of the burden of financing additional low-carbon investment needs: the public sector can partly finance the decarbonisation of the private sector, and vice versa.*

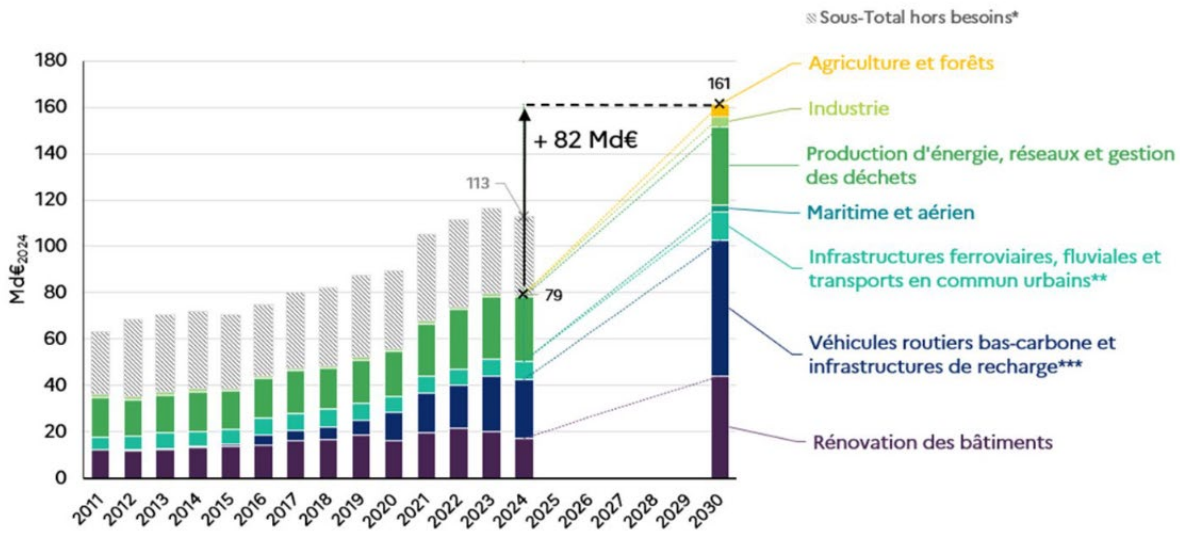


Figure: 3 *Sectoral distribution of the low-carbon investment needed to achieve France's 2030 climate targets, as estimated by SPAFTE 2025.*[111]

To provide visibility and a multi-annual perspective corresponding to these important investment needs, Article L. 100-1 A of the Energy Code provides that **the Government now transmits to Parliament each year a 'multi-annual strategy that defines the financing of the ecological transition and the national energy policy'** (SPAFTE). The second edition of this strategy, published on 27 October 2025,[112] provides an overview of the financing of all economic actors (public sector, businesses, households) with scenarios up to 2030 and provides guidance to strengthen our collective financial mobilisation in support of our environmental and climate imperatives. Financing for decarbonisation is now on the rise in the multi-annual period for all actors, and this momentum needs to be strengthened and continued.

The value of climate action as a tool for assessing the relevance of climate investments

To assess the investments to be made as a matter of priority and their profitability in relation to the emission reduction targets set, SNBC 3 sets out a long-term economic framework and recommends a 'value for climate action' (VAC) trajectory consistent with Article L.222-1 B of the Environmental Code.[113] This tool is a theoretical reference to ensure that you are on the

[111] **Low-carbon historical investment estimates are made on a wider scope than investment needs. The category 'non-investments-needs subtotal' includes historic low-carbon investments in new construction (which have to be reduced with the achievement of the objectives of reducing artificialisation) and sectors for which we do not have estimates of needs (such as, for example, the construction of new railway lines). ** Excluding construction of new railway lines. ***Private vehicles, light commercial vehicles, heavy goods vehicles, buses and coaches.*

[112] Multiannual strategy for financing the green transition and national energy policy – 2025 https://www.tresor.economie.gouv.fr/Articles/2025/10/24/publication-of-the-second-edition-of-the-multiannual-strategy-of-financing-of-the-transition-ecological-and-of-the-political-energetic-national-spafte

[113] https://www.legifrance.gouv.fr/codes/section_lc/LEGITEXT000006074220/LEGISCTA000031055359/#LEGISCTA000031055364

'right path' to decarbonisation at the best cost. It reflects the value that the community chooses to give to public and private actions to avoid the emission of one ton of CO_2 equivalent to achieve climate neutrality at the least cost (it cannot therefore be assimilated to a tax). It is part of a cost-effectiveness approach.

The main role of the value of climate action is first and foremost to guide action by the State, local and regional authorities or public developers. In particular, it is used for the socio-economic assessment of public investments, and more generally of public actions (programmes for the deployment of electric vehicles, thermal renovation of buildings, etc.), by internalising the benefits linked to the fight against climate change. The value of climate action can also provide a reference for companies wishing to have an internal carbon price to inform their choices.

The value trajectory of climate action also makes it possible to assess the scope of socio-economically profitable actions through their abatement costs (the discounted cost of one ton of CO_2e abated by a decarbonisation action compared to a baseline scenario): over a given horizon, any action with an adjusted abatement cost below the VAC would theoretically be cost-effective in a socio-economic approach.

The value of climate action therefore informs the implementation of SNBC 3 in order to identify public policy measures and instruments capable of triggering actions and investments to comply with the decarbonisation trajectory.

A new trajectory for climate action value was proposed by the commission chaired by Alain Quinet[114] in March 2025.[115] The new trajectory acts as an initial upgrade of the VAC, mirroring the increase in the 2030 target. This is €256_{2023}/t CO_2e as of 2025, a significant additional step compared to the level projected by the 2019 trajectory (€187_{2023}/t CO_2e). The growth rate of the value of climate action is set from the outset on the socio-economic discount rate in order to ensure intertemporal neutrality of efforts (the future benefits of the actions taken are neither "crushed" by the discount nor deferred over time). It reaches 300 €$_{2023}$/t CO_2e in 2030 and 563 €$_{2023}$/t CO_2e in 2050.

[114] *The committee, chaired by Alain Quinet, is made up of some 20 environmental experts and economists from universities, research centres and international organisations, the economic and social world, non-governmental organisations and the administration.*

[115] *https://www.strategie.gouv.fr/files/files/Publications/2025/2025-03-20%20-%20Value%20of%20l%27action%20for%20le%20climat/FS-2025-RAPPORT%20QUINET_19mars20h-COUV-vdef.pdf*

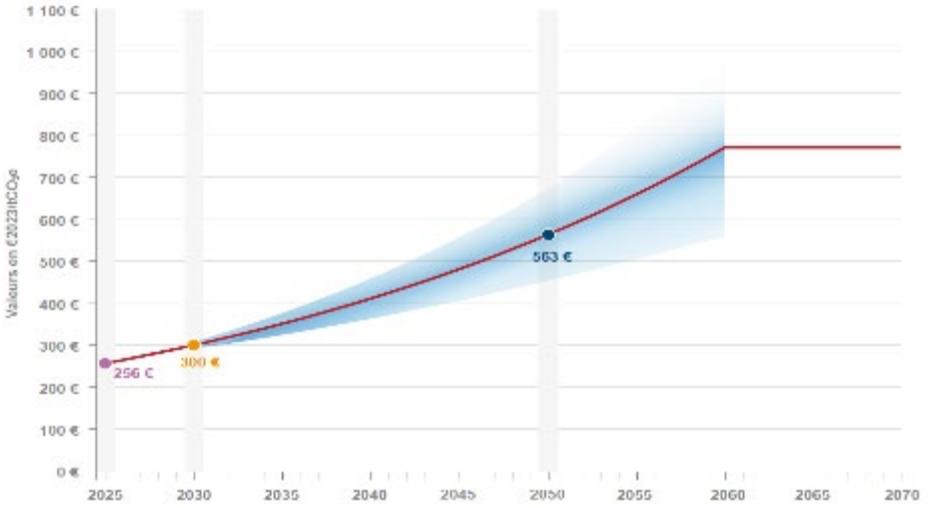


Figure: 4 *Climate action value trajectory recommended by the Commission on the Value of Climate Action, chaired by Alain Quinet and composed of nearly 30 experts from all walks of life. This trajectory is retained in SNBC 3.*

Macroeconomic challenges of the low-carbon transition

The summary report of the mission led by Jean Pisani-Ferry and Selma Mahfouz[116] (May 2023) and the two reports of the Directorate-General for the Treasury on the economic challenges of the transition to climate neutrality[117] (December 2023, January 2025) **recalled that the transition to climate neutrality ultimately generates economic benefits compared to climate inaction.**

As a continuation of this work and building on that of a working group bringing together several administrations and external participants, a macroeconomic assessment of SNBC 3, available in the accompanying report, was carried out. **It 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 the modelling (e.g. reduction of air pollution, health benefit, etc.). Decarbonisation will require significant investment needs.

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

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

mainly imported, the transition will ease this item in the trade balance and reduce the economy's exposure to price shocks, determined in global markets.

Socio-economic challenges of the low-carbon transition

The socio-economic challenges are set out in the SNBC 3 accompanying report. They show that:

- **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 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.

2. Strategy

a. Presentation of the strategy

SNBC 3 aims to establish a framework to trigger investments in a just transition logic by mobilising all stakeholders (companies, local and regional authorities, the State and all French people) and giving sufficient long-term visibility on climate policies. To this end, the Committee for the Financing of the Ecological Transition (CFTE) was tasked with coordinating the action of industrialists, financiers and public authorities in mobilising the financial resources necessary for the ecological transition in France. To bring about such a scenario, a wide range of public policies aims to ensure an **efficient mobilisation of private and public funding for these investments for the green transition.** In a constrained budgetary context, **the government's priority is to mobilise private funding and target public funding according to social justice, efficiency and incentive criteria,** in a multi-annual perspective, as well as to reduce 'brown' spending. Public intervention must be as effective as possible, relying on regulatory incentives and appropriate carbon pricing tools, while allowing for example the financing of essential public goods, and support for vulnerable households and businesses. The combination of several tools makes it possible **to redirect public and private funding flows towards projects for the green transformation of the economy, while ensuring a just and fair transition for all economic actors:**

- **Regulatory levers help** trigger investments by certain households and companies, for example in greening the vehicle fleet, reducing the energy consumption of buildings or decarbonising industry.
- **Carbon pricing tools,** through taxes or the European Emissions Allowance System, provide incentives for economic actors to steer their production and consumption decisions towards less carbon-intensive alternatives. Carbon pricing aims to internalise the negative externalities of greenhouse gas emissions. In both 2023 and 2024, the effective pricing of greenhouse gases (taking into account the taxation applied to these emissions and the emission allowance markets) amounts in France to an average of €91/t CO_2e (CGDD). However, this average level masks large disparities. Energy-related emissions are priced at

€124/t CO_2e, compared to €20/t CO_2e for non-energy-related emissions, 65% of which are not priced[118] at all.

- **The reorientation of private financing flows is encouraged by the introduction of 'green' bonds, targeted government guarantees and labels** (ISR,[119] Greenfin) and helps guide financial flows towards projects that support the green transition. These tools make it possible to mobilize household savings and institutional investments towards sustainable initiatives.
- **Public subsidies** are useful tools to complement these different levers in some cases, such as on the one hand aid for the purchase of electric vehicles and energy renovation (such as MaPrimeRénov'). They direct consumption and investment choices towards less carbon-intensive options by making them more profitable, and make these investments financially viable, in particular for small businesses or households with modest incomes and wealth that do not have the necessary financing capacity.
- **Household savings** are mobilized through labeled financial products and tax incentives to finance green projects.
- **Mechanisms such as Energy Saving Certificates** (CEE) and Extended Producer Responsibility (REP) encourage companies to invest in energy efficiency and waste management projects through public-private partnerships.

The transition raises challenges in terms of equality and just transition. The transition presupposes a capacity to finance public and private decarbonisation levers. Although they may sometimes be profitable in the long term, some low-carbon investments may be non-financeable without public support for certain households: the financing capacities of households vary according to their income, wealth and geographical location, requiring in some cases appropriate support from the public authorities. The problem of financing green investments also arises for companies, especially the smallest ones, which will not necessarily be able to finance all the decarbonisation costs. **The State aims to support certain actors who need it most in order to ensure a just and acceptable transition.**

b. Main targets

Annual fossil investments	Divide fossil investments by two in 2030 compared to 2024
Climate investments in 2030	Double annual low-carbon investments between 2024 and 2030 (at the SPAFTE perimeter).

[118] *https://www.ecologie.gouv.fr/sites/default/files/publications/thema_essentiel_34_tarification_emission_gaz_decembre2024.pdf*
[119] *Socially responsible investment label.*

c. Main orientations of public policies

1- Mobilising all actors to finance the green transition

- **Economic orientation: 1 Develop the multiannual strategy for financing the green transition and the distribution of the burden of effort between the various actors**

The instruments deployed by the public authorities are intended to trigger additional private financing to promote the achievement of climate targets. These guidelines are detailed in the SPAFTE.[120]

The State will continue its efforts to finance the low-carbon transition by also ensuring that expenditure with an unfavourable impact on the environment is reduced (€8.1 billion in 2025). These guidelines are detailed in the SPAFTE.[121]

The draft finance law (PLF) for 2026 consolidates the ecological course set in 2025, reaching an unprecedented level of pro-transition spending. According to the Green Budget, which measures the environmental impact of the state budget, environmentally friendly expenditure increased by €2.1 billion in PLF 2026 compared to the 2025 finance law in 2025 to reach €40.5 billion.[122]

In view of the need for additional investment in the transition and French people economic and budgetary context, **the State will not be able to bear the burden of such investment on its own.** This requires, in particular, thinking both about the distribution of this burden among the main players over time (companies, households, local authorities, the State) and defining the role of the State in this architecture.

The Government is therefore promoting a just transition policy by prioritising direct State support for non-cost-effective and targeted operations targeting households and businesses vulnerable to the economic and environmental consequences of the transition. This targeting should both remove the main social and economic obstacles to the green transition while limiting the cost to public finances. Taxation, regulation or the development of financing tools such as loans or guarantees can be alternatives to direct support through a public subsidy and therefore have a lesser impact on the government deficit.

In addition, a qualitative improvement in expenditure is aimed at by refocusing support on known schemes, targetly contributing to the achievement of our physical targets, combating the risks of fraud and refocusing aid on vulnerable households and businesses.

In addition **to greening its own fleet, the State will aim to deploy targeted extra-budgetary and budgetary mechanisms to enable businesses, local authorities and households to invest in low-**

[120] *https://www.tresor.economie.gouv.fr/Articles/2025/10/24/publication-of-the-second-edition-of-the-multiannual-strategy-of-financing-of-the-transition-ecological-and-of-the-political-energetic-national-spafte*
[121] *Ibid*
[122] *https://www.budget.gouv.fr/reperes/budget_vert/articles/plf-2026-6e-edition-budget-vert*

carbon equipment, in particular by structuring, optimising and improving the visibility of incentive schemes (Enterprise Guidance 3). **The profound changes** linked to the low-carbon transition **will therefore continue to be accompanied by:** energy renovation aid, energy vouchers, aid for the purchase of electric vehicles, etc. **with increased targeting.**

Economic orientation: 2 Relying on regulatory levers to mobilise all actors

New levers can be mobilised, in particular to finance increased investment in the decarbonisation of housing (see Part SNBC III.D - Buildings) and transport (see Part SNBC III.A - Transport) while respecting our public finance trajectory. Regulatory leverage can be mobilised to better articulate and optimise incentives (grants, loans, taxation, regulation) and trigger investments by stakeholders for the green transition.

For the transport sector, the 'Ambition France Transports' financing conference held from May to July 2025 identified a number of proposals for mobilising private financing for the sector and identifying priority issues.

Economic orientation: 3 Supporting the development of sustainable finance and mobilising household savings

Since 2018, the European Union has put in place a regulatory framework on sustainable finance, aiming to steer capital flows towards activities contributing to the green transition.

The European taxonomy, established in 2020, classifies economic activities according to their contribution to the achievement of environmental targets. By creating a harmonised framework at European level, the taxonomy allows investors to better compare the environmental performance of companies and reduce the risk of greenwashing. Taxonomy can be used to design financial instruments and products. Thus, activities aligned with the taxonomy can, since the beginning of 2025, be financed by the issuance **of European green bonds, standardised by a European regulation.**

To guide savers, the European Union and France have adopted rules to ensure that sustainability criteria are properly taken into account in financial products.

- At European level, the Transparency Regulation on sustainability reporting (SFDR) requires investment funds to disclose their negative impacts, mainly on environmental and social aspects.
- Created in 2016, the state label "socially responsible investment" (SRI) is the first sustainable finance label in Europe (> €600 billion outstanding) awarded to investment funds that meet minimum ESG criteria (economic, social, governance). The criteria for awarding the label were strengthened in 2024 to better target transition-friendly investments, including by excluding companies that exploit unconventional coal or hydrocarbons, and those that launch new hydrocarbon exploration, exploitation or refining projects.
- The 'Greenfin' label is another State label, created in 2015, which specifically targets the energy and ecological transition (> €35 billion outstanding) and **certifies green investment funds, in order to help channel funding towards more sustainable activities. Companies engaged in sustainable activities can thus attract additional investment** through this, which also strengthens their credibility. In May 2025, 122 funds were labelled, representing €37 billion in outstanding amounts. The benchmark defining the label criteria was revised in

January 2024, strengthening its consistency with the European sustainable finance framework, including the European taxonomy and to remove nuclear activities from exclusions and include them in the green share of the label, consistent with other decarbonised energies as well as with the European taxonomy.

The arrangements will continue to evolve in a process of continuous adaptation to regulatory developments, taking into account the expectations of financial actors and savers.

The State has also developed, together with insurers and management companies, a new type of bond for SMEs and mid-caps,[123] known as 'transition bonds' (TOs), benefiting from a State guarantee and aimed at long-term financing for the transition, which was launched at the beginning of 2025.

In the process of greening investments, the **reorientation of household savings is encouraged,** in particular by new schemes, such as the Climate Future Savings Plan (PEAC) provided for by the Green Industry Law and the *Livret développement durable et solidaire* (LDDS).

Economic orientation: 4 Giving multi-annual visibility to economic actors

Green planning, through SNBC 3 and its baseline scenario, aims to give long-term visibility to economic actors on climate policies in order to enable the necessary investments to be made for the green transition and to limit the risk of stranded assets. In order to give even more visibility and guide the development of fair and effective public policies, the second edition of the multiannual strategy for financing the green transition (SPAFTE) further specifies the assessment and distribution of financing for the green transition between public and private actors, in line with the public finance trajectory and the targets of SNBC 3. It details several case studies on the profitability of investments (following inter-ministerial work coordinated by the SGPE in 2025) and provides guidance for the coming years. **The annual publication of the document and its consistency with SNBC 3 allow for an end-to-end follow-up of the strategy.**

The Value Pathway for Climate Action (VAC) is a key instrument to complete this long-term visibility. SNBC 3 updates this trajectory, which now serves as a reference and **will have to be used in the future with the following crossing points: €** 256 $_{2023}$/t CO_2e in 2030, € 300 $_{2023}$/t CO_2e in 2030 and € 563 $_{2023}$/t CO_2e in 2050. The methodological framework for carrying out socio-economic assessments of public investments and orders will be updated in order, inter alia, to integrate this new trajectory. The analysis of the possibility of using internal carbon prices consistent with this trajectory in corporate strategies will be supported. The State will also support the analysis of the opportunity of designing a value for climate action at European level to guide future policies for implementing the Green Deal and to strengthen European cooperation on climate issues.

[123] *Intermediate-sized enterprise*

In order to monitor the baseline scenario, **the State will support the use of the VAC to identify the scope of socio-economically profitable decarbonisation actions and the establishment of socio-economic balance sheets of the main measures in the scenario.**

2- Mobilize a wide range of public policies to ensure greening of funding

Economic orientation: 5 Mobilising public-private partnerships and hybrid financing, including CEE

Bank financing **solutions can be developed to replace subsidies for profitable operations. In particular, in the renovation sector, solutions** that are articulated as simply as possible with the public support ecosystem (the Order of 29 March 2025 harmonises certain criteria applicable for obtaining the eco-PTZ with those conditioning the benefit of MPR) **to facilitate the user journey are also implemented.**

Energy saving certificates (CEE), a financing tool that aims to have energy saving operations financed by energy and fuel suppliers, **will also continue to be mobilised with the launch of the 6th CEE period since 1st January 2026 and a work to refocus aid launched.**

Economic orientation: 6 Continue financing low-carbon projects

The Bas-Carbone label (LBC) provides an incentive to reduce national greenhouse gas emissions by officially framing and recognising carbon reduction and sequestration projects in France, the impact of which is quantified in t CO_2e. It provides tangible funding for the emergence of climate-virtuous projects. It has also established itself as one of the benchmarks for climate compensation in Europe. France is taking this example at EU level to inspire the European framework, which is being built by the Carbon Removal Certification Framework (CRCF) regulation adopted in 2024. The territorialisation of the LBC will be perpetuated in order to meet the expectations of the funders to be involved in local, exclusively French, compensation projects. **The LBC will continue**[124] **to evolve,** in particular through the revision of the two main agricultural methods, Carbon'Agri and GrandesCultures, **with the aim of making the system even more operational by incorporating feedback from recent years in order to make the LBC more attractive to its funders and increase its transparency.**

With particular regard to **the obligation to finance low-carbon projects,** several measures have taken place in recent years and have increased demand for financing low-carbon projects with high environmental integrity in France and around the world (obligation to finance low-carbon projects up to the level of emissions from domestic flights;[125] obligation to finance low-carbon

[124] *The LBC's two flagship forest methods, afforestation and restoration of degraded forest stands, were revised and approved in 2025, resulting in major improvement efforts.*
[125] *For aircraft operators subject to the EU Emissions Trading System and generating more than 1 000 tonnes of CO_2 per year in the national territory.*

projects commensurate with the emissions from coal-fired[126] power plants, commitment to finance low-carbon projects commensurate with the GHG emissions of all flights carried out by public officials and public institutions).[127] For the renovation of the building, innovative financing schemes, such as third-party financing, financial leasing and energy performance contracts (CPE) have developed. Third-party funding was opened up to the State, public institutions and local and regional authorities[128] on an experimental basis by the Law of March 2023 on third-party funding. **The State will continue to deploy these devices.**

France is also committed to international cooperation in achieving global decarbonisation targets through Article 6 of the Paris Agreement, enabling, to a limited extent, 'international transfers of mitigation results', with the priority of both French and European climate action remaining the decarbonisation of our economies.

- **Economic orientation: 7 Using carbon pricing revenues and improving the tax structure for carbon and decarbonised energy**

The reform of the EU Emissions Trading System (EU ETS) adopted in 2023 (see Part SNBC - I.B)[129] **should result in an increase in the revenues that Member States derive from the European carbon market, and a strengthening of the Innovation Fund, which finances innovative low-carbon technology projects in European industrial sectors.** One challenge in the coming years will be to **make effective use of these increased resources for France's ecological transition** in order to meet the target set by all Member States of devoting 100% of EU ETS revenues, or their equivalent in financial terms, to climate spending (compared to 50% before the reform).

In addition, the 2023 European reform also created a new carbon market at European level by covering CO_2 emissions from fossil fuels used in the road transport, building, construction and small industry sectors.

This reform provides **for the establishment of a Social Climate Fund (SCF) to mitigate the impacts of the implementation of ETS2 on the most vulnerable households and businesses and to support them in their decarbonisation.** Member States are also free to propose additional support schemes based on the revenues of this new carbon market. The CSF will be endowed with EUR 65 billion at European level over the period 2026-2032.

Inter-ministerial work was carried out in 2025 **to improve the alignment of the energy taxation structure with their environmental merit.** The aim is to make decarbonised energy more

[126] *Prolonged to address the energy crisis related to the war in Ukraine in the Law on "Emergency Measures for the Protection of Purchasing Power» called "MUPPA Law".*
[127] *Whether national or international (Eco-responsible Public Services Circular).*
[128] *Law No 2023-222 of 30 March 2023 to open third-party financing to the State, its public institutions and local and regional authorities to promote energy renovation works.*
[129] *The reform of the EU Emissions Trading System provides for an accelerated reduction of the emission ceiling (-62% in 2030 vs. 2005, compared to -43% before the revision), inclusion of the maritime sector and a trajectory for the removal of free allowances from the aviation sector as well as for certain sectors at risk of carbon leakage as the carbon border adjustment mechanism gradually becomes more burdensome.*

competitive than carbon-based energy. Technical work will continue over the coming years, taking into account developments in the European framework and the challenges of protecting vulnerable households and the competitiveness of French people economy, in particular the most exposed sectors, such as agriculture or energy-intensive industry, and the most vulnerable companies, such as fossil-intensive small and medium-sized enterprises.

3- Ensuring a just transition

- **Economic orientation: 8 Implement measures to support the low-carbon transition of households, including the most modest, businesses and local authorities**

To enable each household to take part in the decarbonisation of France, in particular to reduce its consumption of fossil energy, it is imperative to consider the socio-economic impacts of the transition on all actors in society, taking particular account of the heterogeneity of household situations. Impacts are differentiated, in particular according not only to household incomes and wealth, but also to other characteristics such as their geographical location. The State will ensure the acceptability of decarbonisation measures, adjusting the effort required of each household, in particular through targeted accompanying measures.

In addition to supporting modest households, the achievement of national climate targets may also justify, where necessary, supporting certain organisations (companies, local authorities, associations) that are among the most vulnerable or in a more fragile economic situation. This support may result in the targeting of public policy instruments for decarbonisation.

In addition, **the State will endeavour to strengthen its capacity to monitor indicators of trends in energy poverty, particularly those linked to gender inequalities and energy vulnerabilities** (single-parent families composed of a mother and her children, and elderly women living alone and with low pensions are over-represented among households in energy poverty and particularly vulnerable to an increase in energy prices)[130] in order to ensure gender equality in the development, in particular, of support schemes.

[130] *Bousquet A. and Sanin M.-E. (2024) 'Car-fuel poverty: Determinants and policy implications for France", Transportation Research Part A: Policy and Practice, 185(2024), 104095, p.7*

H. EMPLOYMENT, TRAINING AND SKILLS

PROVIDING PROFESSIONAL TRAINING TO MORE 200,000 PERSONS PER YEAR TO SUCCESSFULLY ACHIEVE THE LOW-CARBON TRANSITION

Credit: Arnaud Bouissou / Terra

PROVIDING PROFESSIONAL TRAINING TO MORE 200,000 PERSONS PER YEAR TO SUCCESSFULLY ACHIEVE THE LOW-CARBON TRANSITION

The low-carbon transition will lead to employment reallocations and deep labour market developments, which will need to be accompanied to limit the negative effects.

The aggregate net effect on employment could be positive, but the magnitude of this effect is surrounded by uncertainties. According to the Jobs and Skills Strategy for Ecological Planning, the low-carbon transition is expected to require the vocational training of more than 200,000 people per year, a majority of whom are technicians and workers.

The levers to achieve this will require mobilising all economic sectors and territorialising the strategy, in order to support changes in the economic fabric (in particular SMEs), as well as current and future assets by stimulating vocations, improving the attractiveness of jobs useful for the green transition and facilitating training.

The main public policy guidelines:

Fostering vocations and improving the attractiveness of jobs relevant to the green transition	**Professionally train more than 200,000 people per year in jobs useful for the ecological transition**
• Enhancing the attractiveness of the sectors and professions of the future	• Train before the first job • Train throughout the life

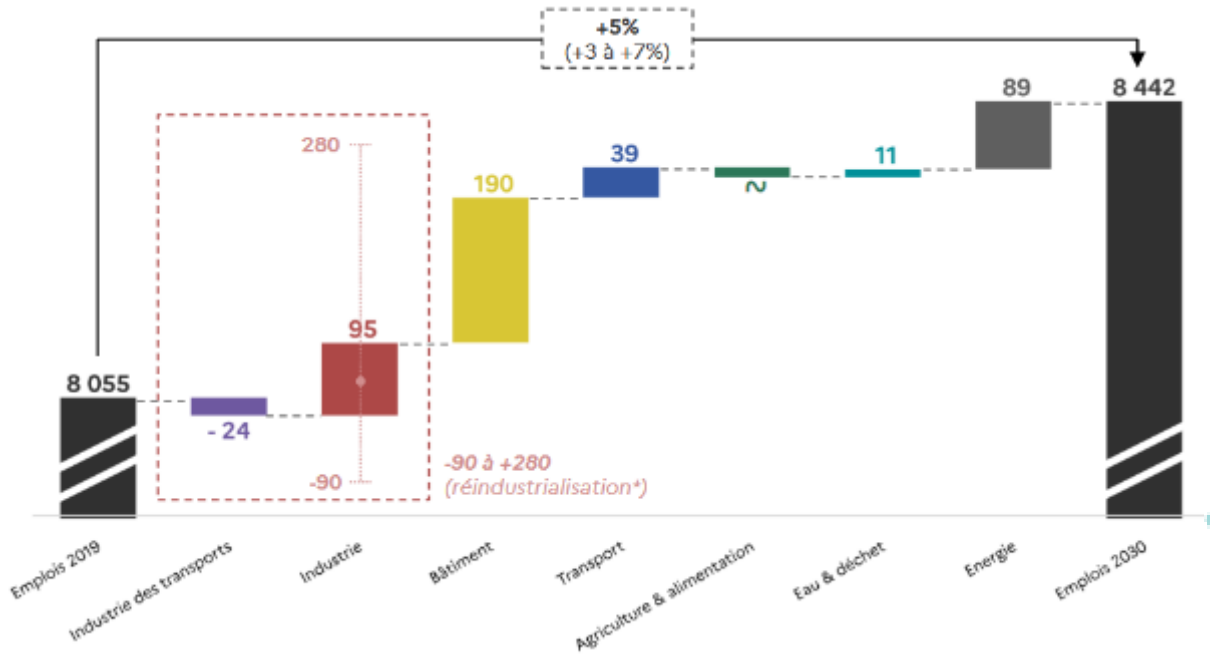
Mobilising and supporting economic actors in training for the low-carbon transition

- Relying on regions and state services
- Engaging companies

1. State of play and challenges

SNBC 3 measures will mobilise all economic sectors, taking into account the country's reindustrialisation ambition and developing innovation for the transition. **Nearly 8 million jobs in the private sector are thus directly concerned by the guidelines for ecological planning and SNBC 3,** [131]mainly in the sectors of energy renovation of buildings, transport, the development of low-carbon energy, industry via reindustrialisation or the agro-ecological transition.

At the macroeconomic level, the transition to climate neutrality will lead to job reallocations with a potential positive aggregate net effect on employment, albeit surrounded by uncertainties. According to the SGPE employment-skills strategy, the implementation of the green transition could **create between 200 000 and 550 000 net jobs by 2030 in several sectors,** [132]with profound reconfigurations in sectors and at the level of employment basins. At sectoral level, the construction sector is expected to create almost 190 000 jobs by 2030. The dynamics of green reindustrialisation would generate nearly 95,000 jobs in industrial sectors. Strong investments in the energy sector would create nearly 89,000 jobs. As a result of job creation aimed at promoting modal shift, the transport sector would see a creation of 39 000 jobs, with a strong recomposition of the job structure in the sector with the electrification of the vehicle fleet and the recomposition of freight transport.



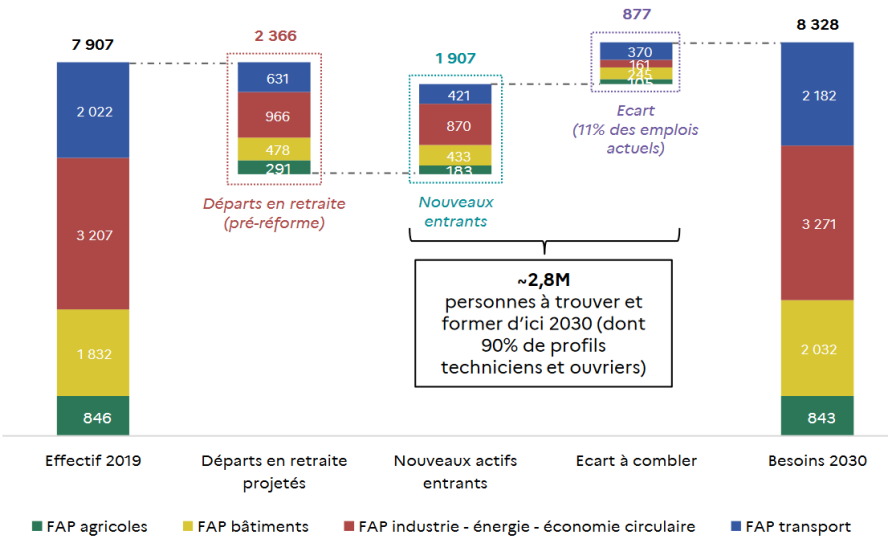
[131] https://www.info.gouv.fr/upload/media/content/0001/10/df0f4182ce4d0e71f75a915e68ed32f233c82b35.pdf

[132] *The forecasts presented in the graph below are based on a classification of activities (NAF) and a collective agreement (IDCC) and are based on the work of the Prospective des métiers et qualifications (PMQ) group of France Stratégie and the DARES, which carry out a forecast of job trends according to three scenarios, based on the assumptions of SNBC 2. The figures indicated are therefore indicative and will be updated on the basis of SNBC 3.*

Figure: 5 *SGPE modelling on the basis of the Prospectives des métiers et qualifications (PMQ), projections from the EDECs (water, gas, electricity, mobility), diagnostics from calls for expressions of interest on skills and professions for the future, studies and extrapolations from the sectors (Automotive Platform, National Association for Automotive Training);*

The implementation of the green transition will face a strong need for vocational training by 2030 to meet the needs of green planning, but also generational renewal and retirements (with an early retirement of 2.4 million people and an inflow of 1.9 million assets), which are significant in some sectors. Thus, **almost 2.8 million people remain to be trained by 2030,** with disparities across regions. The most important vocational training needs will be in the agricultural sector (deficit of 75 000 jobs), the construction sector (deficit of 245 000 jobs), the industrial and energy sectors (deficit of 161 000 jobs) and the transport sector (deficit of 370 000 jobs). In addition, recruitment pressures are already present in some of the priority sectors targeted and some occupations are unattractive, and it could deteriorate with climate change. Training needs amount to **2.5 million technicians and workers** to be identified and trained by 2030 in key sectors, i.e. almost 225 000 each year in the bac-3 / bac +3 segment (mostly CAP and BTS). 80 000 to 100 000 young people will have to be trained every year by 2030.

At national level, the coverage rate of training to meet these needs should be sufficient by 2030. However, this is not the case at regional level, in particular for the transport and building sector, indicating the need to regionalise the strategy. In addition, the regional level is essential in the skills framework for green planning, with the majority of skills (vocational training and apprenticeships, funding of training through the Regional Skills Investment Pacts…). The aim will also be **to improve, by means of training, the filling rate, the conversion of training to employment in the planned sector and the acquisition of sufficiently sustainable skills.** Particular attention will be paid to employees of SMEs, very small enterprises and mid-caps who spend relatively less time in training than in large groups, limiting the ability of certain sectors to transform (especially construction).



Evolution des effectifs par famille professionnelle (FAP) entre 2019 et 2030

***Figure: 6** Training needs by 2030. SGPE Modelling*[133]

Several support tools exist today to meet this important need for initial and continuing training by 2030 and to promote professional retraining for careers in environmental planning in all age groups. Initial secondary and higher education, as well as green apprenticeships and civic service, can help steer young people towards the challenging jobs of the green transition. Attracting jobseekers and current workers to these sectors can be done through the personal training account (CPF), promotion through Alternance, career transition projects or career development advice. Integration through economic activity may also be a lever to attract people who are far from employment to these sectors.

However, a number of these schemes are currently not sufficiently geared towards ecological planning professions. The use of the CPF, based on the free choice of its holder and having as its target the integration, maintenance and evolution in employment, could make it possible to direct more towards the needs of ecological planning (in particular with means of co-financing proposed by third-party funders). In terms of initial training, only a relatively small proportion of work-study placements are geared towards the ecological transition trades (15% of the 1 million apprenticeship training places would be linked to the priority issues of ecological planning). The mobilisation of these schemes for green planning professions will also have to take into account other long-term economic challenges, such as the digital transition or the reduction of recruitment pressures.

2. The Strategy

a. Presentation of the strategy

The purpose of SNBC 3 is to describe the sectoral and transversal guidelines for achieving our climate targets, incorporating a genuine industrial dimension and skills. As part of the work on employment and skills in ecological planning, work is underway to identify and build the necessary actions, which has already led to a first publication of the SGPE[134] with the development of action plans by the competent administrations, for the entire spectrum of the ecological transition. An approach to territorialise the strategy has been launched in order to mobilise the employment and training ecosystem present on the territory and to involve the regions, which are competent on these issues, in order to attract, train and recruit in the sectors at stake.

Ecological planning requires **mobilising all professional branches and economic sectors, taking into account the country's** reindustrialisation ambition and developing innovation for the

[133] *Compared to the previous graph, the scope of accounting is slightly different, focusing on occupational families, making it possible to have visibility into the levels of qualification required by the occupations. This explains the slight difference on the initial starting point.*

[134] *https://www.info.gouv.fr/upload/media/content/0001/10/df0f4182ce4d0e71f75a915e68ed32f233c82b35.pdf*

transition. **Action plans,** co-constructed between the professional sectors and the professional branches, and the State will be **deployed by targeting sectors at stake,** such as the action plan for skills in the nuclear sector.

The levers to meet this need for training, mainly at the hands of sectors and branches, and regional players, are:

- The ability to generate vocations and improve the attractiveness of jobs useful for the green transition by increasing the attractiveness of the sectors and professions of the future.
- Facilitating training for high-stakes jobs. The skills and training needs not covered will be identified by occupation, by level of qualification and, where appropriate, by region, in order to encourage the introduction of new training pathways or the development of existing ones. Existing tools to train and facilitate the retraining of workers (Personnel Training Account, Professional Transition Project, Career Development Council, Skills Development Plan, etc.) will be fully mobilised to ensure that resources and needs are well matched throughout the territory and in each sector. All pools will be mobilised to train more than 200 000 people per year, through youth, jobseekers and workers.
- Mobilising and supporting all economic actors, public services and local authorities.

b. Main orientations of public policies

1- Fostering vocations and improving the attractiveness of jobs relevant to the green transition

➨ **Employment Guideline: 1 Enhancing the attractiveness of the sectors and professions of the future**

The attractiveness of the sectors and professions of the future will be enhanced by means of social dialogue, the recognition and valuation of skills, the debate on working conditions and wages, as well as by mechanisms aimed at impacted employees allowing them to discover these professions and professional opportunities. This will also be the case through the issue of professional transition of assets, which will be able to rely on public support schemes for professional transitions (such as the professional transition project (PTP) or the collective transition scheme).

The attractiveness of the professions will also be sought through the education system and the improvement of school guidance. In particular, the establishment of school-business and employment and training-business partnerships to strengthen the link with existing recruitment pools will be supported. Discovery competitions on a few key trades may be organised for high school, college and vocational classes, along the lines of the partnership between the Interministerial Delegation to the New Nuclear Sector and the University of Nuclear jobs or the Jobs and Qualifications Campuses.

2- Professionally train more than 200,000 people per year in jobs useful for the ecological transition

Employment Guideline: 2 Train before the first job

Initial training institutions will be fully mobilised to enable the acquisition of transversal skills, as well as sectoral skills, as close as possible to the professions through significant changes in the training offer. **Mechanisms could be put in place,** within the framework of France Nation verte, **to improve the readability and attractiveness of the existing and future offer.**

Employment Guideline: 3 Train throughout your life

The transformation of continuing training already under way will be continued so that it better integrates the challenges of decarbonisation and, more generally, the green transition, and provides the necessary skills for all the targets: elected officials, public and private decision-makers, employees, citizens. The sectoral diagnoses of skills needs drawn up in particular within the framework of France 2030[135] will be mobilised to draw up the necessary plans. The qualifications frameworks will be updated in order to adapt the content of the training courses linked to SNBC.

The Government will focus on **creating the conditions for assets to make better use of their Personal Training Account (CPF) to train on the challenges of ecological planning and to target entrepreneurs.**

3- Mobilising and supporting economic actors in training for the low-carbon transition

Employment Guideline: 4 Relying on regions and state services

Government departments and local authorities are at the forefront of implementing the jobs and skills strategy for ecological planning. The momentum is launched with the second year of the regional COPs through voluntary approaches. Several regions already have dedicated road maps (e.g. PACA and Occitanie regions). The desire to enrich the roadmaps of the COPs with a section dedicated to anticipating the need for jobs and training to achieve the targets of ecological planning, led by the State, has also been an opportunity to work closely with the Regional Councils, which have the relevant expertise. The work initiated by the COP was able to draw on the expertise of the Regional Employment Committees (CRE) and the COP impulse allowed for a thorough integration of the green transition into the work programme of the local employment committees. The next challenge will be to undertake a scaling-up at sub-regional level and by large employment pool.

[135] *https://www.info.gouv.fr/organisation/secretariat-general-pour-l-investissement-sgpi/cma-liste-des-diagnostics-de-formation*

In particular, the regions are the spearheads of vocational training. At the same time, the conversion or even closure of certain sites, and the decline or abandonment of certain activities, call for **accompanying measures at territorial level** up to incentives for the mobility of assets from one territory to another, by mobilising and coordinating all the bodies and services that can contribute to it. In particular, the renovation sector will face a peak in job demand in the short and medium term, which is expected to decline in the longer term. The sector will also need to be supported to facilitate the transfer of skills between construction and renovation and to ensure peak demand.

The Government will work to identify mechanisms to better direct public funding towards the priority needs of ecological planning (abundance, franchise exemption…) and will launch a campaign with public contributors to raise awareness.

Employment Guideline: 5 Engaging companies

France will continue the actions undertaken under the France Recovery Plan, the 'France 2030' investment plan and the Law of 23 October 2023 on green industry to mobilise companies:

- **Work with sectors and professional branches to converge the ambition of their decarbonisation roadmaps** with the challenges of SNBC 3, ensuring the need for jobs and skills;
- **Mobilise large companies** (particularly publicly owned companies) to develop ambitious transition plans, thereby creating a spill-over effect;
- **Develop tools to facilitate the matching** of job vacancies and applications, by identifying and characterising the skills acquired/required;
- **Supporting large and medium-sized enterprises** in the implementation of new regulatory requirements (see Part I.B - Enterprise Guidelines 1 and 2);
- **Enhancing the readability of transition aid** for very small enterprises and SMEs (see Part I.B - Enterprise Guideline 3);
- **Supporting reindustrialisation projects** compatible with the ecological transition (see Part SNBC III.C - Industry Orientation 1);
- **Encourage investment** in green innovation (see Part SNBC III.C - Industry Orientation 1).

I. REDUCE THE CONSUMPTION-BASED EMISSIONS OF THE DIGITAL SECTOR

REDUCE THE CONSUMPTION-BASED EMISSIONS OF THE DIGITAL SECTOR

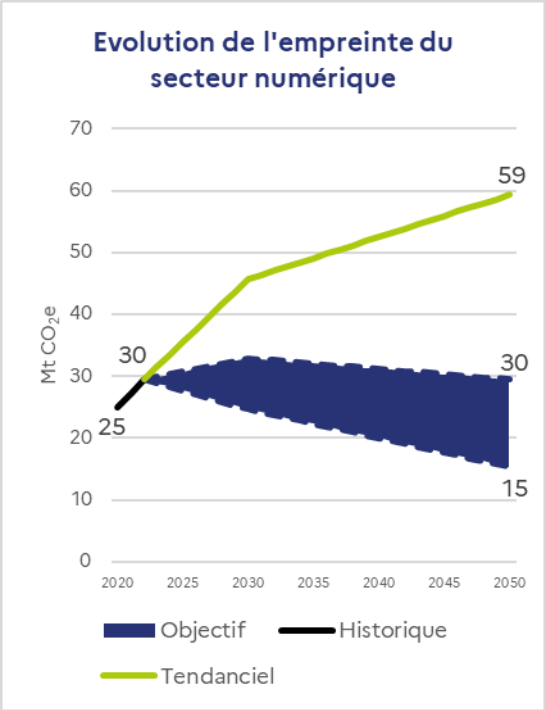
Credit: Damien Carles / Terra

REDUCE THE CONSUMPTION-BASED EMISSIONS OF THE DIGITAL SECTOR

In 2022, the consumption-based emissions of the digital sector are estimated at **29.5 Mt CO_2e,** representing **4.8% of** French people consumption-based emissions across a cross-cutting perimeter.

In a baseline scenario, the sector's consumption-based emissions could double by 2050. The target will be to contain this increase by aiming for a crossing point between **-15 % and +12 %** in 2030 compared to 2022 and an indicative target in 2050 between a stability and a reduction of **-50 %** compared to 2022, depending on the decarbonisation of the rest of the world.

The levers to achieve this are: extending the lifetime of terminals as well as eco-design, developing and sharing a culture of digital sufficiency, better data lifecycle management and controlling the consumption-based emissions of data centers and networks.



The main public policy guidelines:

Better manage the life cycle of data

- Improving the eco-design of digital services and improving data lifecycle management
- Limiting attention capture strategies
- Encouraging the use of frugal AI

Reduce emissions and extend the life of the terminal fleet

- Increasing the reuse, sustainability and recyclability of terminals through the adoption of European ecodesign requirements
- Strengthening the repair industry and better reusing digital terminals

Controlling the consumption-based emissions of data centers and networks

- Supporting the implementation of the new data centers
- Improving energy and water efficiency and recovering waste heat from data centers
- Continuing actions on environmental transparency of data centers
- Controlling the consumption-based emissions of networks

Cross levers

- Supporting the development of a culture of digital sufficiency
- Improving the transparency of environmental assessment and measurement data
- Carry out ambitious positions at European level on texts contributing to the reduction of the digital consumption-based emissions

1. State of play and challenges

Digital technologies and their uses are transversal to all sectors of the economy and are expanding strongly. However, the digital sector as a whole is not identified as a separate sector in the greenhouse gas inventories, or in the estimates of France's consumption-based emissions made by SDES and INSEE. Thus, to define a digital trajectory, SNBC relies on the definition of digital (or 'ICT sector') formalised in 2018 by the International Telecommunications Union in the context of the L.1450 standard.[136] This approach is defined by "third parties" representing "terminals"[137] (or end-user assets), "networks"[138] (or ICT network assets) and finally "data centers"[139] (or data centers). Within the scope considered, emissions linked to the electricity consumption of data centers abroad for French use are included. **Digital is treated as a cross-cutting sector in SNBC3** and modeling is conducted with a physical approach.

The digital consumption-based emissions represent 4.8% of France's consumption-based emissions and could double if no additional measures are put in place by 2050

Digital represents 3.4% of global greenhouse gas (GHG) emissions in 2023.[140] French people digital consumption-based emissions is **estimated at 29.5 Mt CO_{2e} in 2022 and represents 4.8% of French people consumption-based emissions.** [141] It increased by 18% between 2020 and 2022 on the same calculation scope. Data centers (46%) and terminals (50%) share almost the entire consumption-based emissions, with networks remaining in the minority (around 4% of the total). The manufacturing phase accounts for almost 80% of the digital equipment consumption-based emissions and around 40% of the total industry consumption-based emissions. The manufacturing of digital equipment also requires almost 117 Mt of resources per year.[142] As regards data centers, almost 80% of emissions result from electricity consumed by foreign data centers for French digital uses. **These estimates are a low point in the digital consumption-based emissions, as the data used do not, for example, fully integrate the latest developments in generative artificial intelligence (**evolutions are well integrated in forward-looking terms). Almost 85% of digital emissions are imported,[143] indicating the need for **a**

[136] *This approach has been taken up in particular in the ADEME-Arcep prospective studies referring to the national level.*
[137] *Computers and information devices, consumer electronics (mobile phones, smart phones, tablets, fixed and portable computers, home network goods), IoT devices. Elements outside the scope of standard L.1450 are also taken into account: TVs, screens, printers, video game consoles.*
[138] *ICT infrastructure (antennas, towers, cables) as well as goods and commodities installed in support of the wired and wireless access network, the core telecommunications network, enterprise networks, the Metro/Edge/IP core and data network and network data centres, and satellite telecommunications.*
[139] *All types of data centres and corporate networks.*
[140] *According to a GreenIT study (https://greenit.eco/wp-content/uploads/2025/02/greenit-etudemonde2025-20250203.pdf). According to the latest UN Digital Economy Report, in 2020, the ICT sector accounted for 1.5% to 3.2% of global GHG emissions (https://unctad.org/system/files/official-document/der2024_overview_fr.pdf).*
[141] *The carbon footprint of the sector has been revised upwards by ADEME for 2022 as part of a review of the ADEME-ARCEP study, including emissions from data centres abroad. https://infos.ademe.fr/magazine-January-2025/digital-quel-impact-environmental-en-2022/*
[142] *https://librairie.ademe.fr/index.php?controller=attachment&id_attachment=6430&preview=1*
[143] *DGEC calculations.*

consumption-based emissions approach as a complement to the domestic emissions approach used to establish SNBC's carbon budgets.

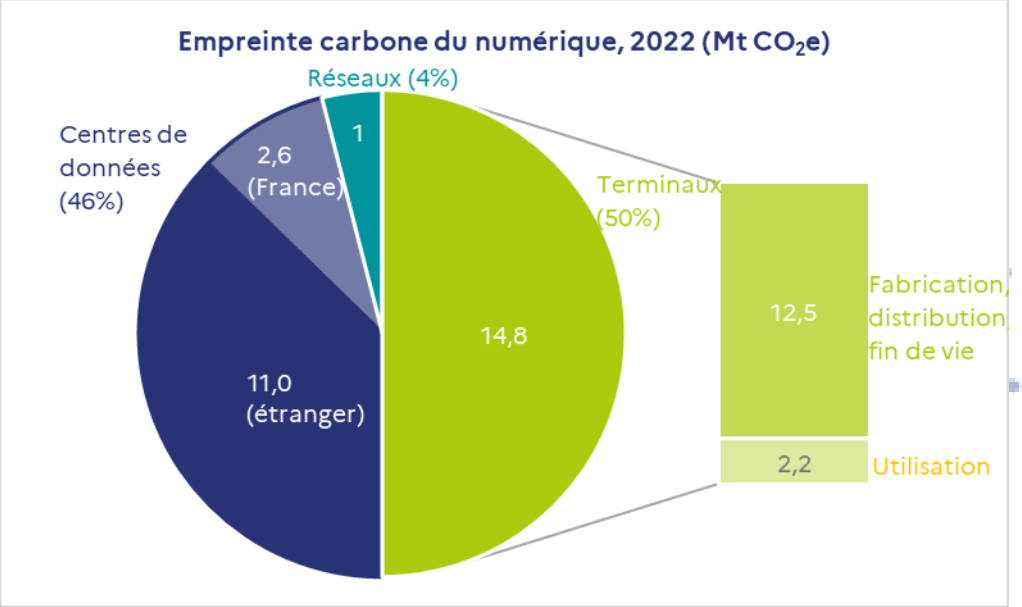


Figure: 7 *Decomposition of the digital consumption-based emissions in 2022. ADEME-ARCEP, Hubblo, according to Masanet, Cisco data.*

The digital consumption-based emissions could reach 45 Mt CO_{2e} in 2030 and *at least double* by 2050[144] in a scenario with existing measures. Moreover, the evolution of the digital consumption-based emissions is highly dependent on the global decarbonisation scenario under consideration, as the prospects for decarbonisation of electricity generation and value chains are highly variable. The trend scenario is based on a global "Current Policies" scenario, reaching an increase in global warming of around "+3 °C" in 2100.

Digital equipment emits a large part of its consumption-based emissions even before it arrives in the hands of the end user: **80% of the consumption-based emissions of terminals takes place at the manufacturing phase in 2022.** The fleet of user equipment in France was estimated at 800 million units in 2020, including 245 million connected objects, the number of which is growing the fastest and 70 million smartphones. The consumption-based emissions depending on the equipment is also variable: TVs, computers and smartphones generate a much higher unit carbon impact[145] than connected objects. The average lifespan of equipment ranges from 2.5 years for smartphones, 7 years for Internet of Things (IoT) terminals[146] and 8 years for a

[144] *While the ADEME-ARCEP study projected a tripling of the digital footprint in 2020, the 'EMA 2024' scenario published by DGEC updates these projections with a better consideration of international decarbonisation.*
[145] *On average, the emission factor of the manufacturing phase of a laptop is 170 kg CO_2e/u, a smartphone 77 kg CO_2e/u and a television 325 kg CO_2e/u (ADEME-ARCEP), compared to 5 to 20 kg CO_2e/u for IoT equipment.*
[146] *Defining a network of connected objects and terminals equipped with sensors (and other technologies) allowing them to transmit and receive data between themselves and with other systems. The selected perimeter includes in particular connected water heaters, connected blinds, … surveillance cameras*

television[147]. The stock of certain equipment is thus frequently renewed, resulting in a significant annual marketing of new products, mainly imported. Moreover, with the development of generative artificial intelligence, the number of digital equipment placed on the market in France could increase again in the coming years. Indeed, AI could make it possible to offer new so-called 'on-board' functionalities and thus encourage the renewal of equipment.[148]

Digital represents 11% of French domestic electricity consumption in 2022 and its exponential development could compete with other long-term decarbonisation levers based on electrification.

The existing literature regularly alerts on the energy consumption of data centers with the development of new uses. Data center electricity demand worldwide is expected to more than double by 2030 to around 945 TWh and 1200 TWh by 2035 according to the IEA.[149] RTE forecasts that it would reach **15-20 TWh** in 2030 and **between 23-28 TWh in 2035** [150] (compared to 12 TWh in 2022, a level that remains uncertain) in France and reports a very significant increase in connection requests (just under 10 GW today), notably in Ile-de-France, around Marseille, and in southern Alsace. In its 2025 forecast, RTE estimates that data center consumption would reach **around 15 TWh in 2030.** [151] In the "With Existing Measures" scenario of SNBC3, these consumptions could reach up to **63 TWh** in 2050. According to the Shift Project, in 2035, data centers could account for up to a quarter of the additional electricity consumed compared to 2020.[152] ADEME estimates that electricity consumption could reach 55 TWh in 2050 on the territory[153] (with 194 TWh imported). This upward trend in demand for data storage and processing capacities is accompanied by a clear shift in traffic, due to the explosion in digital usage, in particular the widespread consumption of online videos and the deployment of artificial intelligence, including generative AI, which consumes a lot of energy both in the training phase and in the inference phase.[154] The announcements of investments in data centers made in the context of the AI Action Summit in February 2025 and the Choose France 2025 Summit could lead to an upward revision of these forecasts[155] and could contribute to reducing the sector's consumption-based emissions by replacing foreign uses. However, **in the absence of additional measures in the short term, pressure on the electric**

[147] *ADEME-ARCEP report on the digital environmental footprint in 2020, 2030 and 2050*
[148] *Arcep, "For a Sustainable Digital" Annual Survey, 2025 edition.*
[149] *https://www.iea.org/reports/energy-and-ai/executive-summary*
[150] *RTE forecast report published in 2024.*
[151] *https://assets.rte-france.com/prod/public/2025-12/2025-12-09-BP2025-resume-executive-synthese.pdf*
[152] *https://theshiftproject.org/publications/artificial intelligence-datacenters-final-report/*
[153] *See the report published by ADEME: Prospective evolution of data center consumption in France from 2024 to 2060*
[154] *According to Patterson et al. (2021) a single complete GPT-3 drive, a model of 175 billion parameters, consumes about 1.3 GWh or the equivalent of the annual consumption of about 320 apartments in France according to ENGIE. In addition, the energy consumption of an inference strongly depends on the length of the text generated and the size of the model. For example, generating a tweet with GPT-3.5 Turbo consumes 0.5 Wh, while a 5-page report with GPT-4 consumes about 5600 Wh (Husmom et al., 2024).*
[155] *EUR 109 billion of investments were announced at the AI Action Summit, with 35 sites available to host data centres and four major investments at the Choose France 2025 Summit, worth almost EUR 27 billion.*

closure could appear in the long term and compete with other decarbonisation levers (development of hydrogen, electrification of vehicles, etc.).

Uncertainties around building trajectories for the digital sector

There are many uncertainties surrounding the definition of a digital consumption-based emissions trajectory: scope of the integrated terminals under study[156], uncertainties about historical data, trends in the decarbonisation of international electricity production, decarbonisation of out-of-use phases, or the emergence of new technologies such as generative artificial intelligence**.** These trajectories must therefore be considered with the level of uncertainty associated with them and may be regularly updated in the light of changes in data quality, scientific knowledge or improvements in forward-looking models.

Box: Digital can also contribute to the green transition

Some digital solutions can contribute to climate targets and facilitate the implementation of decarbonisation levers. For example, digital technology can contribute to the optimisation of certain actions or processes (precision farming and reasoned and targeted use of plant protection products or fertilisers, optimisation of waste collection routes…), replace more impactful activities (telemedicine services replacing travel), provide environmental information to foster behavioural changes, democratise and accelerate the uptake of already existing transition levers (carpooling platforms…) or optimise systems to facilitate the implementation of transition levers (Smart grids, connected thermostats…).[157] **However, these measures are subject to rebound effects and require specific attention in the development of adjoining public policies,** due to their own environmental consumption-based emissions.

Data and the digital tools to produce it are also essential for ecological planning and monitoring to target the most effective actions, manage complexity, reduce delays, model, anticipate crises, network and mobilise. The Digital Actions and Data Framework for Ecological Planning, published in 2023 and updated in July 2025, aims to address this need.[158]

2. Strategy

a. Presentation of the strategy

The baseline scenario of SNBC3 aims **to control the short-term upward trends identified in the trend scenario and stabilise them over the medium term.** Achieving the targets of the trajectory means **taking new measures today to support changes in usage,** in particular as regards the non-renewal of equipment (the average lifespan of which increases by 2 years by

[156] *The perimeter of the selected terminals may differ according to the studies considered.*
[157] *https://librairie.ademe.fr/society-and-politics-publics/7785-evaluation-environmental-of-direct-and-indirect-effects-of-digital-for-case-d-usage.html #product-features*
[158] *https://www.info.gouv.fr/grand-dossier/france-nation-verte/a-proposfeuille-de-route-digérique-donnees*

2030 in the scenario, all equipment combined excluding IoT) and the stabilisation of data consumption around 2035. Although ambitious assumptions are made at national level in the context of the SNBC exercise, **it should be noted that the consumption-based emissions of the digital scenario will largely depend on the decarbonisation trajectory of the rest of the world,** in particular the intensity of the electricity mix across regions. Consistent with the indicative consumption-based emissions budgets, the trajectories of the digital consumption-based emissions are presented in the form of ranges that make it possible to place oneself in a 'Paris Agreement' narrative (the low bound being dependent on a 'Net Zero' decarbonisation scenario for the rest of the world, i.e. ~1.5 °C, the high bound of a 'Policies announced' decarbonisation scenario, i.e. ~2 °C).

The aim will also be **to control the increase in data center electricity consumption anticipated by the exponential trend** emerging from prospective studies and calls for the control of data center electricity consumption to be made a long-term priority, so as not to compete with the electrification of other sectors. This target must be pursued with a view to ensuring French digital sovereignty.

The levers that will enable these targets to be met are as follows:

- **Extending the lifetime of terminals. This will involve ecodesigning** equipment at European level with a view to increasing its durability, re-use and recyclability. More ambitious developments, such as the limitation of screen sizes (in particular for smartphones, tablets, computers and televisions), could be considered in the preparation of the delegated acts on ecodesign of terminals, with a view to greater material sufficiency on certain equipment. In addition, the strengthening of the repair sector, better reuse of digital terminals, and a better orientation of the waste electrical and electronic equipment (WEEE) deposit are key factors in extending the life of equipment. The development of alternative models to new purchasing, including so-called functional economy models, will also extend the lifetime of terminals.
- **The development of a culture of digital sufficiency in order to limit exponential increases in traffic, calculations and new uses.** This will include, in particular, supply-side levers with the improvement of the ecodesign of digital services, in particular by framing attention capture strategies and encouraging the use of frugal AI, better management of the life cycle of data, reducing the consumption-based emissions of online video, as well as demand-side levers, in particular through training and awareness-raising on energy-climate issues and the impacts of digital technology.
- **Controlling the consumption-based emissions of data centers in France,** via the tertiary decree, the environmental transparency of data centers, a territorial deployment strategy, and the energy efficiency of IT equipment.
- **Cross-cutting levers to maintain an international ambition to support the development of frugal AI** and to improve the transparency of environmental assessment and measurement data. In addition, other sectoral measures of SNBC3 will reduce the digital consumption-based emissions, in particular support towards sustained decarbonisation of the rest of the world (see Part SNBC IV – Consumption-based emissions Guideline 13).

In 2030, the digital consumption-based emissions of the baseline scenario are assessed between 25 Mt CO_{2e} and 33 Mt CO_{2e}, i.e. between -15 % and +12 % compared to 2022 and

between -28 % and -46 % compared to the trend scenario, with a strong dependence on the international decarbonisation context.

In 2050, scenarios to reduce the digital consumption-based emissions at a pace consistent with the indicative national consumption-based emissions target would imply a reduction in the consumption-based emissions between 0 and 50% compared to 2022 depending on the international context. It is estimated between 15 Mt CO_{2e} and 30 Mt CO_{2e} in the reference scenario, i.e. between -50 % and -75 % compared to the trend scenario, with a strong dependence on the international decarbonisation context. In particular, the halving of the consumption-based emissions in 2050 compared to 2022 remains highly uncertain and will only be achieved if the rest of the world is decarbonised on a carbon-neutral trajectory. These crossing points are indicative and could change between now and the next revision of the National Low Carbon Strategy.

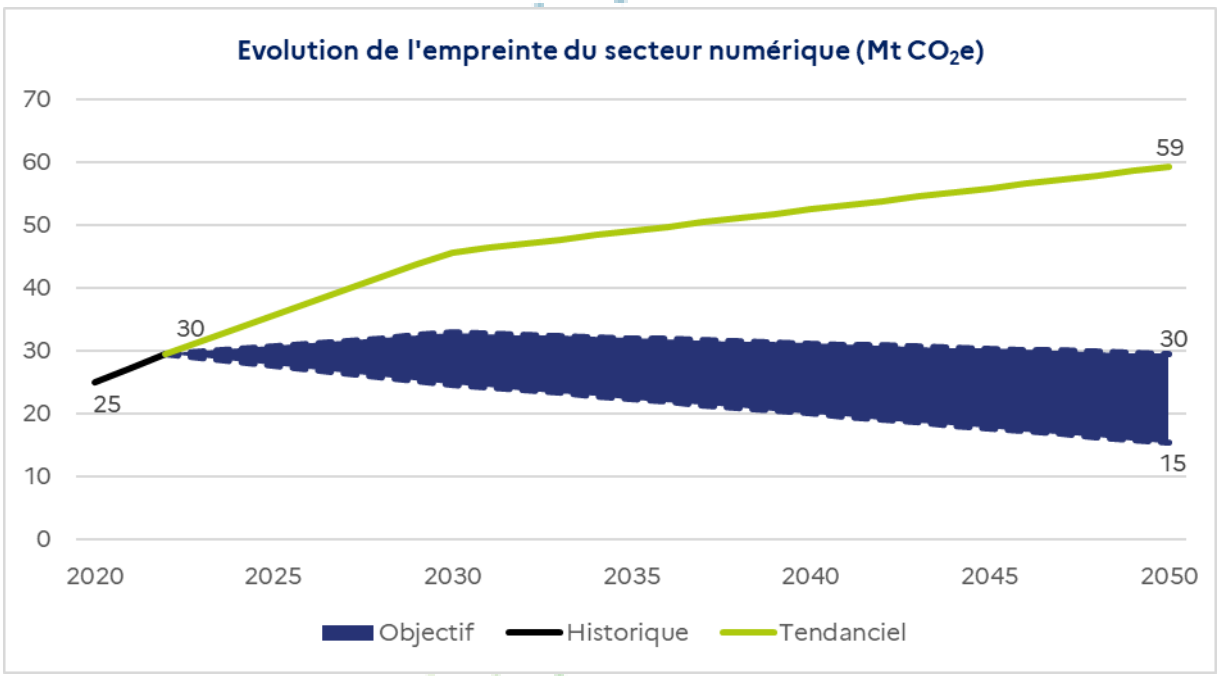


Figure: 8 *Evolution of the digital consumption-based emissions in forward-looking terms. The 'Target' range corresponds to two global scenarios 1.5 °C (the IEA's 'Net Zero' scenario) and close to 2 °C (the IEA's 'Announced Pledges Scenario'). The trend scenario corresponds to a scenario with current policies (national and global).*

The main levers to reduce the digital consumption-based emissions by 2030 are:

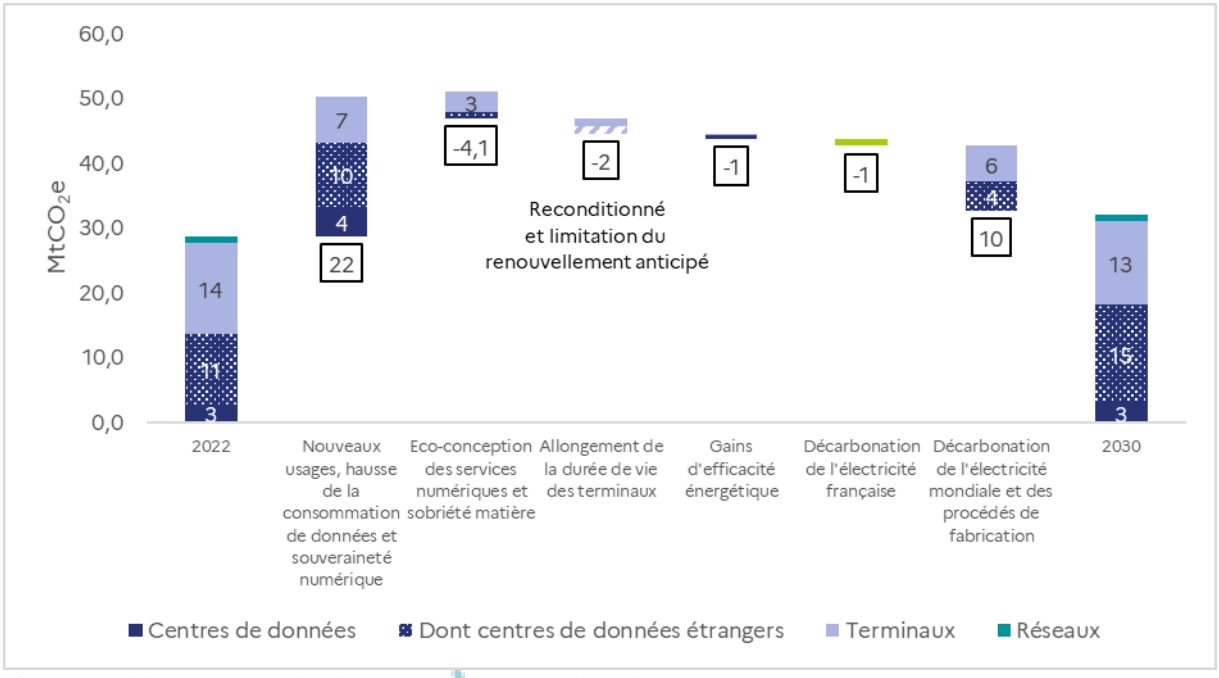


Figure: 9 *Digital decarbonisation levers calculated in a high bound context of the target (close to 2°C scenario) and against a global trend scenario. – DGEC calculations.*

The digital trajectory makes it possible to establish indicative carbon budgets (average annual emissions over five-year periods covering the sector's consumption-based emissions, excluding emissions associated with carbon storage), with low and high bounds defined with the 1.5 °C to 2 °C scenarios (see Part SNBC IV. - Consumption-based emissions).

Average annual consumption-based emissions (in Mt CO_{2e})	Reference years		3rd carbon budget	4th carbon budget	5th carbon budget
	2020	2022	2024 - 2028	2029 - 2033	2034 - 2038
Digital consumption-based emissions	25	30	[27, 31]	[24, 33]	[22, 32]

The evolution of the electricity consumption of data centers will be a crucial monitoring indicator and requires the definition of targets to ensure the adequacy between electricity supply and demand in the national territory. As part of the work to draw up French people strategy on energy and climate, tensions over the 'electric closure' (ability to meet demand) are identified in the long term. **Too much increase in data center consumption would risk competing with other decarbonisation levers** (hydrogen production, in particular for the refining of synthetic aviation fuels, electrification of industry and transport…) to achieve our long-term targets.

In the current state of knowledge and work, a target, integrated into the SNBC 3 baseline scenario, is to **target a data center power consumption target of 40 TWh in 2050 (compared**

to between 5 and 10 TWh in 2024)[159] **that** would ensure electrical closure by that time horizon. **Beyond that, trade-offs would be necessary as of today to ensure that additional levers are deployed in other sectors to reduce pressure on the electricity system** (decrease in production and consumption of synthetic fuels, less ambition to reindustrialisation…). The increase in uses will also not have to be accompanied by a too large increase in energy consumption abroad to meet our uses, at the risk of an increase in imported emissions.

In the shorter term, the challenge is to set up efficient and low-carbon data centers on the territory. The SNBC 3 baseline scenario incorporates a data center power consumption assumption of 20 TWh in 2030 and 28 TWh in 2035, which could be upgraded **as trends change.** This does not exclude the need to take action now to master the development of long-term data centres in the overall context of ecological planning.

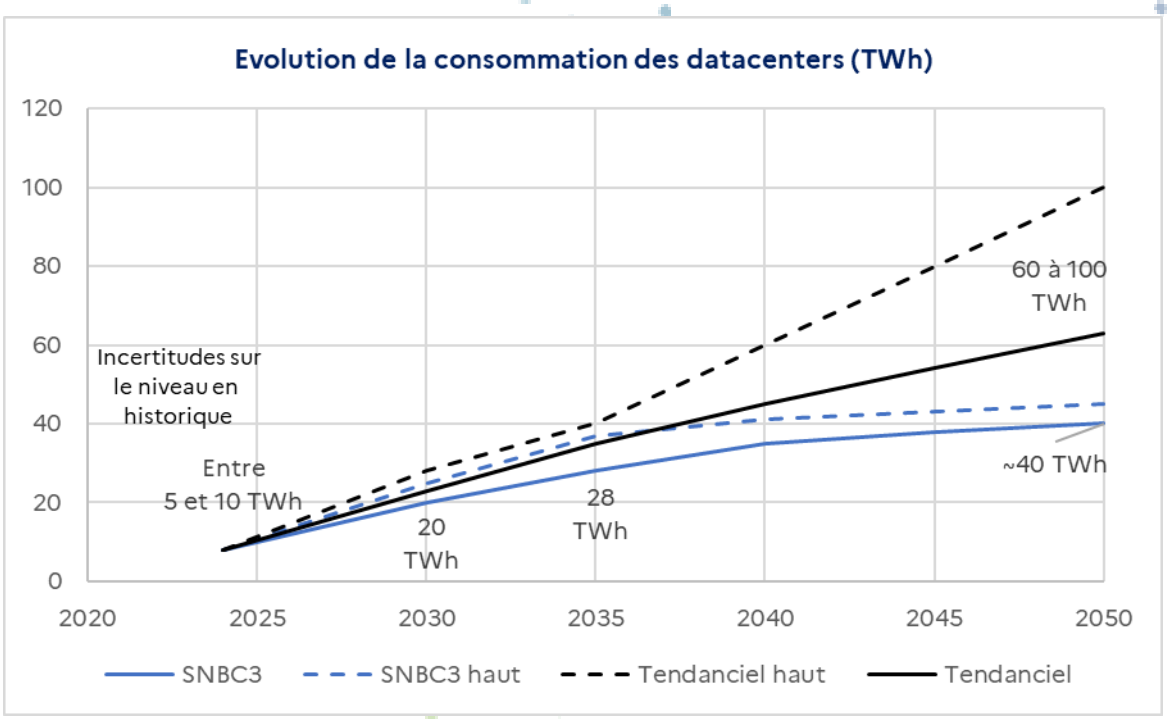


Figure: 10 Evolution of electricity consumption of data centers in SNBC3 (with office racks). Historical data center consumption data are uncertain and vary by perimeter.[160]

[159] *Historical data center consumption data are uncertain and vary by perimeter. In particular, ADEME estimates in its data center outlook report that data center power consumption reached 10 TWh in 2024 (including office buildings). The SDES estimates them between 4 and 6 TWh in 2023 (excluding office bays). https://www.statistiques.developpement-durable.gouv.fr/la-consommation-delectricite-des-centres-de-donnees-between-2018-and-2023*

[160] *See in particular the SDES estimate between 4 and 6 TWh in 2023 (excluding office bays) https://www.statistiques.developpement-durable.gouv.fr/la-ommation-delectricite-des-centres-de-donnees-between-2018-and-2023*

Sensitivity test: Sustained development of artificial intelligence

Long-term projections are still very uncertain, given the rapid development of new technologies. In a maximalist view of trend installation, the associated electricity consumption could even reach 40 to 80 TWh in 2035.

For example, an additional 40 TWh of electricity consumption compared to the projections in the scenario underlying SNBC 3 (i.e. 80 TWh) would be equivalent to about one third of the electricity dedicated to hydrogen production, or one quarter of the electricity consumption of industry. At the set production level, these consumption levels may require lower electricity consumption in other sectors. For example, meeting these additional needs could require reducing air traffic by almost 80% compared to its level in 2050 (due to the production of synthetic fuels).

The work carried out in the framework of the High Committee for Digital Eco-responsibility (HCNE) co-chaired by the ministers responsible for the green transition, energy and digital will **make it possible to make this approach sustainable, to monitor the long-term adequacy of the trajectories to the targets, and to deploy public policy levers to make it possible to approach them.**

b. Main targets

Indicative consumption-based emissions target	Maintain the digital consumption-based emissions between its current level and a 50% decrease in 2050 compared to 2022.
Indicative carbon budgets	2024 – 2028: 27 to 31 Mt CO_2e 2029 – 2033: 24 to 33 Mt CO_2e 2034 – 2038: 22 to 32 Mt CO_2e
Power Consumption of Data Centers	Aim for a data center indoor energy consumption target of 40 TWh in 2050[161] to avoid impacting other electrification levers (between 5 and 10 TWh in 2024).
Average Energy Efficiency Indicator (EEI)	Aim for an average energy efficiency indicator (EEI) of 1.2 to 1.4 in 2030 according to data centers (-30% compared to 2022).

[161] *Over a wide scope including public data centers, corporate internal data centers, commercial data centers, proximity cloud data centers and data centers dedicated to intensive computing.*

Terminal park	Support the growth of connected objects by 2030 by aiming to control its increase compared to the trend and support the deployment of the digital devices used (smartphones, computers, tablets, etc. ...) by aiming to control the fleet of active terminals at its current level, in particular through an increase in their lifespan.
Terminal lifetime	Increase the average lifetime of terminals by 2 years by 2030.

c. Main orientations of public policies

1- Better manage the life cycle of data

- **Digital orientation: 1 Improving the eco-design of digital services and improving data lifecycle management**

The IEA estimates that data traffic could be **multiplied by 6 between 2020 and 2030** (and by more than 200 between 2020 and 2050 in trend projections), reflecting a change of scale in digital uses and **an increasing demand for data centers. Thus, new uses call for new infrastructures, and vice versa.**

Considering that almost 68% of global internet traffic in 2023 is linked to **online video** viewing (the main uses of which are video-on-demand for 34%, pornographic websites for 27%, short video sites for 21% and social networks for 18%) **and that the energy demand of data centers could increase by 160% due to the development of artificial intelligence in 2030,** the reduction of the consumption-based emissions of these two uses will be targeted. To this end, France will continue to work towards the environmental accountability of major service providers at European level.

The State will also aim to **encourage and promote the ecodesign of digital services at European level, within the meaning of the General Ecodesign Framework for Digital Services (RGESN),** [162] which aims to reduce the consumption of IT and energy resources and limit obsolescence (better-designed services make it possible both to use equipment less and to operate on older terminals, limiting obsolescence and the feeling of obsolescence). It makes available to the public and digital service designers 78 factsheets specifying several criteria to audit the compliance of a digital service, a template for an ecodesign declaration, and a methodology to calculate the maturity of the digital service through a progress score.

[162] *https://eco-responsible.digital.gouv.fr/publications/referential-general-ecodesign/*

Digital orientation: 2 Limiting attention capture strategies

Limiting attention capture strategies is a priority criterion of the RGESN[163] **by ensuring** that services do not, for example, contain automatic playback by default or easily leave the possibility for the user to delete it, or if the content is loaded at the user's request, for example through a 'see more' button (or other). The industry also committed, in the digital decarbonisation roadmap published in 2023, to regulating these mechanisms for capturing the attention of digital platforms and measuring the impact of *autoplay* and video advertising. **The State will carry out further work to identify legislative developments aimed at regulating these practices.**

Digital orientation: 3 Encouraging the use of frugal AI

Today, artificial intelligence systems are being used on a massive scale. In particular, generative artificial intelligence systems require much better and more digital resources. This leads to impacts in terms of water, energy and resource consumption, and greenhouse gas emissions. In order to reduce the impact of artificial intelligence, a working group was launched in January 2024, led by the Ecolab of the *Commissariat Général au Développement Durable*, in partnership with AFNOR and within the framework of the National Strategy for **AI, and enabled the publication of the General Framework for frugal AI.**[164]

This voluntary application document is an international first to provide all actors in digital services with a repository that is accessible and understandable by all. The repository contains a methodology to assess the environmental impact of AI on several impact categories and identifies all good practices that can be implemented by organisations to reduce the impact. This benchmark must become a benchmark for companies to use their know-how in frugal AI and to control the environmental impact of their AI solution.

The State will seek to widely deploy the frugality of artificial intelligence projects and will support its appropriation by the various actors and its dissemination at European and international level (in particular within the framework of the Coalition for Environmentally Sustainable Artificial Intelligence).[165] The public procurement will make it possible to promote these approaches, for example by studying the implementation of clauses in the public procurement of artificial intelligence aimed at reducing the environmental impact of artificial intelligence services by relying on the General Framework for Frugal AI.

In order to reduce the impact of AI algorithms, **the State will also support the provision of frugal models** by generalising the measurement of the environmental impact and energy consumption of AI models (using tools such as Green Algorithms, CodeCarbon, Ecologits, etc.).

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[163] *Criterion 4.1: Does the digital service only include animations, videos and sounds whose autoplay has been disabled? Criterion 4.2: Does the digital service only display content in infinite scrolling?*
[164] *The general repository for frugal AI is the result of 6 months of work with 150 contributors, from companies, research, associations and administrations.*
[165] *https://www.elysee.fr/emmanuel-macron/2025/02/11/coalition-for-environmentally-sustainable-artificial-intelligence*

2- Reduce emissions and extend the life of the terminal fleet

- **Digital orientation: 4 Increasing the reuse, sustainability and recyclability of terminals through the adoption of ecodesign requirements**

Material sufficiency and ecodesign of equipment will also reduce the manufacturing consumption-based emissions of terminals, for example by seeking to enhance the durability, re-use and recyclability of terminals as well as to quantify the impact of the increase in screen size and limit its negative effects (the energy label is already unfavourable to large screens). European ecodesign requirements for the incorporation of recycled raw materials in digital terminals will be adopted by 2029. The strong emergence of IoT[166] will also be monitored to ensure that its development does not jeopardise the targets of the sector.

Finally, as part of the revision of the Directive on waste electrical and electronic equipment[167] (D3E), measures will be taken to improve the collection of the D3E deposit and to strengthen the re-use of digital terminals.

- **Digital orientation: 5 Strengthening the repair industry and better reusing digital terminals**

The reuse, repair and reconditioning of electrical and electronic equipment will be increased, improving the efficiency of the WEEE EPR sector in the collection and treatment of the deposit. Indeed, in 2022, more than half of the total deposit of WEEE[168] (2 Mt) escaped the accounting of the approved sector and fed in particular the parallel sectors as well as the 'drawer phenomenon' (consisting of keeping terminals not used at home), resulting in competition for access to the deposit of equipment among the actors of re-use, repackaging and recycling.

France is a pioneer in aid to speed up repair. In particular, the repair bonus, in force since 2022, allows the consumer to obtain an immediate cash back to extend the life of his or her items at a certified repairer. The repair bonus could be used even more, but several obstacles to repair exist both on the part of consumers (lack of information and visibility of repairers and repair costs, lack of confidence, incentives for premature renewal) and on the part of repairers (difficulties in accessing spare parts and aircraft plans).

In order to support consumer information on the more or less repairable nature of products and to encourage ecodesign and repair, repairability indices were introduced in 2021 for

[166] *The trend scenario (ADEME-ARCEP, DGEC) foresees a strong explosion in the number of connected objects due to the adoption of new uses.*
[167] *Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE).*
[168] *This figure includes all WEEE, with a perimeter that exclusively exceeds digital (which remains a minority in the deposit).*

certain products including the laptop.[169] A new wave of indices is being developed, which should include audio speakers. Since January 2025, the sustainability index has been intended to gradually replace the reparability index for certain products, by adding certain criteria, in particular reliability. The first product concerned is a digital equipment, the television (8 January 2025). This new index will be a powerful tool both to combat product obsolescence, to extend the lifetime of equipment and to raise awareness among consumers about the possibility of extending the duration of use.

Re-use will also be supported and the State will focus on removing the obstacles identified by economic actors (strong competition on the deposit intended for re-use, quality of the deposit difficult to ensure, competitiveness regarding the new).

The use of the functional economy model will be encouraged for the use of digital equipment in enterprises, to help extend the lifespan of professional digital equipment.

The EU Ecodesign Delegated Acts also[170] allow for the possibility of extending the lifespan of products through repair. The text on smartphones and tablets, which entered into force on 20 June 2025, includes innovative minimum requirements: obligation to make parts available for at least 7 years, maintenance of software (or provision of equivalent software compatible with the same terminals as the software initially sold) for at least 5 years, delivery time for parts not exceeding 5 days, ease of disassembly of certain parts or use of reusable fasteners.

3- Controlling the consumption-based emissions of data centers and networks

➨ **Digital orientation: 6 Supporting the implementation of the new data centers**

France has made strong commitments to the data center sector, in particular as part of the announcements made at the AI Action Summit held in February 2025, and many private investment projects in France are underway to meet growing demand. At the Summit, the government announced €109 billion in private investment. Four major investments were also announced at the Choose France Summit.[171] France has **many advantages in hosting data centers and is implementing measures to facilitate their establishment:** Since the EUR 109 billion investment announcements at the AI Action Summit, 28 new host sites that could host data centres have been identified, in addition to 35 sites announced in February 2025.[172] Nearly

[169] *Smartphones and tablets are also affected by the reparability index, but the decree establishing it will be repealed in June 2025 due to the entry into force of an index at European level.*
[170] *https://eur-lex.europa.eu/FR/legal-content/summary/ecodesign-requirements-for-sustainable-products.html*
[171] *The "Campus IA" project by MGX (United Arab Emirates): €30-50 billion, the data center project in Cambrai, Hauts-de-France, by Brookfield (Canada): €15 billion, the Fluidstack data center (GB) project in partnership with the French Government: €10 billion.*
[172] *https://www.economie.gouv.fr/actualites/ia-des-investissements-records-announcements-lors-du-sommet-choose-france-2025#*

10 GW of connection requests have already been identified by RTE in 2024, in particularly targeted areas (south of the Ile de France, Marseille, south of Alsace).

Data centers require a large amount of electricity for their operation, a new location can impact the electricity grid because of the concentration of data centers already potentially present in the territory. This can be extended, to a smaller extent, to water consumption. Their implementation must be accompanied to anticipate these impacts and maximize the economic and energy benefits possible with the valorization of waste heat. Tools will also be developed to support local authorities and data center operators, such as the guides on heat recovery and the implementation of data centers developed with ADEME.

A national strategy for the implementation of data centers for AI will be deployed,[173] in order to make France an attractive territory for data centers, while anticipating and reducing environmental impacts.

- **Digital orientation: 7 Improving energy and water efficiency and recovering waste heat from data centers**

Several levers make it possible to contribute to improving the energy performance of data centers: reduction of equipment consumption, energy and water efficiency criteria, recovery of waste heat, reduction of fuel consumption of generators and maintenance of their temperature, choice of less GHG-emitting fuel.

Based on the data from the collection of the Energy Efficiency Directive, **the European Commission will have to define, in the context of future regulation, environmental performance thresholds applicable to data centers within the European Union.** This European regulation complements the national framework of the Tertiary Decree, setting energy performance thresholds for data centers.

As part of the strategy for setting up data centers in France, announced at the Summit for Action on AI, **a taskforce bringing together several stakeholders, including RTE, accompany public and local authorities and project leaders:** identification of the most suitable areas, implementation guide incorporating environmental issues, etc. In the longer term, the State may study the relevance of prioritising requests for the connection of data centers in certain areas.

- **Digital orientation: 8 Continuing actions on environmental transparency of data centers**

The recast of Directive 2012/27/EU (known as the "Energy Efficiency Directive" or EED) as part of the "Fit for 55" package requires data centers to publish information on their energy performance and sustainability on an annual basis. All data centers above 500 kW shall publish: performance indicators (area of the accommodation infrastructure, power, volume of data

[173] *See in particular the guide to setting up data centres in France published by the DGE and Business France in 2025: https://www.entreprises.gouv.fr/la-dge/publications/location-de-centres-de-donnees*

processed) and sustainability indicators (energy efficiency indicator (PUE), water efficiency indicator (WUE), energy reuse factor, renewable energy factor).

The transparency of the environmental performance of data centers (through the declaration of data center operators on the OPERAT platform) **will make it possible to monitor the evolution of the impacts of data centers and better plan the location of new data centers on the territory.** A project has been launched to align and simplify environmental requirements by harmonising the criteria required by the various legislations in order to organise the monitoring of these indicators over time and to better manage and adjust public policies or arrangements such as the excise duty on electricity.

- **Digital orientation: 9 Controlling the consumption-based emissions of networks**

Controlling the environmental impact of networks will require improving the energy efficiency of existing and new networks **by integrating energy and environmental performance into the criteria for assessing network operators by the regulator,** as well as in the allocation of frequencies, thus incentivising more sustainable practices. In addition, the eco-design of network equipment and the optimization of deployment and technological strategies will reduce electricity consumption in the operational phase. Studies will also be undertaken to quantify the impact of satellite networks in the future, in order to anticipate and minimize their environmental consumption-based emissions.

4- Cross levers

- **Digital orientation: 10 Supporting the development of a culture of digital sufficiency**

The Government will also support **a culture of digital sufficiency** by promoting the least energy-intensive uses, and in order to limit the renewal of terminals by reducing the influence of cultural obsolescence. The State will rely on the training lever by continuing to support the deployment of continuous training on the challenges at the interface between digital and ecology for predominantly digital training, as well as on the communication[174] and awareness-raising lever. In 2021, 25% of working smartphones were renewed in favour of a newer model by desire or 'purchase pleasure'. It is therefore necessary to encourage the voluntary extension of the period of use of the equipment by its owner in order to avoid its premature renewal.[175]

- **Digital orientation: 11 Improving the transparency of environmental assessment and measurement data**

All guidance to reduce the sector's environmental consumption-based emissions and electricity consumption will require reliable and high-quality data. **The State will support the**

[174] *Following the model of the Alt IMPACT programme, led by ADEME, CNRS and INRIA, which aims to accelerate and support digital sobriety, for businesses, associations and local authorities.*
[175] *'Digital Barometer – Edition 2021; study carried out by CREDOC on behalf of Arcep, Arcom, CGE and ANCT'*

improvement of data quality and the simplification of reporting through: harmonisation of environmental procedures and data collection (environmental authorisation, multiannual energy efficiency plan, European data collection, OPERAT, ARCEP data collection…). Support for methodological developments, in particular regarding the assessment of the digital consumption-based emissions, will also be essential.

- **Digital orientation: 12 Carry out ambitious positions at European level on texts contributing to the reduction of the digital consumption-based emissions**

France will support a strong ambition at European level to encourage digital sufficiency, the ecodesign of digital services, and the development of frugal AI, or the consideration of climate issues in the regulation of electronic communications, particularly within BEREC.[176]

[176] *Body of European Regulators for Electronic Communications*

Crédibilité, robustesse et points de vigilance **de la SNBC**

II - Credibility, robustness and points of vigilance of SNBC

A. Achieving our electrification targets and generating enough electricity

Over the past decade, overall national electricity consumption has been declining, significantly impacted by the health crisis in 2020-2021, then by the energy crisis linked to the war in Ukraine from 2022 and by the sufficiency plan subsequently implemented. Compared to the historical average values (2014-2019), consumption in the years 2023, 2024 and 2025 is thus around 6% lower. The decarbonisation strategy proposed in the National Low-Carbon Strategy will lead to a clear break with this historical trend, because while final energy consumption must significantly decrease as a result of energy efficiency and sufficiency efforts, electricity consumption will increase as a result of:

- Electrification in transport (development of electric vehicles and associated charging infrastructure), buildings (installation of heat pumps) and industry (electrification of processes) to meet European and French climate ambitions;
- reindustrialisation, which will require new energy needs;
- The potentially limited availability of other decarbonised energy carriers, particularly those linked to biomass;
- The production of low-carbon hydrogen, to replace current uses of 'grey' hydrogen produced from fossil fuels and to meet new uses in industry and transport (in particular the production of synthetic fuels to decarbonise the aviation and maritime sectors);
- The expansion of the digital uses and artificial intelligence.

The **measures to control electricity consumption (sufficiency and efficiency) provided for in the SNBC make it possible to mitigate that increase, but will not be able to fully compensate for the sharp increase in electricity needs.** Depending on these measures and the socio-economic context, the pace and level of electricity growth can be highly differentiated. **In the central reference scenario of SNBC 3, expected electricity consumption increases sharply, close to doubling domestic electricity consumption by 2050.** These trajectories are based on ambitious assumptions of industrial sovereignty, the deployment of digital and data centres, and the production of hydrogen and synthetic fuels on the national territory.

Having this target trajectory makes it possible to meet a first target: that of adequately sizing our production fleet to sufficiently develop the supply of decarbonised electricity, in response to growing needs and in order to ensure our security of supply. Anticipating the construction of the means of production is indeed essential to ensure the decarbonisation of consumption.

Concerns about a possible delay in demand growth are emerging in the public debate in a context where electricity consumption is stagnating and decarbonised production at French and European levels is showing strong growth.

Having this target consumption trajectory should also make it possible to monitor the actual decarbonisation dynamics of the different sectors and their aggregate contribution to achieving our climate targets, and to adjust support policies where necessary. SNBC 3 contains numerous actions and measures to support the transfer of energy consumption from fossil fuels to electricity in all sectors (residential, tertiary, industry, mobility, etc.). In April 2026, an electrification plan was presented by the Government to accelerate the electrification of uses, particularly in buildings, transport, industry and agriculture. In order to ensure a consolidated and coherent vision, the State will develop specific monitoring and steering of this component (see Action Conso. 7 of MEP 3).

The State is also working on variants of the central scenario where the increase in electricity consumption would be less significant: for example, a scenario with less reindustrialisation and lower electricity consumption in residential and tertiary buildings would be in line with the consumption levels studied by RTE in the 'Rapid decarbonisation – achieving public targets' scenario of the 2025 Forecast Balance Sheet. The State is also preparing for scenarios in which electrification actions are delayed, particularly in the short term, which could threaten the achievement of greenhouse gas emission reduction targets, such as the 'Slow decarbonisation – failure to meet public targets' scenario studied by RTE in the 2025 Forecast Report. The 3rd Multiannual Energy Plan specifies that the target electricity production trajectory may be adjusted according to the observed evolution of electricity consumption.

The following graph shows the electricity consumption in each of the main sectors in the central reference scenario, as well as the range of variants of lower electrification considered (including the 'Rapid decarbonisation – achieving public targets' scenario in RTE's 2025 Forecast Balance Sheet).

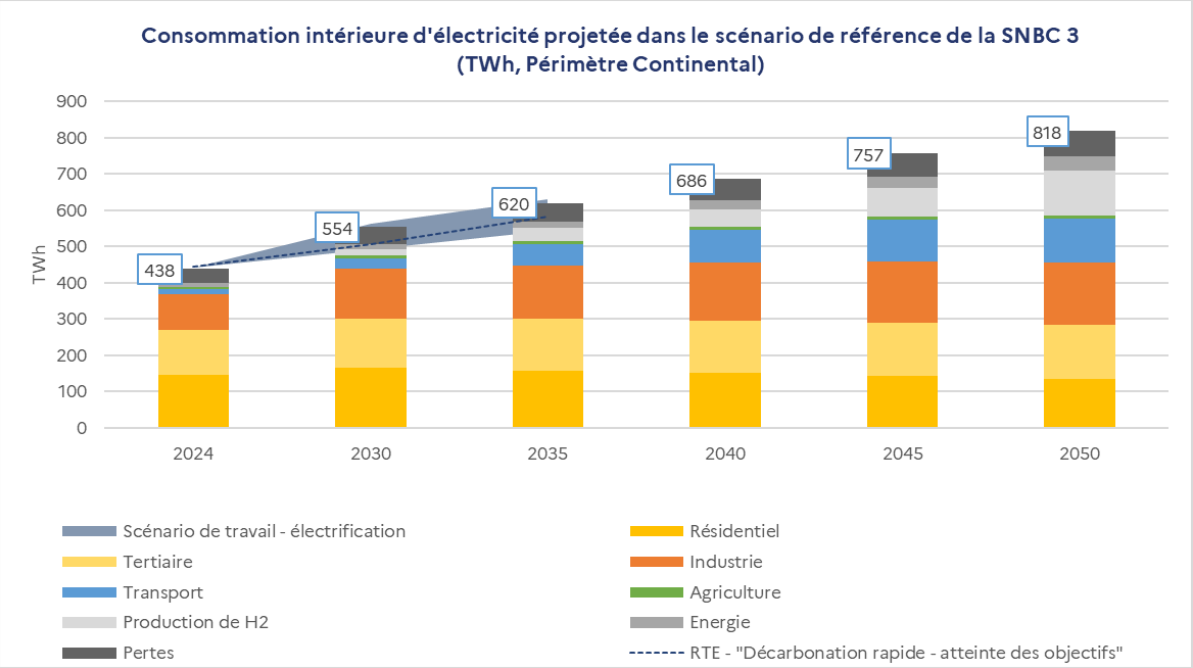

Figure: 11 *Evolution of domestic electricity consumption in the reference scenario (WAM) of SNBC 3 (central scenario and working scenarios taking into account delayed electrification) – Continental perimeter, excluding self-consumption of thermal power plants, consumption for uranium enrichment, and consumption due to flexibilities.*

It should be noted that, in order to ensure the supply-demand balance of the electricity system at all times, a production margin must be taken in relation to the expected level of consumption. In addition, the development path of the means of production is defined by the 3rd Multiannual energy plan (MEP) so as to maintain an export balance by 2035. However, this surplus is expected to decrease in the following years due to the continued electrification of uses, and given the remaining uncertainties on consumption trajectories, it cannot be excluded that consumption will develop more rapidly, which implies setting production targets higher than the target consumption trajectory. Maintaining a high level of electricity production by 2035 will also help to keep electricity prices at attractive levels and stimulate the electrification of uses. Depending on the observed evolution of electricity consumption, the production trajectory may be adjusted (see Action Conso. 7 of MEP 3).

The issues of electricity looping relate both to the amount of electrical energy available (energy looping) **but also to the ability of the electricity system to meet demand at the cutting edge,** at a time when consumption is highest (power looping). This means both reducing our energy consumption, especially fossil fuels, through sufficiency and energy efficiency, and massively increasing decarbonised electricity production by building on the relaunch of nuclear power and accelerating the deployment of renewable energy. However, the construction of the new means of production takes several years, especially the new nuclear reactors and the new offshore wind farms.

Finally, the decarbonisation of the energy system involves a transition that involves electrifying uses and strengthening decarbonised means of electricity production, some of which are difficult to control, making it all the more strategic to develop flexibilities and manage energy consumption. **Flexibilities can be considered on the production, demand or storage side, and**

occur at all time scales, from seasonal structural flexibilities to near real-time balancing. They also have the dual interest of ensuring security of supply and optimising the electricity system, including from an economic point of view. Studies show that **demand flexibility could become a major component for the functioning of the electricity system by 2030,** subject to "scaling up" and enhanced steering.

It is therefore necessary to make the most of the electrification of uses, which leads to more consumption than can be modulated or shifted over time without constraint, especially to smooth the peaks of consumption in the morning and evening. This is typically the case for charging electric vehicles (driving charging, setting up the 'vehicle to grid'), for domestic hot water or any other high-power erasable equipment. There is significant potential in real estate, building on the development of steering tools and thermal inertia, with only 6% of buildings equipped with technical building management tool today.

All the issues related to electricity production, briefly described above, are developed in the Third Multiannual Energy Plan.

B. Biomass resources to be mobilised to meet our decarbonisation needs without jeopardising the priority given to food and environmental protection

1. Biomass, an important driver of the decarbonisation of the economy, but whose available resources are constrained

Biomass is defined as 'the biodegradable fraction of products, waste and residues of biological origin from agriculture, including plant and animal substances, forestry and related industries, including fisheries and aquaculture, as well as the biodegradable fraction of waste, including industrial waste and household and similar waste where it is of biological origin' (Article L. 211-2 of the Energy Code).

Biomass **is one of the important drivers of the decarbonisation of the economy.** Indeed, biomass combustion, as long as it is sustainable within the meaning of the European directive on the promotion of the use of energy from renewable sources, known as the "RED directive", is counted as neutral for GHG emissions. This convention on the neutrality of combustion emissions is retained for SNBC, in line with the UNFCCC and Citepa inventory methodologies that account for emissions from biomass harvesting in the land sector, provided that the necessary condition of compliance with the RED sustainability criteria is effectively met (failing which the emission factor of non-sustainable biomass used must be taken as non-zero under the ETS.)

By replacing fossil fuels, biofuels, biomethane, wood combustion or other biomass (… organic waste) make it possible to decarbonise many uses: heat networks, high-temperature industry, heavy transport, etc. In addition, the use of biomass as a material can contribute to decarbonisation, as evidenced by the example of wood in construction: used in place of

concrete, it reduces the emissions associated with it, and avoids the release of carbon into the atmosphere through the storage of carbon in these long-lived wood products (see Part SNBC - III. G)

The increased use of biomass, particularly for energy purposes, therefore 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 useful 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.**

In the context of France's and the EU's open trade relations, biomass consumption is partly based on the use of imports, whose flows change in particular according to prices. At present, imported biomass accounts for less than 10% of the biomass used in France (all uses combined), with a point of attention however to the imbalance of certain sectors which are more heavily importing, a dynamic which has been growing in recent years (wood pellets, particularly in the Overseas Territories; finished wood-based products such as furniture, parquet and packaging; biofuels). In a context of decarbonisation of the rest of the world, and particularly at European level, it is likely that the pressures on biomass supply are similar in other countries, which could imply price increases and make an import-based strategy particularly risky, in addition to the challenges related to the sustainability of this imported biomass. **Looking for a balanced biomass scenario for France therefore also strengthens its strategic and energy autonomy.** This balance must be found in compliance with the guarantees of sustainable and multifunctional forest management set out in the Forest Code and in compliance with the environmental requirements laid down in the Environmental Code, in order to ensure consistency between the use of biomass and nature restoration targets and the protection of ecosystems.

2. A necessary increase in the supply of biomass that can be used for energy purposes to meet the increase in consumption, which must be part of a sustainability approach

The modelling work of SNBC 3 **supports the hypothesis of a foreseeable increase in the need for biomass, in particular for energy purposes in a context of decarbonisation of all sectors of the economy,** and the technical and economic difficulty of using other vectors, in particular electricity, for certain energy consumptions, at least on a transitional basis. This is for example the case in the transport sector (use of biofuels), in industry to decarbonise heat production in

certain sectors (cement, sugar, etc.), and in buildings, to replace gas with biomethane and to produce heat for urban heating networks.

In the reference scenario of SNBC 3, to ensure the decarbonisation of the different sectors and while providing for a moderation of demand (see point B.3 below) and a prioritisation of uses (see point B.4 below), **primary consumption of energy from biomass (in solid, liquid and gaseous form, including overseas) reaches 240 TWh**[177] **PCI in 2030 (from around 174 TWh PCI in 2019 and 186 TWh PCI in 2023) and continues to increase beyond 2030, reaching 272 TWh PCI in 2040 and 290 TWh PCI in 2050.**

Faced with this foreseeable increase in biomass consumption, a first challenge is therefore to deploy measures **allowing greater mobilisation of biomass to increase the supply available for energy purposes** compared to a trend scenario, while respecting the priority to be given to food uses (for agricultural biomass), carbon sinks, the preservation of biodiversity and the uses of biomass as a material (for agricultural and forestry biomass).

The reference scenario thus provides for **the mobilisation and, where possible, increased production of biomass for energy purposes** in France to[178] **reach a supply of 198 TWh PCI by 2030,** as illustrated in Figure 12 below. **In 2050, production reaches 260 TWh PCI** in the baseline scenario, thus continuing to grow after 2030 (see **Figure: 12** below). **Such a development is based** both on **improved collection systems and** on **significant changes in cultivation practices and/or the areas concerned,** as reflected in the assumptions of the reference scenario and the guidelines and levers of SNBC 3, as set out in the Annex. The SNBC is therefore drawing up ambitious policy guidelines to ensure that agricultural and forestry biomass production for the production of materials and energy is increased. SNBC's supply scenario therefore departs from a trend scenario, both on the increase in harvest in the forest and on the assumptions of the different agricultural biomass, and will require the implementation of public policies to ensure that these targets are achieved.

[177] *The supply and consumption of biomass in this document corresponds to the amount of energy contained in the fuel before it passes through the boiler or engine at the end of the chain. For the tender, conversion efficiencies (methanation, biofuel manufacturing) are therefore taken into account up to the final fuel (platelet, pellet, bio, biofuel, etc.). On the other hand, the efficiency of the last appliance is not taken into account in the calculation (boiler, engine, etc.). For a given type of biomass (solid, liquid or gaseous), the aggregate supply corresponds to primary production, the aggregate demand corresponds to primary consumption (taking into account the consumption of the energy branch as well as internal losses and uses).*

[178] *The reference scenario covers the production of biomass in hexagon to meet the needs of hexagonal France and the needs of overseas France from hexagon. The production of biomass in the Overseas Territories is treated independently in the simplified models carried out for these territories.*

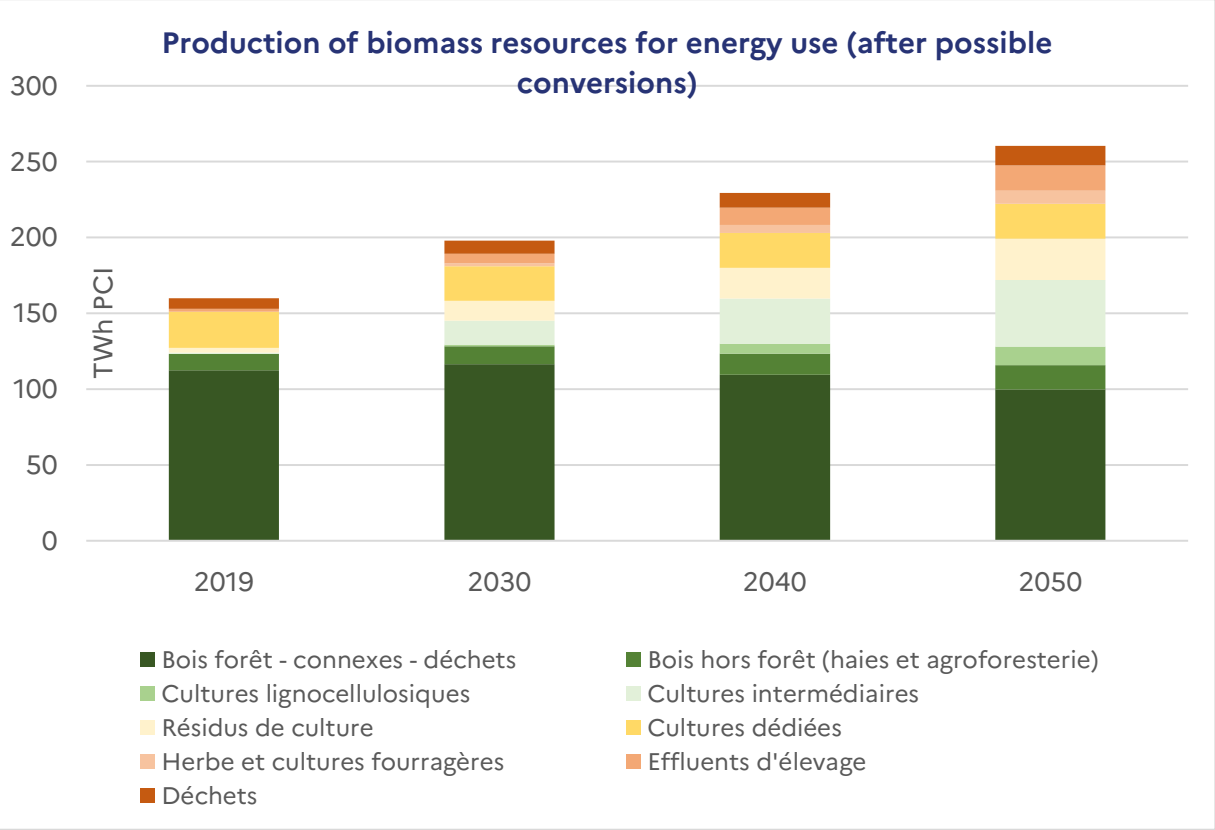

***Figure: 12** Evolution of the production in France of biomass resources in the SNBC 3 reference scenario (Sources: DGEC modelling)*

The set of assumptions of the SNBC reference scenario detailed in the annex leads to projections of wood-energy, biomethane and biofuels production that guide the setting of production and consumption targets in the PEP and SNBC, while taking into account the diversity of possible scenarios and the feedback from consultations conducted throughout the year. These assumptions were therefore constructed on the basis of expert work carried out during the various SNBC modelling exercises, drawing on feedback from stakeholders in the context of sectoral consultations conducted in different working groups (forest, biomethane, etc.). Feedback from the public consultation was also duly taken into account in the construction of the assumptions. The work carried out by the *Groupement d'Intérêt Scientifique sur la Biomasse* (*GIS Biomasse*) will make it possible to specify the capacities for sustainable mobilisation of the various types of agricultural, forestry and bio-waste biomass. **The reference scenario therefore makes it possible to give indications of the biomass potentials that can be mobilised over the various time horizons and to assess the adequacy between these potentials and the anticipated demands by the various sectors ('closures'), on the basis of hypotheses co-constructed during the modelling process, but it does not in itself constitute the State's targets in this area.**

This increased mobilisation of biomass resources is the subject of the national biomass mobilisation strategy (SNMB), provided for in Article L. 211-8 of the Energy Code and published on 26 February 2018. In particular, it shall establish recommendations to promote and increase the mobilisation of domestic biomass, while ensuring climate change mitigation and ecosystem preservation, to cover, as far as possible from domestic resources, identified biomass needs,

both for energy purposes and for biomaterials and bio-based chemistry. This strategy will be revised following the new targets of MEP (Multiannuel Energy Programming) 3 and SNBC 3 in order to set updated biomass mobilisation targets and specify the public policy levers to be used to ensure that SNBC's ambitious targets are met. **This national strategy is now implemented at regional level** by the regional biomass schemes (SRBs) provided for in Article L. 222-3-1 of the Environmental Code[179] and adopted in the vast majority of regions. The revision of the SNMB will thus take into account the regionalised targets set by the SRBs, which may also be revised according to regionally specific timetables to take account of developments in MEP 3 and SNBC 3. This strategy therefore does not detail precisely the closures of all biomass subtypes (but presents the specific orientations for solid biomass, biomethane and biofuels) or the territorial declination of additional biomass mobilisation.

Increasing the need for biomass resources must also be part of a sustainability approach. The environmental framework for biomass cultivation or management and harvesting practices must be clear and transparent and must be based on the latest available scientific knowledge (see box below). **This environmental framework remains a priority so that the energy use of biomass does not lead to a reduction in the capacity of ecosystems to provide all their services** (food, biodiversity, carbon sinks, maintenance of the quality and availability of … water resources), a fortiori in a context of climate change. This framework is based on a set of European requirements, first and foremost the environmental provisions of the common agricultural policy, and the sustainability of bioenergy within the meaning of the RED Directive, recalling that biomass used for energy purposes can also be a co-product or residue of other biomass-producing activities, that it often has a strong territorial component and that, as regards forest biomass, it already benefits from a national framework based on sustainable and multifunctional forest management. The recent revision of the **Directive on the promotion of the use of energy from renewable sources (RED III) introduces,** compared to the previous version ('RED II'), new provisions to be complied with to ensure the sustainability of biomass, in particular of forest origin. These provisions concern the control of clearcuts, the avoidance of the harvesting of stumps and roots, the preservation of soil quality or the maintenance of dead wood in the forest. The Directive also defines a set of 'prohibited areas' within which forest harvesting for value chains leading to energy production is prohibited or severely restricted (primary and sub-natural forests, forests rich in biodiversity, grasslands, heathlands, wetlands, peatlands), thus limiting the impact of the mobilisation of forest biomass on different ecosystems. The operational implementation of the Directive will promote the sustainable management of forest biomass. In addition, the European Regulation against Deforestation and Forest Degradation of May 2023 introduced rules to ban the placing on the EU market of products that have contributed to deforestation and degradation, and is essential to ensure the sustainability of biomass imports. These provisions also apply to overseas departments and regions subject to European law, making it possible to define a basic

[179] *These documents specify the concrete measures to be implemented, as well as the regional quantified objectives for mobilizing new resources.*

legal framework for the sustainable mobilisation of biomass resources. However, adaptations are possible to the RED sustainability criteria in these territories to ensure the decarbonisation of their electricity mix by using forest biomass as provided for by their MEP; in view of the difficulty of using only other renewable energies, the impossibility of relying solely on local biomass (waste, … invasive alien species) and the need, in the case of Guyana, to clear agricultural land in order to guarantee the territory's food sovereignty, in the limited proportions provided for in the Guiana Regional Planning Scheme.

Potential environmental impacts of increasing biomass mobilisation for energy purposes and knowledge to be strengthened according to the INRAe Bibliographic Synthesis Study[180] completed in 2023

This synthesis lays the **groundwork for reflection on potential environmental impacts, and identifies the knowledge that needs to be strengthened.** It should be noted that this study is a bibliographic study, not a case study analysing French practices or regulatory framework.

Annual crops are first and foremost the subject of alert points of the same nature as those relating to food crops, justifying the framework for the use of this type of crop.

Perennial **crops of the** miscanthus or switchgrass type have more positive effects, especially when they are planted on marginal land, but the intensification of practices (water withdrawal, inputs) or the choice of settlement areas remain points of attention. The report points to the need for local studies on 'limit' levels of straw and residue exports, in order to maintain sufficient soil quality in terms of organic matter. Potential positive effects are identified on energy-oriented intermediate crops (soil carbon stock, nitrogen management, reduction of runoff and erosion, biodiversity) with, however, limits identified on groundwater recharge, and the overall need for additional research on this theme (carbon-nitrogen-water cycles and their couplings, biodiversity, sustainability in the face of climate change). The environmental interest of mowing grass from grasslands, in particular those including legumes, is highlighted in several respects, stressing the need for an adequate mowing frequency to ensure the maintenance of the ecosystem services associated with grasslands.

As regards **manure,** the importance of storage (covered tanks) and spreading conditions is emphasised.

As regards **forest biomass,** the risk of mineral depletion caused by timber and residual samples is pointed out, as well as the potential impact on the water cycle and run-off according to the cutting methods (clean cutting, compaction linked to the machines). The interest of pellets made from processing residues (bark, sawdust, … wood chips) is underlined. The impacts associated with the mobilization of short rotation coppice or increased harvesting of hedgerows remain to be analysed in more detail overall.

The **impacts of the return to the ground of digestates and vinasses** are nuanced. Good spreading practices, adapted to the pedoclimatic context, are essential to minimise these

[180] *INRAe Transfer (2023). Environmental impacts and technical, economic and societal challenges associated with mobilising agricultural and forestry biomass for energy production in France by 2050 https://www.ecologie.gouv.fr/sites/default/files/documents/20231020 _INRAe _ Biomasse-Energie-2050.pdf*

impacts. Some biochars appear to have positive impacts, particularly on carbon storage in soils. Ash is of potential interest only in terms of chemical balance, with a focus on the dissemination of metallic trace elements.

3. Biomass closure: moderate the increase in demand so as not to exceed the supply available for energy uses, both in 'quantity' and 'nature' (solid, liquid, gaseous)

As it stands, in the reference scenario of SNBC 3 (see details in the annex), the total primary consumption of biomass for energy purposes in its various forms (including overseas) could amount to **240 TWh PCI in 2030** for an estimated production at that time of **198 TWh PCI.** An aggregated view between all uses and availability of biomass thus highlights **a supply-demand imbalance in biomass in 2030 at the national level, with in particular a high consumption of biomass in the residential, industrial and transport sectors.** This imbalance is then reduced by 2050 (in total, 260 TWh PCI of supply and 290 TWh PCI of demand by that date). Taking into account the presence of a 'heel' of biofuels imports already present today at around 10 TWh (see details in the annex) and which continues until 2050, biomass closure is therefore improving in 2050 compared to the 2030 and 2040 deadlines, with a significant reduction in the imbalance on biofuels, despite the persistence of a slight tension on the three biomass vectors (solid, liquid and gas). **Biomass closure, i.e. verification that the model provides sufficient biomass to meet needs, is therefore difficult to achieve in 2030 and 2040, but efforts to moderate demand and increase biomass mobilisation then bear fruit by 2050.**

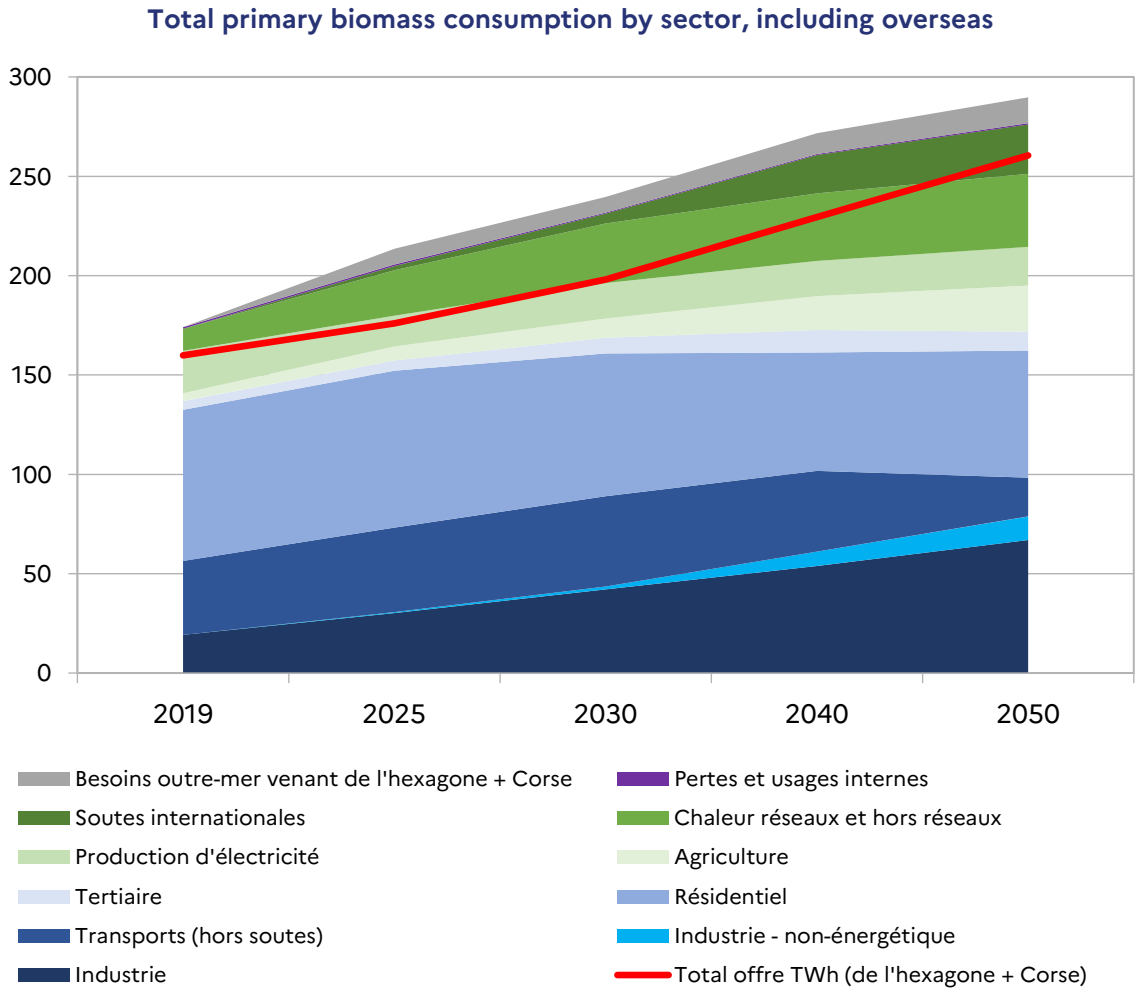

***Figure: 13** Biomass consumption by sector in the modelling of the reference scenario of SNBC 3 (Sources: France's energy balance sheet, SDES, 2023 edition; DGEC modelling)*

However, beyond the issues of 'quantity', **the question of supply-demand adequacy also arises as to the nature (mainly according to the solid/liquid/gaseous distinction) of the energy carriers used.** Indeed, for energy uses, recent or emerging technologies can allow the recovery in biomethane or liquid biofuels of biomass resources whose physical characteristics are less adapted to this type of energy carrier, such as pyrogasification or Fischer-Tropsch biofuel production processes[181] that can notably recover wood or other lignocellulosic resources. These processes involve **conversions whose yields further reduce the volume available for final energy, which justifies the low use of final energy in the reference scenario.** Therefore, fungibility between the three types of bioenergy (biomethane, biofuels, solids) is limited: **This**

[181] *These processes would produce 0.3 TWh of biomethane and 0.3 TWh of biofuels (final resources) from solid biomass in 2030, respectively.*

means that the different types of biomass (agricultural, forestry, waste) must be guided according to their physical nature and associated uses.

Thus, food waste, in addition to its priority treatment by composting, is oriented towards methanization or biofuels for the specific case of lipid waste. Agricultural biomass is generally shared between the production of biomethane by methanation and biofuels, with certain types of agricultural biomass oriented preferentially (intermediate crops are exclusively dedicated to methanization for example). A limited share of agricultural biomass (crop residues) is also intended for short- and medium-term combustion only, in particular in the form of agropellets. A large part of forest biomass, related biomass and wood waste, in addition to material uses, is also destined for combustion in the form of solid biomass, with however a small share destined for biofuels (for the aviation sector) as well as a small share destined for the production of biomethane by pyrogasification.

Finally, this finding of low fungibility, coupled with that of a resource available in limited quantities, **also highlights the importance of achieving our targets of reducing energy consumption:** Measures to moderate demand for biomass to ensure supply/demand closure by 2030 and beyond are essential.

a. Biofuel closure

For biofuels, the increase in production is mainly based on crop residues and ligno-cellulosic crops, and to a lesser extent on lipid waste and woody biomass (forest chips and end-of-life wood for the production of aviation fuels, in small quantities due to the priority given to non-substitutable material and energy uses for forest biomass, in line with the prioritisation of uses presented in point 4 below).

It is important to take into account that we are already importing a significant amount of biofuels ("heel" of imports that lasts until 2050), making the "biofuel closure" difficult to achieve. The target of SNBC 3 is therefore to limit the quantity of imported biofuels as much as possible, without seeking complete self-sufficiency. **A sharp increase in biofuel consumption by 2030 and 2035 is foreseen in the SNBC 3 targets in order to achieve the biofuel incorporation rates set by the RED, with land transport constituting the vast majority of biofuel uses in 2030.** This creates an imbalance with respect to supply which is growing less rapidly, and therefore requires a transitional increase in imports in order to satisfy demand in full by these deadlines: a part should be imported as inputs and processed in France, while a part will be imported directly as biofuels. **This imbalance persists in 2040,** due in particular to a significant increase in usage for the aviation sector (international supports), in line with the obligations imposed by the RefuelEU Aviation Regulation.

Looking further afield, the biofuel closure is improving to a much lower deficit in 2050 (the closure deficit is again similar in order of magnitude to the situation observed in 2019), **notably through a decrease in the use of biofuels in land transport, with the almost complete electrification of the light-duty vehicle fleet and an increase in biofuel production that continues until that deadline.** In 2050, biofuels are used in heavy land transport, to a much lesser extent than in 2030, while aviation uses continue to grow significantly.

b. Biomethane closure

Biomethane comes from the methanisation of various inputs, mostly intermediate crops, livestock manure and crop residues, but also to a lesser extent from dedicated crops, grass and forage crops and waste (landfills, sewage sludge, food and industrial waste). **The increase in production is guided by the target set by the Multiannual Energy Plan, and is based on ambitious assumptions for the mobilisation of agricultural biomass, including a sharp increase in the area under intermediate energy crops (CIVE), the mobilisation of crop residues and livestock manure** (see Part SNBC - III. B. Agriculture). These assumptions make it possible to reduce emissions from gas consumption in industry and buildings, until **full decarbonisation in 2050 (the carbon-neutrality target requires that all gas in the network be decarbonised by that date,** so that the majority of it is made up of biomethane and about 10 TWh of synthetic gas). However, the total production of biomethane in 2050 is subject to many uncertainties: it is estimated in the baseline scenario at around 100 TWh PCI (111 TWh PCS). Given the current level of methane gas consumption (417 TWh PCS in 2023), the prioritisation of biomass uses, the methanizable biomass deposit as well as the maturity of other biomethane production technologies, this requires a significant decrease in gas consumption in order to be able to meet the needs. This goes hand in hand with a 60-70% trajectory of heating conversion in homes equipped with gas boilers and an effort to limit the use of biomethane in industry by 2050. At this time, industrial and residential uses constitute the majority of biomethane outlets.

Since the majority of biomethane comes from agricultural methanization, its production is conditioned by ambitious agronomic hypotheses. A moderate share of renewable gases is also produced via hydrothermal gasification of sewage sludge and pyrogasification of woody biomass, for volumes measured due to the cost and technological maturity not yet fully achieved by these technologies. Regarding pyrogasification, its development raises questions about the availability of woody biomass used as an input. Due to the high cost of this technology and the importance of valorising all the heat produced to increase its efficiency, it is particularly relevant for industrial uses, in line with the merit-order of biomass (see point 4), and not for use as an injection into the network.

c. Solid biomass closure

As regards solid biomass, i.e. woody biomass intended mainly for combustion (forest biomass, wood waste, biomass from hedges and agroforestry in particular), **the closure is tight at all times, and in particular in 2030 with specific challenges for woodchips, a more detailed analysis being made difficult by the uncertainties inherent in forest sector modelling, exacerbated in a context of climate change.** Closing is linked to a physical reality which requires new uses to be made available with a sufficient quantity of solid biomass to satisfy them (subject to having previously studied the possibilities of decarbonising these uses in a different way, for example via electrification; see next section). Moreover, the difficulty of transporting the resource, whose economic model is often closely associated with local valorisation, makes it all the more necessary to manage the closure.

By 2030, the supply of solid biomass increases in the baseline scenario, notably through an increase in the forest harvest from 53 Mm3 in 2023 to 60 Mm3. However, this increase is limited due in particular to the impacts of climate change on the forest and a difficulty in increasing the harvest rate in both public and private forests. Indeed, according to the national GHG emissions inventory published by Citepa, although French people harvest increased by 7 Mm^3 from 2013 to 2023, its value in 2023 (53 Mm^3) corresponds approximately to the average national harvest since 1990, which is approximately 52 Mm^3. The harvest of forest biomass has therefore been relatively stable for 30 years, while the stock has steadily increased. According to the IGN, the volume of standing wood in French forests rose from 1.8 billion m3 in 1985 to 2.8 billion m3 in 2023, including 148 million m3 of standing dead wood (5% of the total). Dead wood on the ground accounts for 289 million m3. On average, one hectare of mainland forest contains 9 m3 of standing deadwood and 18 m3 of deadwood on the ground. It should be noted, however, that the volume of standing deadwood less than 5 years old has doubled in 10 years, while the volume of deadwood on the ground has increased by 10% over the same period, resulting in a decrease in annual net production of almost 15% between the periods 2005-2013 and 2014-2022.

The increase in the harvest envisaged under the SNBC is mainly reflected in an assumption of an increase in the share of private forest under management (which represents almost three quarters of French people forest area and at least one third of which is currently not under forest management).[182] Forest management operations in these stands are likely to result, initially, in thinning work that will result in a significant proportion of industrial wood and energy wood. To a lesser extent, this increase in harvest is then reflected in the hypothesis of an intensification of harvests, targeting certain stands that are poorly or moderately managed, or affected by significant declines. **In the short term, there is therefore a sharp increase in the amount of wood energy available in the reference scenario.**

Modelling of SNBC 3 has led to a smoothing of forest mortality and therefore does not take into account the effects of potential major crises or which would occur in cascade following a biotic or abiotic hazard (storms, scolytes, … fires). The crisis timber that would be generated by such phenomena could supply wood-energy power plants, but they cannot constitute a sustainable resource on which to base the supply of a long-term project. The unpredictability of crises, despite the increase in their frequency and intensity due to climate change, also makes it impossible to have reliable volumes for this resource. The development of organisational capacities within the sector could also make it possible to convert crisis wood into wood-material uses, as recommended by SNBC 3 in the LULUCF section.

However, it is estimated in the baseline scenario that there is a high voltage by 2030 on wood chips, which are the main source used in industrial and district heating projects. Indeed, an

[182] *More than two thirds of the private forest area does not have a sustainable management document: only 27% of the private forest area has a PSG, RTG or CBPS (CNPF), and almost a third of this area has no recent signs of management (source: IGN)*

analysis of projects funded by France Relance and France 2030 calls for projects between 2019 and 2024 showed a significant increase in the consumption of solid biomass in the form of woodchips by 2030, in particular for industry, going well beyond what had previously been estimated. **This pressure on wood chips is not alleviated by the decrease in biomass consumption by 2030 in the residential sector** (households mostly using wood logs for heating, as well as wood pellets, but not chips), and is not a priori compensated by the possibilities to mobilise other types of biomass by this deadline (wastewood, … hedgewood). A **strong reorientation of existing incentive schemes has thus been initiated, giving priority to alternative technologies to biomass where these are technically and economically viable (see** next section).

By 2050, the desire to develop solid biomass uses, in particular in order to strengthen the carbon sink of wood products, in line with the cascading principle of the RED III Directive (which aims to give priority wherever possible to the material use of biomass over its energy use), is leading to a reduction in the supply of solid biomass for energy purposes, in particular through a reallocation of the forest harvest, which is more intended for wood products, sawnwood and panels rather than directly oriented towards energy. However, the increase in hedgerow linearity continues, leading to greater availability of woody biomass. At the same time, the total consumption of solid biomass decreases as a result of material sufficiency efforts and investments in energy efficiency, in particular in the industrial and building sectors (see Sectoral Parts III.B and III.D of the SNBC), and the application of the hierarchy of biomass uses.

Details of the various sub-shields (biofuels, biomethane, solid biomass) are available in the annex.

4. A necessary prioritisation of biomass uses given the limited nature of the resource and the goal of prioritising food and material uses over energy uses

Biomass is needed primarily for food, and for its uses as a material, in particular in construction and furniture. In order to ensure the balance between the need for biomass for energy uses and its availability ('biomass closure'), giving priority to food and material uses, **the Government adopts a principle of prioritisation of biomass uses.** This prioritisation will involve strategic choices to identify uses where biomass is an essential decarbonisation pathway and where biomass use may be limited, in order to ensure an efficient allocation of constrained resources. **This prioritisation of uses is presented in the table below**, and is identical to the one in MEP 3. It is consistent with the priority target of food sovereignty and the preservation of the material and forest carbon sink, **placing the food and material uses of biomass above all its energy recovery.** This is in line with the **cascading principle** introduced by RED III, whose target is to optimise the recovery of biomass in terms of environmental performance by favouring long-lived material uses over energy uses where possible.

The question of prioritising the energy uses of biomass thus raises the question of alternatives (example: the increased use of heat pumps or geothermal energy for heating residential or tertiary buildings), **their energy efficiency compared to biomass and the cost of decarbonisation in the absence of the use of biomass.** Indeed, the prioritization of the resource requires a good identification of industrial and residential or collective heating uses for which an alternative technology to biomass exists and is technologically and economically viable to ensure its decarbonization. This involves both studying alternative technologies and the cost of decarbonisation. **This issue has already led to changes in the specifications for public support for the decarbonisation of heating networks and industry,** with the generalisation of preliminary studies of existing alternatives by project promoters (Pact Industrie and ENR'Choice approaches). Limiting public support for the installation of non-performing biomass heating equipment via MaPrimeRénov and energy saving certificates (EEC) is also part of this approach. **The latter will be the subject of further work in the future, in order to ensure optimal allocation of biomass resources by aligning the various public policies affecting demand for biomass (public support schemes, tax and regulatory framework) and the price signals they induce with the prioritisation of uses; by favouring demand moderation and alternatives to biomass** (geothermal, solar thermal, electrification, waste heat recovery), where technically and economically feasible with a view to preserving the biomass resource. In particular, an assessment of the limitation of platelet consumption in calls for projects and the ENR'Choice and Pact Industrie provisions will be carried out to assess their effectiveness in reducing the voltage on the resource.

BIOMASS USES	EXPLANATION
NON-ENERGY USES, WHICH TAKE PRIORITY OVER ENERGY USES	
HUMAN FOOD	Food sovereignty issue.
ANIMAL FOOD	Protein autonomy challenge – up to the needs of lower animal protein consumption consistent with the overall dietary transition scenario.
SOLS FERTILITY (RETURN TO THE SOIL OF RESIDUES AND COVERS)	At the level of needs to maintain the performance and health of ecosystems.
CARBON SINKS AND MATERIAL USES	In order to promote carbon storage (forests, soil, … hedges) to the extent necessary to meet the climate targets set by the SNBC, and with a view to developing the use of biomass materials (wood products, bio-based materials and fibres, chemistry), with a focus on increasing the lifespan of bio-based products, re-use and recycling.
ENERGY USES TO BE CONSIDERED IN PRIORITY	
INDUSTRY – HIGH TEMPERATURE HEAT	Few decarbonised alternatives.
HEAT NETWORKS	Subject to giving priority consideration, before the use of biomass, to waste heat recovery and alternative technologies to biomass (geothermal, solar thermal …)
ENERGY CONSUMPTION OF AGRICULTURE AND FORESTRY AND WOOD INDUSTRY	Especially for agricultural machinery. Possibilities for short circuits and upgrading of agricultural energy production (also possibility to consider more electrification). Forest-wood sector: own resource self-consumption and on-site recoverable energy production, in balance with other non-energy uses of related sawmill products
HEAVY CONSTRUCTION EQUIPMENTS	Few decarbonised alternatives.
ENERGY USES TO BE DEVELOPED RAISONNABLY AND UNDER CONDITIONS	
AIR TRAFFIC (DOMESTIC AND INTERNATIONAL)	The modal shift (where possible and relevant), sufficiency and additional costs related to the trajectory of increasing incorporation of sustainable fuels are expected to moderate the growth of air traffic. Synthetic sustainable aviation fuels, made from decarbonised electricity and not using biomass, are also set to play an increasing role, as set out in the European Refuel EU Aviation Regulation.
MARINE BUNKERS	Possibility of using e-fuels (e-methane, e-methanol, e-ammonia, hydrogen and e-diesel from the production of e-kerosene). Depends on the level of maritime traffic, with, on the one hand, a desire for re-bunkering in France and, on the other hand, a decline in imports of goods linked to reindustrialisation.
TRANSPORT – HEAVY TRUCKS, BUS AND CARS, AND FLUVIAL AND RAIL TRANSPORT	Development of biofuels through controlled incorporation rates, and maintaining a priority given to electrification of a share of uses. Possibility of using other sources (in particular H2 and LNG) for specific uses.

TRANSPORT – LIGHT VEHICLES	Through controlled incorporation rates and in a transitional perspective, and maintaining a priority given to the progressive electrification of the park.
INDUSTRY – OTHER USES	Uses with viable decarbonisation alternatives (PAC, electrification, RCU,[183]... geothermal energy).
RESIDENTIAL AND TERTIARY – SOLID HEATING BIOMASES AND PERFORMING DOMESTIC HOT WATER	Solid biomass for residential and tertiary heating is available in limited quantities. The electrification of heating by the installation of heat pumps shall be a priority and shall remain the preferred route where technically and economically feasible. In the absence of a relevant alternative, wood energy should be prioritised over high-performance appliances, replacing non-performing wood appliances or fossil equipment (oil and LPG).
NON-INTERCONNECTED AREAS	Production of energy from local or imported biomass under the condition of sustainability of production. Possibility to further develop other electric RES. Reminder: Non-interconnected areas have dedicated PPE.
USES FOR WHICH DEVELOPMENT IS TO BE MODERATED	
ELECTRICITY PRODUCTION	Give preference to other technical solutions, in particular for basic production.
RESIDENTIAL AND TERTIARY – HEATING AND NON-PERFORMING DOMESTIC HOT WATER	Reduce the use of low-performing appliances (installed before 2005) consuming solid biomass.
RESIDENTIAL AND TERTIARY – KITCHEN	Electric alternative (induction in particular) more efficient and less dangerous.

***Table: 1** Prioritisation of biomass resource uses*

Beyond the energy uses of biomass, which directly replace the use of fossil fuels, material uses of biomass can also contribute to the decarbonisation of the economy. **The physical and mechanical properties** of the various biomass must be exploited in order to offer **alternatives to materials of fossil origin** (starch, cellulose, flax or hemp fibres, wood, natural elastomers). Similarly, **the extraction of certain more or less complex natural molecules,** present in biomass, can reduce **the consumption-based emissions of chemistry and all the industrial sectors it feeds.** These may be active ingredients usable for health or nutrition, platform molecules used as chemical intermediates, solvents or formulation agents for consumer products (alcohols, fatty acids, surfactants, mineral fillers, etc.) or sugars to feed biochemistry. These biomass recovery pathways may be **more energy efficient than turning biomass into fuel or precursors compatible with current petrochemical processes.** In addition, if further processing is required, bio-based chemistry can use low-energy processes (enzymatic catalysis, fermentation) that help lower the consumption-based emissions of final products. **It will therefore be necessary**

[183] *Urban heat networks*

to continue the work and to document, on a case-by-case basis, the value of these material uses in comparison with energy uses.

5. The need for strengthened governance at national and regional level

Given the many challenges identified around the subject of biomass (increase in mobilisation and production, increase in consumption and associated moderation, monitoring of supply-demand adequacy, etc.), **France must adopt strengthened governance on the subject,** both at national and regional level, aimed in particular at:

- **Precisely and regularly up-to-date estimates of the available or possible resource,** including by integrating uncertainties related to the impacts of climate change; ensure the sustainable management of the resource in order to have an optimal carbon impact, taking into account the evolution of the carbon sink; and expertise on levers to support the effective availability of an adequate biomass supply in the medium term;
- **Continuous monitoring of the installed uses of biomass,** in particular the consumption of energy installations;
- **Evaluate the relevance of new uses or new projects** and their projected consumption in the light of the resources still available and projected, applying the prioritisation of uses defined above;
- **Ensure overall consistency of the projects supported** throughout the territory with this strategy and the balances and priorities defined at national level.
- **Build national and regional strategies and public policies that are consistent with each other and with the above-mentioned challenges,** and in consultation with professional, institutional and associative stakeholders in the biomass sectors.

As such, the **issue of data and its accessibility, and the related legal framework, is identified as a key point.** The 'biomass regional cells' are currently responsible for checking the suitability at regional level between the supply of locally available biomass and the needs of the various subsidised projects, in order to limit conflicts of use. **Strengthening the role of regional biomass cells, in their task of validating supply plans for biomass-using projects, is a key issue in order to implement the prioritisation of biomass uses, the principle of cascading biomass use and to ensure the closure between biomass needs and resources.** Biomass cells will also be responsible for monitoring the supply of and demand for biomass on the regional territory, in order to be able to identify existing tensions and adapt the local application of the hierarchy of biomass uses accordingly. On the issue of data, convergence work will be undertaken between the Cartofob tool, used by biomass cells to assess the availability of forest and forest biomass, and the National Biomass Resources Observatory (ONRB), which makes it possible to visualise the availability of agricultural biomass. This will allow regional cells to have a comprehensive view of all biomass at local level. This is a major challenge due to the development of projects using various types of biomass to ensure the resilience of their supply in the face of the observed tension on the forest resource, with a observed trend of increasing use of agricultural biomass in the form of agropellets. Work will also be carried out to ensure convergence of data from

regional biomass observatories and national tools, and to align biomass conversion factors and typologies used at different scales. This work will take place in the context of the revision of the SNMB and will be fed by the expertise of the GIS Biomasse.

Indeed, in order to improve knowledge of biomass supply and demand, the State is supported at technical level by a scientific interest grouping (GIS) bringing together public reference institutions on biomass (ADEME, FranceAgriMer, IGN, INRAE), the creation of which was announced on 1 March 2024 during the International Agricultural Show. In particular, the GIS contributed to SNBC's modelling by providing a critical scientific perspective, in order to ensure that biomass supply and demand estimates were as rigorous as possible. **The GIS should also participate in the development of methodologies to support the drafting of opinions of regional biomass cells on biomass-consuming projects and their monitoring of local resources and uses.** This work will feed into the doctrine that will be developed regarding the implementation by biomass cells of the prioritisation of biomass uses and the cascading principle, while integrating issues of prevention of the environmental impacts of increased biomass mobilisation. The expertise of the GIS biomass will also make it possible to specify how to apply the hierarchy of biomass uses at regional level, with the construction of indicative 'regional biomass budgets' to guide the opinions of the regional cells on new projects. The work of the GIS will be the subject of a stakeholder dialogue within the **Inter-stream Thematic Commission (the CTI) on the Bioeconomy within FranceAgriMer, which saw its missions extended to woody biomass by decree on 6 July 2024.** This body will also allow monitoring of the implementation of the biomass component of SNBC 3 and a dialogue between the State, scientists and stakeholders on subsequent public policy measures.

In addition, in order to further detail the state of tension already observed on wood chips and solid biomass in general, work will be carried out to clarify the figures for imports and exports of biomass, in particular wood waste. On this last point, a recent ADEME report[184] indicates that a significant amount of flows are now going to export, which suggests a possibility of relocating this biomass to develop uses as a material and then energy in France, but this possibility still needs to be specified. This work will also be carried out on interregional biomass flows based on available data, so that regional cells have a more accurate view of them and can take them into account in their opinions.

C. Allocation of space: anticipating the impacts of the strategy on land use patterns

The developments envisaged in the reference scenario **lead to significant changes in land use patterns (agricultural, natural, forestry and urban areas).** More specifically, some modelled

[184] ADEME, *Wood waste deposit study in the wood / wood energy sector*, 2024. https://librairie.ademe.fr/economy-circular-and-waste/7539-etude-de-gisement-des-waste-de-bois-dans-la-filiere-bois-bois-energie.html

developments in agricultural production, forest development and new construction occupy new spaces, which must therefore be 'liberated' by other developments.

In particular, forest area is increasing, in particular as a result of non-forest afforestation and the development of forest accrus (see Part SNBC - III. G. Carbon sinks – forest and land use change). Artificialised areas are increasing as a result of the need for new construction and the establishment of new industrial sites, although these are controlled by building efficiency assumptions (see Part SNBC - III. D. Buildings) and the achievement of the target of Zero Net Artificialisation (translated into the scenario by a balance in 2050 between artificialised and renaturated surfaces). Finally, there are differentiated developments in agricultural areas:[185] sharp increase in leguminous areas linked to changes in diets (double the area by 2030 and increase by 2.6 by 2050, compared to 2020), decrease in fodder crops, maintenance of productive permanent grassland, etc.

The modelled scenario therefore highlights issues of competition between different land use patterns, which should be anticipated. For example, a stronger actual artificialisation trajectory than in the baseline scenario could lead to a smaller increase in forest areas, or to agricultural abandonment (see sensitivity test below).

Sensitivity test – Enhanced artificialisation pathway

If the decrease in annual artificialisation were half as fast as in the reference scenario by 2050, i.e. a reduced annual artificialisation of 47% from 2019 to 2050, and without renaturation (compared to a reduction of around 93% in the reference scenario, the residual artificialisation being compensated by renaturation), this would lead to an additional artificialised area in 2050 of around 290 kha compared to the reference scenario. These additional artificial surfaces should therefore necessarily be taken from other types of surfaces, thus complicating the achievement of decarbonisation targets. For example, if all these additional artificialised areas were taken from forest areas, this would be equivalent to a decrease in non-forest afforestation representing a sink loss of around 3 Mt CO_{2e} in 2050 compared to the baseline scenario. Another impact of this additional artificialization could be to greatly limit the increases in certain agricultural productions. By way of comparison, the reference scenario foresees +535 kha of cultivated area of protein crops from 2020 to 2050: this increase, which is essential to increase the target consumption of legumes, could therefore be called into question in such a scenario.

[185] *In practice, total area changes are the result of farmers' choices based on pedoclimatic, agronomic, economic, social factors, etc. and are part of longer or shorter rotations. In the context of the scripting of SNBC, the rotations are of course the result of past rotations, as well as the changes envisaged on a number of crops and areas of the French territory. Thus, the rotation is built in the SNBC projections but is not the result of a simulation by an economic model of supply and demand.*

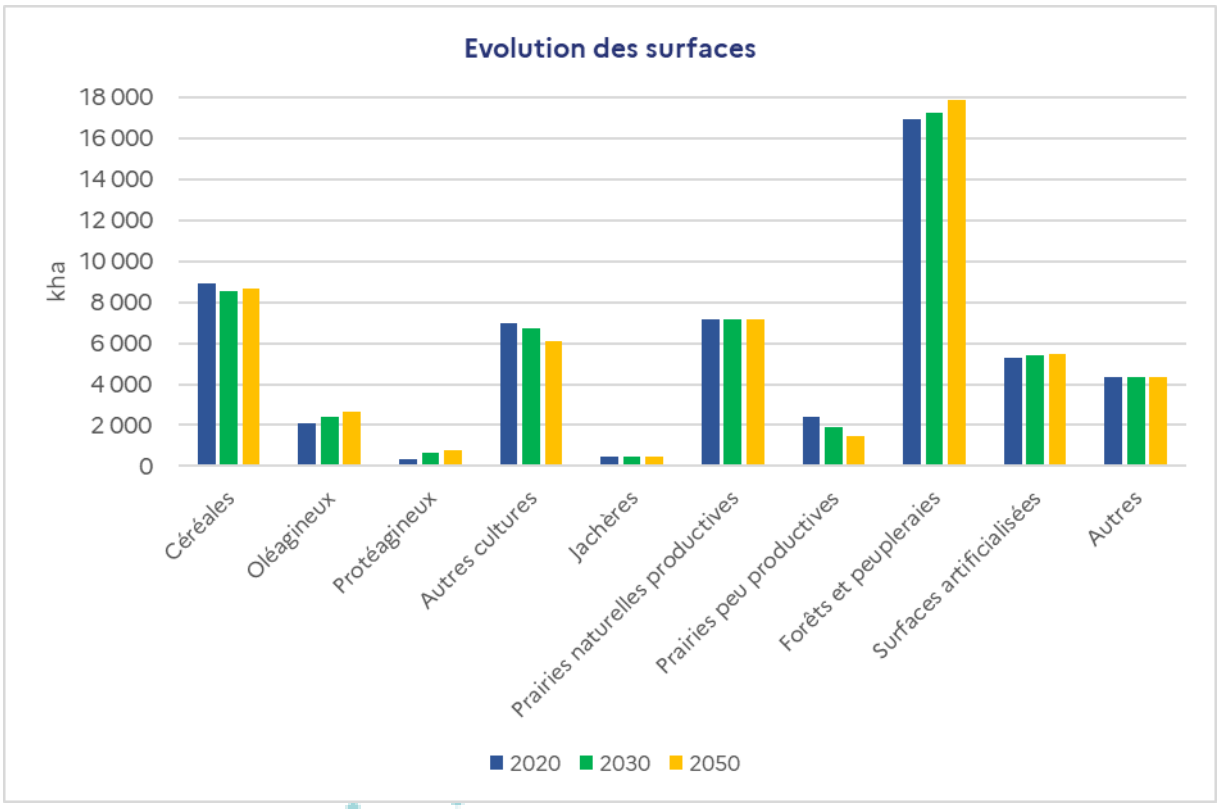

Figure: 14 *Evolution of areas in the reference scenario of SNBC 3 (Sources: DGEC modelling)*

D. Reducing the impact of climate policy itself on human and environmental health

Climate change affects the physical environment as well as all aspects of natural and human systems, including social and economic conditions (air, water and soil quality, food systems and livelihoods, etc.). **As climatic conditions change, more frequent and intense weather and climate events are observed,** including storms, extreme heat, floods, droughts and forest fires. **These weather and climate hazards also affect human health** both directly and indirectly, increasing the risk of death, the emergence and spread of infectious diseases, and health emergencies.

Reducing the impact of climate policies on human and environmental health is part of the One Health approach, which recognises the close links between human, animal and ecosystem health. A poorly regulated energy transition can generate new pressures (air pollution, artificialisation, disturbance of environments) with deleterious effects on these three dimensions. **In order to anticipate and reduce those effects, SNBC was subject to an environmental assessment *on an ongoing basis*.** The environment is understood as a whole: population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape.

The analysis of the likely significant impacts of the implementation of SNBC 3 through the lens of the 10 challenges identified,[186] compared to a trend scenario (i.e. "with existing measures" or MEA)[187] **highlights entirely positive or neutral likely impacts on most environmental challenges.**

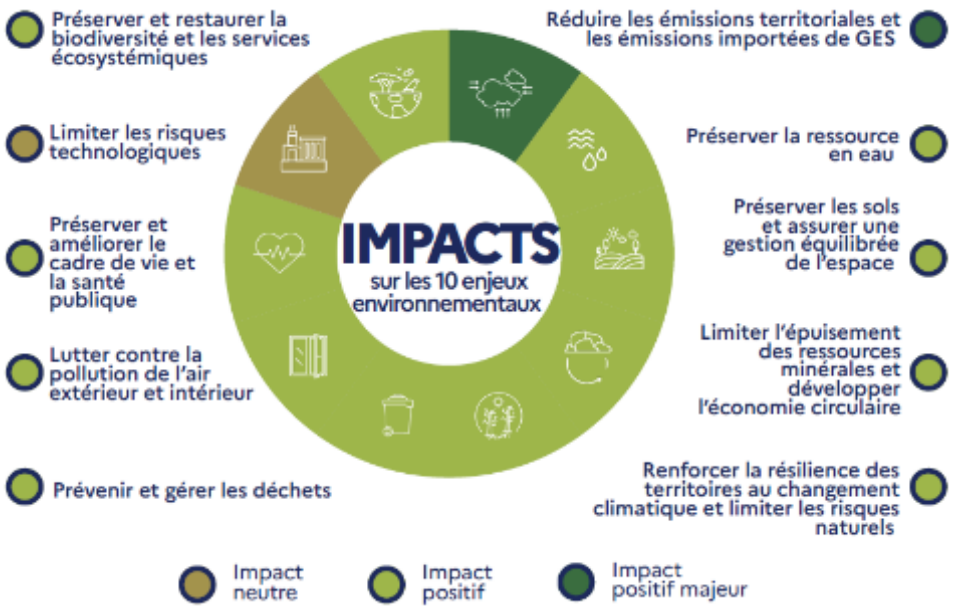

Figure: 15 *Qualitative summary of the residual environmental impacts of SNBC 3*

On the reduction of territorial emissions and imported GHG emissions, the impact of the implementation of SNBC is considered to be a major positive one.

With regard to the other environmental issues identified, with the exception of issue No 7 'limiting technological risks', the impact of implementing SNBC is considered to be limited. The reduction of the use of fossil fuels, the evolution of agricultural practices (in particular through the development of agroecological systems and the deployment of precision farming techniques, favouring an integrated and systemic approach to French production systems), the promotion of sufficiency in travel and consumption patterns and the development of the circular economy, mainly contribute to reducing pressure on the environment compared to the trend situation (water, soil, mineral resources). On biodiversity, the main positive impacts concern the agriculture and land use sectors through crop diversification and the development

[186] *The 10 issues examined in the environmental assessment of SNBC 3 are: 1) Reduce territorial and imported greenhouse gas emissions; 2) Preserving water resources; 3) Preserving soils and ensuring balanced spatial management; 4) Limit the depletion of mineral resources and develop the circular economy; 5) Strengthen the resilience of territories to climate change and limit natural risks; 6) Preserving and restoring biodiversity and ecosystem services; 7) Limit technological risks; 8) Preserving and improving the living environment and public health; (9) Combating outdoor and indoor air pollution; 10) Prevent and manage waste.*

[187] *The WEM scenario available to date is the WEM scenario constructed in 2024. It incorporates the latest available data, as well as the impact of policies and measures adopted until 31 December 2023.*

of agro-ecological infrastructure, the maintenance of permanent grassland and wetlands, the adaptation of forests to climate change, forest renewal, as well as off-forest afforestation.

However, these positive effects are mitigated by certain points which call for vigilance:

- Some decarbonisation levers may increase the pressure on **water or mineral resources.** This includes the electrification of transport, carbon capture and storage technologies and the development of renewable energy. In the building sector, the scale of renovations and possible new constructions will also require resources and could give rise to certain tensions;
- The increase **in water** needs due to climate change (in particular the increase in evapotranspiration of plants in agriculture) is likely to cause tensions on water resources;
- The developments envisaged in the reference scenario lead to significant changes in **land use** patterns and the modelled scenario highlights issues of competition between different land use patterns, which should be anticipated;
- The increased **mobilisation of biomass**, as foreseen in SNBC 3, is accompanied by environmental challenges with a potential increase in pressure on water **resources, soil and biodiversity.** To meet this challenge, this increase in timber harvesting must comply with the regulatory framework for the sustainable and multifunctional management of French people forest, while respecting soil, biodiversity, water cycles, carbon and developing the number of managed forests benefiting from a sustainable management document;
- As regards **the living environment and public health,** the substitution of fossil fuels by other energy sources may lead to a shift in environmental impacts towards new production sites. In addition, some technologies still face challenges related to their social acceptability;
- Particular attention should be paid to the effects of waste combustion and the use of biomass for heating with regard to **air pollutants;**
- The replacement of equipment (boilers, convectors), the renovation or renewal of the vehicle fleet and the emergence of specific waste streams, such as end-of-life batteries or charging stations requiring specialised recycling channels, call for vigilance with regard to the **issue of waste management.**

As regards technological risks, the impact of the implementation of SNBC is considered **neutral.** The positive impacts observed in several sectors linked to the reduction in the use of fossil fuels are indeed counterbalanced by **the increase in technological risks induced by certain decarbonised solutions.** This concerns in particular the industrial sector with the increasing use of hydrogen as an alternative to fossil fuels, and the energy sector with the increase in the production of renewable heat or recovery and the use of hydrogen. These risks are nevertheless limited by a reasoned mobilisation of these levers in SNBC 3.

That assessment thus made it possible to inform the decision-making process of SNBC 3 in the light of the environmental issues identified and to define the measures necessary to reduce the negative effects of its implementation on the environment.

E. A modelling exercise with many uncertainties, which must be taken into account

1. Uncertainties due to modelling methodology

The energy consumption and GHG emission trajectories presented in SNBC 3 contain different sources of uncertainty:

- **Existing uncertainties on historical data** (SDES energy balance sheets and SECTEN emission inventories published by Citepa). In 2023, the combined uncertainty as a percentage of total emissions, together with LULUCF, is estimated by Citepa at 8%. **To manage these uncertainties and in accordance with the rules,**[188] **SNBC 3's carbon budgets will be adjusted as necessary to historical reference years at the time of their compliance assessment,** in order to ensure consistency with the latest inventories and take into account their methodological developments, as presented in part by SNBC - II for the carbon budget balance sheet covering the period 2019-2023.
- **The models used to establish the trajectory also contain sources of uncertainty (they** may come from the calibration of the parameters or the internal structure of the model). One way to quantify model uncertainties is to use multiple models to study differences in results. This exercise was not carried out in the context of SNBC 3, and may constitute a work stream for SNBC 4. Indeed, for many parts of SNBC modelling, there are not several complete models equivalent to those used to conduct such an exercise.
- **Uncertainties due to the effects of climate change** (see Part II.E.3).
- **Uncertainties arising from the macro-economic framing of the scenario.** The macroeconomic framework corresponds to the assumptions common to all sectoral modelling: population trends, mainly economic growth trends. The scoping uncertainties are estimated at +/- 6 Mt CO_{2e} in 2050 (see ***Figure:* 16** next section).

2. Uncertainties inherent in defining a long-term strategy

Defining a long-term strategy inevitably entails uncertainties about the public policies to be implemented and their effects, the evolution of major socio-economic trends and the progress that will be made over the years. **The challenge for the State is therefore more to indicate a privileged direction** in order to guide economic, social and territorial actors in their investments and to be able to anticipate future changes, as well as to **conduct public policies consistent with the targets and minimizing uncertainties about their achievement** (for example, the European logic of carbon markets makes it possible to directly control the quantities of greenhouse gases emitted) **rather than pretending to predict and define exactly the precise crossing points on the way** to climate neutrality.

[188] *The Environmental Code (Article D. 222-1-B) provides for a technical adjustment of the carbon budgets for each period if changes in the methodology of greenhouse gas emission inventories lead to changes of more than 1% of the values of the reference years. 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.*

To reflect these uncertainties, sensitivity tests have been displayed throughout the document, to assess the effects of changes in the conditions for implementing climate policies, the pace of deployment of low-carbon technologies, and the behaviour of economic actors and citizens. **They make it possible to:**

- **Test the robustness of the trajectories and justify the choices made for the scenario:** Many policy choices have been made by comparing several possible situations and developments, and by selecting the trajectories that appear most robust (i.e. minimising associated uncertainties, risks associated with certain technological dependencies or policy choices, etc.) and credible. Some sensitivity tests thus make it possible to show other choices considered and rejected.
- **Show the diversity of possible paths, offering a broader view of possible futures:** some policy choices are political decisions to ensure balance between actors for a just transition, technological neutrality and limit technological and behavioural bets. Some of these choices have room for manoeuvre that it is useful to assess. In addition, it is possible that technological or social disruptions that are difficult to predict today will change the situation in the coming years and lead to a review of certain points in the strategy. Sensitivity tests thus make it possible to show what the trajectory might look like in this case, in order to consider the diversity of possible paths to reach climate neutrality.
- **Anticipate the upheavals that could impact the strategy, and thus foresee actions that could limit their consequences or adjust the trajectory, or even highlight certain unfavourable conditions under which the strategy would be defeated:** climate change more intense and impacting than anticipated, geopolitical tensions limiting trade capacities between countries, economic shocks threatening key sectors for the transition, etc. These tests thus contribute to strengthening the strategy's adaptive capacity in the face of uncertainties.

All the sensitivity tests carried out and the associated impact estimates are summarised in the table at the end of this section.

By developing these sensitivity tests and combining several of them into a coherent narrative, **variants of the central scenario can be explored** for illustrative purposes. Among the variants explored by combining the sensitivity tests presented in SNBC 3, two of them illustrate certain uncertainties and impacts on the overall trajectory of greenhouse gas emissions. The first, entitled *'Slower deployment of sufficiency'*, examines the consequences of a slowdown or partial failure in reducing structural consumption, relying in particular on sensitivity tests concerning the maintenance of a high level of air traffic, the least modal shift in freight, the maintenance of high tertiary energy consumption, the maintenance of a high use of wood-energy and the massive spread of artificial intelligence. The second, *'Slowdown in the resurgence of industrial and energy sovereignty'*, is based on contrasting, non-exhaustive assumptions: decrease in industrial production compared to the central scenario (no reindustrialisation dynamics), increased e-kerosene import, lower production of low-carbon gases (inducing increased use of imports), limited timber harvesting, lower deployment of heat pumps in France (inducing in particular an increase in gas consumption in housing). These two alternative trajectories make it possible to highlight the differentiated effects of structuring choices on emissions and to enrich the analysis of the levers to be favoured (see **Figure 16**).

The '*Slower deployment of sufficiency*' variant could, for example, all other things being equal (and without representing the entirety of sufficiency), increase emissions by 12 Mt CO_{2e} in 2050. For the '*Slowdown in the resurgence of industrial and energy sovereignty*' variant, emissions could decrease by up to 17 Mt CO_2e in 2050 (integrated shocks with positive or negative impacts on greenhouse gas emissions). In addition, the reduction in emissions of the 'Slowing *down the resurgence of industrial and energy sovereignty*' variant leads to an increase in the consumption-based emissions that is capable of complicating the achievement of the indicative consumption-based emissions target set by SNBC 3. It mechanically leads to a decrease in French sovereignty compared to the baseline scenario. These estimates are made without taking into account any change in French energy mix.

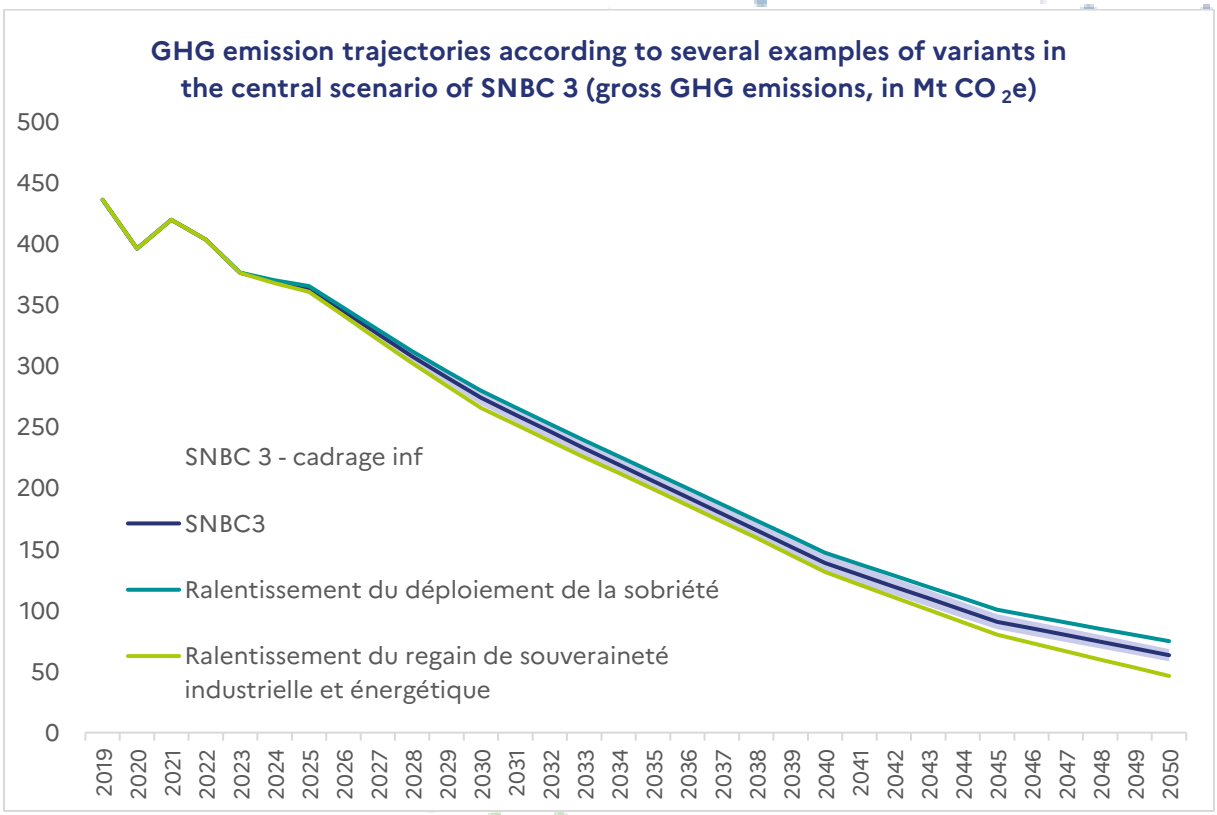

***Figure:* 16** *Gross GHG emission trajectories according to two combinations of sensitivity tests on greenhouse gas emissions. The scoping uncertainties relate to population and GDP developments. (Mt CO 2e).*

While the central scenario remains unavoidable for setting a baseline trajectory, the development of sensitivity tests and variants helps to anticipate long-term uncertainties and strengthen the resilience of the strategy. Thus, SNBC is not limited to a single vision of the transition, but offers a flexible and adaptable approach to the inevitable hazards that will mark the path to climate neutrality.

In practice, this work of assessing the impacts of certain measures or targets, constructing complete and consistent variants, and comparing them with other possible scenarios carried out by other actors (for example, the Transition(s) scenarios of the ADEME), is part of the ongoing process of constructing energy-climate scenarios within the State.

Beyond the sensitivity tests and variants identified to date, the regular update of the SNBC (every 5 years) contributes to forging, over time, a robust and coherent strategy, taking into account the results and developments observed. The next revision of the SNBC will be prepared by a regular update of the SNBC 3 central scenario to incorporate short-term developments and trends by sector.

Sector	Sensitivity test	Deadline	GHG (Mt CO_2e, deviation from the central scenario)	*Energy (TWh, deviation from the central scenario)*
Transport	Relaxation of vehicle regulations	2050	+6,4	/
	Traffic in the aviation sector	2050	+0,4	Electricity: +9 Biofuels: +3,5
	Rates of sustainable fuels in the aviation sector	2050	+2	Electricity: -20 Biofuels: -10
	Less electrification of heavy goods vehicles	2050	+4	Electricity: -6
	Less modal share of rail freight	2030	+1	/
	Reduce the carbon intensity of sustainable maritime fuels	2030	+0,25	/
Industry	Process electrification	2050	+8,5	Electricity: -35
	Less reindustrialisation	2050	/	Electricity: -22 Biomass: -8
Buildings	Limitation of the installation of gas boilers	2035	-3,5	Biomethane: -4
	Less deployment of heat pumps	2035	+4	Biomethane: +5 Electricity: -9
	Achievement of the targets of the Tertiary Decree	2050	+7 (if fossil gas)	Biomethane: +30
Energy	Low-carbon gas production volume	2050	+4	Biomethane: -20
Waste	Waste stored in ISDND	2050	+6,5	/

LULUCF	Strong sensitivity of the forest sink to global warming	2030 - 2050	-24 to +8 in 2030 and -33 to +19 in 2050	/
	Limited Harvest	2030	-5	Wood energy: -6
	Maintaining dependence on wood energy	2050	+3	Wood energy: +10
Digital	Massive development of artificial intelligence	2050	/	Electricity +40
Artificialisation	Enhanced trajectory of artificialisation	2050	+3	/

Table: 2 *Sensitivity tests around the baseline scenario, presented in SNBC 3*

3. The resilience of SNBC 3 to uncertainties caused by climate change: Translating a systemic, ambitious and operational climate and energy policy

The climate on the national territory has already changed and will continue to change in the coming decades. Climate change will have a significant and lasting impact on our lifestyles, production methods and infrastructure. This is why France is acting both to limit GHG emissions as much as possible (via the SNBC) but also to anticipate and limit the effects of climate change, already at work, on the population, territories, the economy and natural environments (via the National Climate Change Adaptation Plan (PNACC)).

Published on 10 March 2025, the 3rd PNACC makes it possible to build a systemic public strategy with all actors to put our country on the right track, make the right choices, avoid maladaptation that would have an unbearable cost for our society, taking into account the diversity of situations between territories. In particular, the NACCP is based on a Reference Warming Trajectory for Adaptation to Climate Change (TRACC): defined on the basis of the trend scenario according to IPCC scientists, it should serve as a reference for all adaptation actions carried out in France. It corresponds to a global warming that continues and reaches +3 °C in 2100 compared to the pre-industrial era, i.e. about +4 °C on average in France mainlandal compared to the pre-industrial era.

Articulating these two climate policies (mitigation and adaptation) is essential for at least two reasons.

The first is to avoid maladaptation. If the links between adaptation and mitigation are not well thought out, adaptation policies could lead to an increase in greenhouse gas emissions (e.g. through an uncontrolled increase in energy consumption and refrigerant emissions linked to the use of air conditioning). On the other hand, sustainable land-use planning makes it possible

to prevent ill-adaptation by integrating the various public policies. Thus, the greening of urbanized spaces, for example, makes it possible both to fight against urban heat islands and to increase carbon sinks, while contributing to the maintenance of biodiversity in cities. These are "no regrets" measures with multiple co-benefits for society and the environment.

The second is to design a climate-resilient mitigation strategy. Achieving our long-term climate targets (2050 and beyond) thus means looking ahead and anticipating foreseeable climate change.

The multiplication and intensification of extreme climatic events linked to climate change will be felt in all French economic sectors. For example, the increased risk of fire will impact natural carbon sinks, the increase in extreme temperatures will lead to more frequent closures of transport axes (road or rail) disrupting the transport of goods and people, including in the tertiary sector; climatic hazards, scarcity of water resources and changes in rainfall patterns will have an impact on agricultural crops; the issue of excess or lack of water will also be central for industrialists, particularly in a context of reindustrialisation; the multiplication of drought episodes will increase the shrinkage and swelling of clays and therefore the risk of cracking buildings; the increase in air and water temperatures and the decrease in river flows will change energy production levels, particularly for the nuclear power plant.

As SNBC is part of the Paris Agreement and the commitment of the signatory countries to build long-term strategies to reduce their greenhouse gas emissions, it was chosen to frame a limited climate change scenario thanks to the involvement of all countries. At the same time, in accordance with the NACCP, which aims to integrate TRACC into all public planning documents, SNBC must be resilient to the future climate. **This requires identifying, sector by sector, all aspects and targets of SNBC that may be impacted by climate change at TRACC level and quantifying those impacts.** Where these impacts complicate the achievement of mitigation targets, additional measures need to be identified to avoid and reduce these impacts, or compensate for them with additional measures in other sectors.

However, it is often difficult to quantify the precise impacts of climate change on different assumptions in the SNBC Reference Case. For example, we know that the health of forests, agricultural yields or the availability of public transport infrastructure will be affected by climate change, but it is not yet possible to estimate precisely, at national level, the amount of greenhouse gases that the forest will not be able to absorb, the decline in agricultural yields or the number of people who will not be able to use public transport because of a warming trajectory of +4 °C, especially since these impacts will depend on the effect of public adaptation policies deployed on these same sectors.

Transport

Climate **change is likely to affect emissions from the transport sector.** Climate hazards can cause physical damage to transport infrastructure (e.g.: road or rail infrastructure partially or totally destroyed by land movements or torrential floods, instability of earthworks following periods of drought, overheating of the electrical components of signalling systems, etc.). This leads to the disruption or interruption of traffic for longer or shorter periods of time, which may lead to shifts to intermediate routes, sometimes to other modes of transport, temporarily disrupting the modal shifts referred to in the SNBC. For railway infrastructure in particular, high

heat can lead to the expansion of rails or catenaries, involving the introduction of temporary speed limitation measures to ensure passenger safety and limit the risk of infrastructure damage. Travellers are then directly impacted, with longer journey times, whose experience can be degraded in the event of thermal discomfort due to the inadequacy or malfunction of rolling stock refreshers. There is then a risk of modal shift to the private car, more comfortable with air conditioning in the hand of the passengers, more flexible in the choice of the route and without speed constraint.

Inland waterway transport is also sensitive to the effects of climate change, the risk being the increase in navigation restrictions in a context of extreme hazards (increases but also low water levels when the level of watercourses drops) increasingly intense and more frequent. This has a particular impact on freight transport. Indeed, river infrastructure, but also railway infrastructure (which also presents vulnerabilities, see above), is not as redundant as road infrastructure, which does not guarantee the possibility of a postponement to a decarbonised route in case of a hazard. Achieving the targets of SNBC 3 based in part on modal shift, limiting the risks related to climate change on massed modes is therefore essential. Finally, ports are also subject to the impacts of climate change, in particular with regard to the risk of marine submersion, which will increase with sea level rise and also concerns other coastal transport infrastructure. It can also disrupt the transport of goods and its routes.

Measure 30 of the NAPCC 3[189] aims to ensure the resilience of transport and mobility to climate change, by identifying the vulnerability of our transport infrastructure and services to climate change, establishing adaptation plans accordingly, proposing best practices to improve thermal comfort in public transport, and updating technical benchmarks for the design, operation and maintenance of transport infrastructure to anticipate the effects of climate change. This measure will help to ensure the feasibility of the targets set out in SNBC 3 for transport, in particular with regard to the modal shift towards collective or mass transport and decarbonised transport. Details of these actions can be found in the dedicated PNACC 3 fact sheet. In addition, action 6 of measure 33 of NACCP 3 aims to propose a method to improve the resilience of supply chains to climate change.

Agriculture

Climate change is likely to have direct and indirect impacts on emissions from the agriculture sector. Increasing temperature, water scarcity and changing rainfall patterns, altered soil fertility and the multiplication of bioaggressors are likely to impact agricultural yields and influence practices. The overseas territories are particularly affected in view of the changes in rainfall patterns, the intensification[190] of extreme climatic events,[191] the salinisation of soils, the

[189] *https://www.ecologie.gouv.fr/sites/default/files/documents/Mesure30%20-%20services%20essentiels%20-%20transports.pdf*
[190] *but not the increase in frequency*
[191] *such as cyclones or hurricanes, El Niño and La Niña episodes*

retreat of the coastline and the regular submersion of coastal areas, which have already been observed and are expected to increase. These impacts can also be significant on the downstream link of agri-food processing, the adaptation of which will be crucial to accompany changes in agricultural upstream. Measures 36 and 37 of the NACCP 3 aim to anticipate the consequences of climate change in the agricultural sector and the agri-food industry and to support farms, sectors and the agri-food industry in the face of climate hazards and to initiate the transition to resilient and low-carbon models.

⇨ In the WAM reference scenario:

Climate change can have a negative impact on agricultural yields, while technical advances (genetics, best practices, technical innovations in the machinery used, etc.) could also encourage an increase in yields, or at least limit their decrease. These developments are closely dependent on the crops concerned, geographical areas and other exogenous factors.[192] By default, the SNBC Reference Case (AMS) incorporates an assumption of stable agricultural yields by mode of production for all crops, compared to 2020.

Forests

The work of IGN-FCBA[193] shows that forest ecosystems are highly sensitive to the effects of climate change: increased heatwaves and droughts, resulting in increased mortality and reduced natural growth, as well as greater vulnerability to natural disturbances (fires, storms, diseases, etc.). The pessimistic scenario developed in this study reflects increased sensitivity, and shows the impact in terms of forest growth and capacity to absorb carbon (see the sensitivity test in Part SNBC – III. G.). Indeed, with constant public policies, differences of up to 50 Mt CO2e in 2050 exist between the most optimistic and pessimistic scenarios. The pessimistic scenario highlights the possibility of the forest becoming a carbon emitter in view of increased mortality, with probably significant consequences on the supply chains of the wood industry and the quality of the wood harvested (and thus the amount of biomass available for the decarbonisation of all economic sectors). However, it is still difficult to establish a direct correlation between a given level of global warming and the capacity of forests to act as carbon sinks.

Measure 38 of the NAPCC 3 aims to make our forests more resilient to climate change and to prevent its consequences for the downstream sector and the timber industry.

[192] *For example, the Giec considers that in France there would be a fall in maize yields in the southern part, and uncertain developments in the northern part; they do not conclude on the evolution of wheat yields. In addition, these developments vary depending on the irrigation possibilities, or the introduction of new varieties. (Giec, 2022. AR6, WGII, Section 13.5, pp. 1843-1850).*

[193] *Projections of wood availability and carbon stocks and flows in the French forestry sector, study report, May 2024, IGN-FCBA: https://www.ign.fr/projections-wood-carbon-foret-francaise-2023-2024*

Industry

Climate change is likely to have indirect impacts on emissions from the industry sector, linked to impacts on production: impact of high heat on the operation of certain equipment, impact of droughts likely to result in restrictions on water withdrawals necessary for industrial installations and disruption of access to the site in the event of heavy rains (flooding, supply problems in the event of access to the compromised site, etc.).

Buildings

Climate change has significant effects on direct emissions from the building sector. In winter, milder temperatures reduce heating consumption, reducing greenhouse gas emissions. In summer, rising temperatures increase the use of air conditioning, increasing electricity consumption. In addition, heat waves exacerbate the thermal discomfort of the inhabitants, especially in energy sieves. The energy renovation of housing and tertiary buildings must therefore take into account the challenges of summer comfort, as the RE2020 does for new buildings. In addition, to adapt, passive solutions exist such as the installation of shutters or active solutions such as the use of high-performance air conditioning.

In addition, climate change exacerbates hazards such as clay swelling (RGA)194 and marine submersions, which can impact buildings and thus lead to an increase in building demolitions and thus in new construction needs (the associated emissions of which are accounted for in the industry sector).

⇨ In the WAM reference scenario:

In the buildings sector, the models used make it possible to directly link energy consumption for heating to a climate scenario. The scoping hypothesis chosen is the IPCC RCP 2.6 scenario, more optimistic than TRACC by 2100 but close to TRACC by 2030 and 2050 of SNBC-3. In fact, the effects on energy consumption are rather limited by 2050: in a TRACC scenario, electricity consumption for air conditioning increases by 2 TWh in the residential sector in 2050 (or +1%) compared to the baseline scenario, thanks to assumptions for improving the energy efficiency of equipment and sufficiency of use, and up to +5 TWh for years experiencing an extreme heat wave. At the same time, heating consumption decreases by 5 TWh (-4%) between the TRACC scenario and the reference scenario (RCP 2.6), all energies combined.

In addition, compared to a climate change-free situation, the baseline scenario leads to an estimated 10% decrease in heating demand by 2050.

SNBC 3 plans to renovate the housing stock with energy in order to achieve, on average, an energy performance level equivalent to that of low-consumption buildings (BBCs) in 2050.

[194] *During clay retreat-swelling (RGA), variations in water content in clay soils cause contraction and expansion movements, resulting in deformations of the soil and built structures.*

These renovations will have to integrate the challenge of adapting to climate change by improving the thermal comfort of residents, particularly during heat waves.

Energy production and transformation

Climate change can have a direct impact on energy production levels: decrease in efficiency for nuclear, hydroelectric and photovoltaic production during periods of high heat or lower river flow, change in wind patterns impacting wind production, effect of heat on turbine blade efficiency, etc. As detailed in other sectors, climate change also impacts consumption patterns: increase in the use of air conditioning in summer, decrease in heating needs, industrial production, etc.

In addition, electricity transmission and distribution networks are doubly confronted with the challenges of climate change. On the one hand, physical infrastructure needs to be adapted to better take into account environmental changes linked to climate change (increased temperatures, changing hazards). On the other hand, the structure of the network will also have to adapt to changes in consumption patterns.

Measure 31 of the NACCP3 aims to put in place actions to ensure the resilience of the energy system as a whole, by reducing the vulnerability of our means of energy production, transmission and distribution.

Waste

Climate change exacerbates greenhouse gas emissions in non-hazardous waste storage facilities (NDWS) by accelerating the decomposition of organic matter, increasing methane production. To adapt to these challenges, it is crucial to strengthen gas capture and treatment systems, as well as improve waste management to reduce their volume and environmental impact. Solutions include increasing recycling rates or promoting the circular economy. Better planning and proactive management of landfills are also essential to mitigate the health and environmental risks associated with rising temperatures.

Digital

Climate change can have direct consequences on data centres with extreme temperatures increasing the risk of service interruption with strong pressures on data centre cooling systems. In addition, data centres consume water for cooling servers. Water stress situations in a strong climate change scenario could constrain the ability of data centres to cool down and function properly, potentially causing significant constraints on all associated digital services. In this context, it is essential to ensure that the new data centres are sober and resilient, in particular with regard to water resources.

Measure 5 of the NAPCC 3 aims to support the development of data centre water sufficiency plans (HSPs) by promoting the emergence of innovative water-efficient solutions, to disseminate good practices on water efficiency to data centres and to use the vector of the sectoral delegated acts of the European Energy Efficiency Directive revised in 2023 to ensure that the water/energy duo is taken into account in the requirements for data collection and publication and the establishment of environmental performance thresholds for data centres.

⇨ In the WAM reference scenario:

The SNBC Reference Case (AMS) incorporates a climate change assumption into data centre consumption, integrated into the tertiary sector in the modelling.

Overseas

Overseas countries are concentrating strong climate risks on already vulnerable territories. Geographical specificities, such as the relative isolation of these territories, call for the definition of a dedicated adaptation strategy per territory. In these territories, mitigation and adaptation are closely inseparable because the already severe effects of climate change directly determine the feasibility and sustainability of the measures of the National Low-Carbon Strategy. The development of renewable energy can be particularly weakened by intense, cumulative and more frequent climatic hazards in the Overseas Territories, such as the intensification of cyclones or rising sea levels, which can affect energy infrastructure and networks. The development of carbon sinks, including forests or mangroves, requires adaptation measures to withstand coastal erosion or increased droughts. Mitigation pathways specific to Overseas Territories aim to integrate these disruption risks related to extreme events to gain resilience.

The National Climate Change Adaptation Plan stresses the need to strengthen the resilience of infrastructure and also provides for strengthened governance and dedicated engineering tools to support these territories, as well as greater integration of their specificities into national and European policies.

Focus – Improved knowledge and modelling tools to better take into account the impact of TRACC on the baseline scenario

The preparatory work for SNBC 3 showed both the strong impacts that climate change could have on the achievement of mitigation targets and the difficulty in precisely quantifying these impacts. This difficulty may stem from a lack of upstream knowledge to link warming trajectories to specific impacts on emissions or removals, or a lack of suitable tools to translate relatively well-known impacts.

As part of the preparation of future planning work and therefore the revision of the baseline scenario, the quantification of the impacts of different warming trajectories will be refined in the modelling of France's emission trajectories. Thus, SNBC's resilience to TRACC will be deepened and better assessed. In addition, as knowledge advances, some impacts will appear to be inevitable, due to the inertia effects of climate change, and will then have to be integrated into the baseline scenario of the next SNBC.

GOUVERNEMENT

Liberté
Égalité
Fraternité