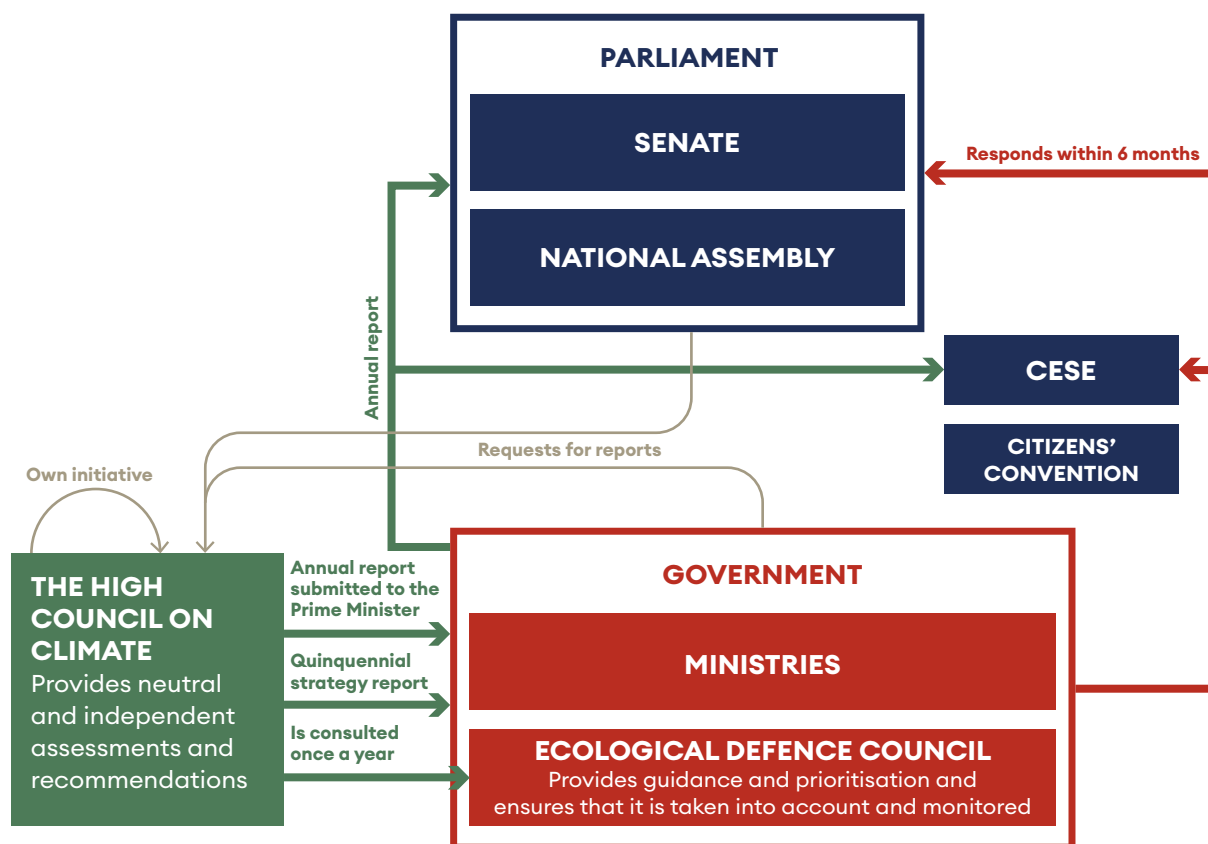

ACTING IN LINE
WITH AMBITIONS

FIRST ANNUAL REPORT
OF THE HIGH COUNCIL ON CLIMATE OF FRANCE

June 2019

ACTING IN LINE
WITH AMBITIONS

THE POSITION OF THE HIGH COUNCIL ON CLIMATE WITHIN THE POLICY LANDSCAPE



The High Council on Climate is an independent body charged with issuing advice and recommendations on the implementation of public policies and measures to reduce France’s greenhouse gas emissions. It is intended to provide independent insight into government climate policy. The High Council on Climate was created by the Decree of 14 May 2019, after being instated on 27 November 2018 by the President of the Republic. Its members are chosen for their expertise in the fields of climate science, economics, agronomy and energy the transition.

Under the terms of the Decree implementing its creation, the High Council on Climate has two main missions:

- Each year, it provides a consultative report on compliance with the greenhouse gas emissions reduction trajectory and the proper implementation of policies and measures to reduce greenhouse gas emissions and develop carbon sinks.
- It issues an advice every 5 years on the Government’s draft low-carbon strategy and carbon budgets, as well as on the

greenhouse gas emissions reduction trajectory that France is committed to. It assesses the consistency of the low-carbon strategy with respect to France’s national policies and European and international commitments, in particular the Paris Agreement, and achieving carbon neutrality by 2050.

For these two missions, the High Council on Climate considers the socio-economic impacts of the transition for households and companies, as well as sovereignty issues and environmental impacts.

Its reports, based on analyses, assess the policies and measures already in place and those planned and formulate recommendations and proposals to help France achieve its objectives. It provides independent, factual and rigorous insight into the evolution of France’s greenhouse gas emissions and its public policies. It provides a long-term perspective. All advices and reports emanating from the High Council on Climate are made public.

FOREWORD



“Achieving France’s ambitious low-carbon target requires more coherent **public policies** across the economy”

The French government created the High Council on Climate in response to two needs: that of immediate and ambitious action from all actors in society, and first and foremost the public authorities, to respond to the urgency of the climate and environmental crisis; and that of the time needed to implement the profound changes in society and to transition major systems – namely energy, transport, housing, industry, food and land management (agriculture, forests, natural carbon sinks). We have just under a generation to complete most of the changes that will both mitigate climate change and enable us to adapt to it. This is a great opportunity, one which raises legitimate causes for concern, but which also offers great promise. The transformation will need to be accompanied by a scientific perspective which goes beyond short-term time horizons, that provides a constant reminder for public action. That is the core focus of our mission.

Instated on 27 November 2018 by the President of the Republic, the High Council on Climate was formally created by the Decree of 14 May 2019. The first report marks the start of work, to be pursued and clarified in the future, at the request of the government, the Parliament and at our own initiative. Unsurprisingly, this report reinforces and confirms the conclusions of several recently published evaluations: France is not on a greenhouse gas emissions trajectory which is compatible with its international commitments. The initial efforts are worthy, but they are clearly insufficient and have not produced the expected results. They do not set in motion the profound socio-economic transformation needed to move towards carbon neutrality.

Our method is to assess available scientific, technical and socio-economic information in an impartial, transparent and objective manner and to report on conflicting uncertainties and viewpoints. On this basis we make a series of explicit recommendations. The first of these are included in this report. They are aimed primarily at government, which must respond within six months, and also at all other public bodies and stakeholders throughout the territory. Dealing with climate change requires making essential changes to the French economy and society as a whole as soon as possible. These changes will be anchored in broad, inclusive and lasting consensuses between all actors and at all scales. The High Council on Climate intends to make a positive and independent contribution through its recommendations to provide a rigorous and common basis for building this consensus.

Corinne Le Quéré
Chair of the High Council on Climate

THE MEMBERS OF THE HIGH COUNCIL ON CLIMATE



Corinne LE QUÉRÉ

Chair

Corinne Le Quéré is a French-Canadian climate scientist. She is Royal Society Research Professor at the University of East Anglia, where she heads a research group on carbon emissions and sinks. She is a fellow of the UK Royal Society and sits on the Committee on Climate Change advising the UK government on its climate policies. She was an author of the 3rd, 4th and 5th assessment reports of the Intergovernmental Panel on Climate Change (IPCC). She holds a doctorate in oceanography.



Michel COLOMBIER

Michel Colombier specialises in climate change, public energy policy and international negotiations. He is Scientific Director of the Institute of Sustainable Development and International Relations (IDDRI) and associate professor at Sciences Po Paris. He was Chairman of the Committee of Experts on Energy Transition and a member of the Scientific and Technical Advisory Group for the Global Environment. He was also a negotiator at the UNFCCC and a member of the Management Committee of *Climate Strategies* in London. He holds a doctorate in economics.



Alain GRANDJEAN

Alain Grandjean specialises in ecological, economic and financial transitions. He is a co-founder and partner of Carbone 4, a climate strategy consulting firm, and Chair of the Nicolas Hulot Foundation. He chaired the Committee of Experts in the National Energy Transition Debate (DNTE) in 2013 and co-chaired the Committee on the Mobilisation of Climate Finance in 2015, as well as the Committee on Carbon Pricing aligned with the Paris agreement in 2016. He is a co-author of several books and runs a blog called “Chroniques de l’anthropocène”. He is a graduate of the Ecole Polytechnique and Ensaë and holds a doctorate in environmental economics.



Marion GUILLOU

Marion Guillou specialises in food and agriculture. She is Chairwoman of the Board of Directors of the French Agricultural, Veterinary and Forestry Institute (AGENIUM), and an Extraordinary State Councillor. She was Chairwoman and CEO of the French National Institute for Agricultural Research (INRA) from 2004 to 2012 and Chairwoman of the Board of Directors of the École Polytechnique from 2008 to 2013. She is an engineer and holds a doctorate in physical chemistry for bio-transformations.



Céline GUIVARCH

Céline Guivarch specialises in the economic impacts of climate change, trajectories for reducing greenhouse gas emissions, and climate policy. She is a research director at the École des Ponts and economist at the International Centre for Research on the Environment and Development (CIRED). She is an author of the IPCC 6th Assessment Report. She worked as an expert on climate change at the International Energy Agency. She holds a doctorate in economics.



Jean-Marc JANCOVICI

Jean-Marc Jancovici specialises in the physical analysis of the economy and carbon and energy accountancy. He is a co-founder and partner of Carbone 4, a climate strategy consulting firm, the founder and Chairman of The Shift Project and a professor at Mines ParisTech. He is also involved in numerous outreach initiatives on energy and climate. He is a graduate engineer of the École Polytechnique and the École Nationale Supérieure des Télécommunications de Paris.



Benoît LEGUET

Benoît Leguet specialises in climate change economics, public policy analysis and the low-carbon transition. He is the General Director of the think tank I4CE – Institut de l'Économie pour le Climat. He is also a member of the Economic Council for Sustainable Development and the Scientific Committee of the Goodplanet Foundation. He is a graduate engineer of the École Polytechnique and the École Nationale Supérieure de Techniques Avancées (ENSTA ParisTech) and holds a Master's degree in economics from the University of Paris X-AgroParisTech-École Polytechnique.



Valérie MASSON-DELMOTTE

Valérie Masson-Delmotte is a researcher in climate sciences, particularly regarding the quantification, characterisation and understanding of past climate change by combining natural archives and modelling. She is Research Director at the Laboratory of Climate and Environmental Sciences at the Institut Pierre-Simon Laplace, University of Paris-Saclay. She has held the position of co-chair of the GIEC Working Group on the Physical Bases of Climate Change since 2015. She holds a doctorate in energy, fluids and transfer physics.¹

1. List of publications:
https://scholar.google.fr/citations?hl=fr&user=P9MTAyEAAAJ&view_op=list_works&sortby=pubdate



Katheline SCHUBERT

Katheline Schubert specialises in environmental economics, natural resource economics, the energy transition and sustainable growth. She is Professor of Economics at the University of Paris 1 Panthéon-Sorbonne, and an associate chair at the École d'économie de Paris, an associate researcher at the Centre for Economic Studies (CESifo) and co-director of the Globalisation, Development and Environment Programme at the Centre for Economic Research and its Applications (CEPREMAP). She is a member of the Economic Council for Sustainable Development (CEDD) and the Economic Analysis Council (CAE). She chaired the French Association of Economic Science (AFSE). She holds a doctorate in economics.



Jean-Francois SOUSSANA

Jean-François Soussana specialises in agriculture and climate change. He is Director of Research and Vice-President of INRA, in charge of international policy. He has led a research laboratory on ecosystems and global change and has been a member of the IPCC as lead author since 1998. He coordinates national and European research projects as well as international programmes on agriculture, land use and climate change. He is an agricultural engineer and holds a doctorate in plant physiology.



Laurence TUBIANA

Laurence Tubiana is a specialist in climate change negotiations. She is President and Executive Director of the European Climate Foundation (ECF). She is also Chairman of the Board of Directors of the French Development Agency (AFD) and a professor at Sciences Po Paris. She was Ambassador for climate change negotiations and a Special Representative for COP 21². She founded the IDDRI in 2002 and headed it until 2014. She holds a doctorate in economics.

2. COP 21 is the United Nations conference where the Paris agreement was negotiated and adopted in 2015.

The High Council on Climate team that prepared this report

Olivier Fontan (Executive Director), Audrey Berry, Marion Ferrat, Jacques Portalier, Paul-Hervé Tamokoué Kamga and César Amalou.

ACKNOWLEDGEMENTS

We would like to thank:

Those who provided detailed analyses to support the assessments made in this report: Jean Colard, Marie Degremont and Nicolas Meilhan of the Sustainable Development and Digital department of France Stratégie, headed by Bérengère Mesqui. Jean Fouré, for reviewing the report and Denise Young and Johannes Mengel for their support.

The representatives of organisations that provided data and insights during interviews with the High Council on Climate (in alphabetical order): the Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique (CITEPA), Conseil Economique Social et Environnemental (CESE), Conseil National de la Transition Ecologique (CNTE), Commissariat général au développement durable (CGDD), Direction Générale de l'Energie et du Climat (DGEC), Direction Générale des infrastructures, des Transports et de la Mer (DGITM), Institut du Développement Durable et des Relations Internationales (IDDRI), Institute for Climate Economics (I4CE), and Réseau Action Climat (RAC-France).

The staff of France Stratégie, for their logistical and technical support.
Bureau Mine for the production of this document www.bureau-mine.fr

RECOMMENDATIONS

With the Energy and Climate bill (amending the Energy Transition for Green Growth Bill) and the new national low-carbon strategy being drawn up, France is intending to set appropriate targets for reducing its greenhouse gas (GHG) emissions. The target of achieving carbon neutrality by 2050, aimed for by these policy projects is consistent with the objectives of the Paris agreement and the latest scientific knowledge. Carbon neutrality by 2050 is technically achievable but will involve profound transformations of the economy and society at a major scale.

The pace of this transformation is currently insufficient, as policies associated with transition, efficiency and energy sobriety are not at the centre of public actions. As such, the 1st carbon budget set in 2015 and covering the period 2015-2018 has been exceeded, and current GHG emissions reductions, standing at 1.1% per year on average over the recent period, are nearly just half the pace needed to meet the targets³.

As long as the national low-carbon strategy remains on the periphery of public policy, the carbon budget and

carbon neutrality targets are unlikely to be met. The strategy adopted by France implies certain choices. The transition to a low-carbon economy must now be at the heart of the policies defining the future of France, and be consistent with the transition initiated by the European Union.

The first report by the High Council on Climate highlights the foundations which must be put in place to ensure the long-term low-carbon trajectory of France is met. It provides a framework to enable the government to implement the necessary actions at the national, European, regional and local levels, so that public and private actors, as well as the general public, can make their contributions.

Our recommendations to the government aim to align France's actions with its climate commitments.

3. The 1st budget has been exceeded by 62 million tonnes of CO₂-equivalent (MtCO₂EQ) according to the preliminary data produced by CITEPA (see Section I.3)

4. Excluding technical revisions.

1. Ensuring that national laws and major projects are compatible with the national low-carbon strategy

Several measures are in place to assess the effects of national and regional laws and major projects on reducing French GHG emissions. But in practice, the climate objectives of the national low-carbon strategy carry little weight during arbitration. The government must ensure that the policy goal of reducing GHG emissions and conserving carbon sinks is taken into account both in legislation and in all public investment projects. [Section III.1; Box 7]

companies to make choices in line with the low-carbon transition, i.e. to reduce their emissions and invest in low-emissions activities. The entire climate policy system must immediately be strengthened using an architecture that respects spending efficiency, social justice and transparency. The carbon tax is a powerful tool for this, but it will have to be thoroughly reviewed to ensure its social appropriation and effectiveness. [Section III.2; Box 8 for the specific recommendation related to the carbon tax.]

2. Immediate strengthening of climate policy instruments

Climate policy instruments include standards and regulations, taxes, tradable quotas, and subsidies. These instruments establish a carbon price that encourages households and

3. Identifying and implementing the structural changes needed to prepare the French economy and society for carbon neutrality

Most of the current measures only lead to marginal reductions in emissions. The government must identify and then plan the structural changes

needed to achieve carbon neutrality and support employment and the French economy over the long term. This involves taking action in urban planning and regional development, developing and financing new infrastructure, in particular for transport, and changing supply chains, markets, consumer behaviour and agricultural practices. Knowledge of climate change, GHG emissions and low-carbon actions must also be systematically incorporated into education and training programmes and throughout our lifetime. [Section II.1]

Ensuring a fair transition

4. The low-carbon transition must be fair, and perceived as such, for its actions to be sustainably supported by the whole of society. The transition will necessarily be accompanied by major economic changes that bring both downsides and opportunities. Insufficient attention has been paid to the impacts on equality of public policies associated with the low-carbon transition, including geographical inequalities. These potential inequalities are related to the incomes and opportunities of individuals and households, as well as the competitiveness of companies. The government must ensure that the transition is fair and that the solutions put in place are sustainable. It should also reduce the cost of risk in order to facilitate innovation, and a fair distribution of costs and effort between households, companies, local authorities and the State must be ensured. [Section II.2 and III.3; Box 6]

Incorporate the national low-carbon strategy at all levels

5. The regional and sub-regional climate-air-energy policy plans are key elements in the contribution of regional policies to France's climate targets and enable local actors to take ownership of the issues. The resources (human, technical, organisational, financial) needed by local authorities to develop these plans should be identified and strengthened, the data and working methods also need to be harmonised (development of climate plans, indicators, monitoring, consistency with the national low-carbon strategy and the carbon budgets). At the same time, the government should act at the European level to bring the budgets,

actions and policies of the European Union in line with the objectives of the Paris agreement and its own long-term strategy, particularly the carbon neutrality by 2050. [Section I.1 and III.3]

Systematically assess the impact of policies and measures on greenhouse gas emissions

6.

Many actions aimed at reducing GHG emissions do not work in practice. A systematic and quantitative assessment of the impacts of existing and planned policies and measures on GHG emissions is required to ensure that policies and measures are in line with climate targets, to quickly identify and address issues, and to determine successes and replicate them. Unless evaluations are carried out before, during, and after the implementation of policies and measures, major investments may be ineffective and opportunities may be missed. Routine monitoring reduces the risks of non-compliance with the objectives facilitates timely adjustments. [Section I.3, II.1, and III.1]

Strengthen the revised draft national low-carbon strategy

7.

The GHG reduction targets presented in the draft national low-carbon strategy, currently under consultation, are consistent with the climate targets set by France, but we recommend that the levels of the second carbon budget presented in this draft strategy be revised downwards in line with the long-term trajectory and the latest data on national emissions, and that carbon budgets be enshrined in law and fixed once their levels have been set⁴. Moreover, these carbon budgets do not cover France's entire responsibility, given the significance of its imports, which come on top of the national emissions to make France's total carbon footprint. The targets concerning international transport (aviation and shipping) should be included and be set at the same level as national targets. Additional measures and a strategy to reduce France's carbon footprint should be developed. [Section I.2 and I.3]

I. IN SPITE OF A STRUCTURED INSTITUTIONAL FRAMEWORK, SET TARGETS HAVE NOT BEEN MET

Global warming currently stands at around 1°C⁵ and continues to increase in response to increases in the level of greenhouse gases (GHG) in the atmosphere due to human activities. To stop the rise in global temperatures and contain climate change, global GHG emissions must be reduced rapidly and steadily.

This first section examines the national, European and international framework of actions to limit climate change, and the targets France has set itself, and compares France's GHG emissions with the set targets.

5. With a likely range of 0.8°C and 1.2°C. Intergovernmental Panel on Climate Change (IPCC), Global warming of 1.5°C (2018). The global warming values mentioned in this report are compared to the pre-industrial levels (1850-1900).

6. United Nations Framework Convention on Climate Change (UNFCCC), Paris Agreement

7. France's contribution is integrated into that of the European Union. The European Union has committed itself on behalf of its Member States (including France) to a reduction target for 2030, the implementation strategy of which will be specified in 2020.

8. UNFCCC, Paris Agreement (Article 2)

9. UNFCCC, Paris Agreement (Article 4)

10. Carbon neutrality is defined as zero net emissions for all greenhouse gases combined.

I.1 National and international action on climate change is largely insufficient to contain global warming to 1.5 or 2°C. The commitments made so far under the Paris Agreement and France's first national low-carbon strategy adopted in 2015 are insufficient. If additional actions are not implemented quickly, the pace of global warming could accelerate.

The Paris Agreement⁶ provides a binding international framework that commits States to reducing their GHG emissions⁷ and increasing their carbon sinks, taking into account the different national contexts. Adopted universally in 2015, the Paris Agreement came into force in 2016.

- It aims to strengthen the global response to the threat of climate change by:
 - Holding the increase in the global average temperature to well below 2°C above pre-industrial levels.
 - Pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
 - Increasing the ability to adapt to the adverse impacts of climate change.
 - Make financial flows consistent with a pathway towards low GHG emissions and climate-resilient development.⁸
- Its aim is to achieve global peaking of GHG as soon as possible and to achieve a balance between emissions by sources and removals by sinks of GHG in the second half of the century, on the basis of equity and in the context of sustainable development and efforts to eradicate poverty.
- The signatory countries, or groups of countries (in the case of the European Union), must draw up, communicate and update, at least every five years, successive action plans, or “nationally determined contributions” which they plan to implement.⁹

11. Energy and Climate bill, No. 1908, submitted to Parliament on Tuesday 30 April 2019.

12. Article 1 of the Energy Transition for Green Growth Bill no 2015-992 (LTECV) of 17 August 2015

13. European Commission, A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy (November 2018)

14. Conclusions of the EUCO 169/14 Council meeting. This framework was adopted by EU leaders in October 2014. It is part of the extension of the 2020 Climate and Energy Package. The GHG reduction and renewable energy share targets are binding. The targets for the share of renewable energy and energy efficiency were revised upwards in 2018 (previously 27%) https://ec.europa.eu/clima/policies/strategies/2030_en

15. European Commission, 2020 Climate and Energy Package

16. Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009, Article 1 paragraph 96

France set itself the target of achieving carbon neutrality¹⁰ by 2050 in the July 2017 climate plan (see Box 1). The draft Energy and Climate Bill 2019¹¹ will soon write this new target into law, replacing the current target of reducing greenhouse gas emissions by 75%.¹² The draft national low-carbon strategy project (SNBC, see box 2) published in December 2018 aims to transform this objective into an operational strategy.

The European Union (EU) has not yet set itself a carbon neutrality target. European policy provides an important framework for Member States to be able to develop appropriate climate policies and objectives.

- Carbon neutrality for all GHG emissions was proposed by the European Commission in its draft long-term strategy for 2050, supported by research.¹³
- The 2030 climate and energy framework sets out three main objectives: to reduce GHG emissions by at least 40% (compared to 1990 levels); to increase the share of renewables in the energy mix to at least 32%; to improve energy efficiency by at least 32.5%.¹⁴
- The 2020 Climate and Energy Package¹⁵ on climate and energy is a set of binding legislative bills that aim to reduce GHG emissions by 20% (compared to 1990 levels), to increase the share of renewable energy in the gross energy consumption mix of the European Union to 20%¹⁶ and improve energy efficiency by 20%.

Box 1: Climate policy in France

- The Climate Plan 2004-2012¹⁷, launched in 2004, was intended to stabilise greenhouse gas emissions at their 1990 levels by 2010 and presented a technological research strategy to enable emissions to be reduced by a factor of 4 or 5 by 2050.
- The 2005 Energy Program Bill establishing France's energy policy priorities (POPE Law)¹⁸, supported a target of halving global greenhouse gas emissions by 2050, which, given the differences in consumption between countries, required developed countries to reduce them by a factor of 4 or 5.
- The 2009 Grenelle 1 Act¹⁹ set a national target of reducing greenhouse gas emissions by 75% by 2050 compared to 1990 (known as "Factor 4") and supported the target of reducing greenhouse gas emissions in the European Community by at least 20% by 2020. The Grenelle 2 Law of 2010²⁰ formalised the guidelines of the Grenelle 1 law.
- The 2015 Energy Transition for Green Growth Bill (LTECV)²¹ set a target of reducing greenhouse gas emissions by 40% between 1990 and 2030 and by 75% between 1990 and 2050. It requires France to draw up a national low-carbon strategy (SNBC) and a Multi-Annual Energy Plan (PPE) every 5 years.
 - The first national low-carbon strategy (SNBC1) was adopted in November 2015²² and the first PPE was approved by Decree in 2016²³. They were drawn up according to the "Factor 4" target before the Paris Agreement.
- The Climate Plan was published in July 2017 with a new target of achieving carbon neutrality by 2050, requiring a revision of the SNBC.²⁴
- The draft revisions of the SNBC (draft SNBC2) and the PPE (draft PPE2) were published in November and December 2018.
- The 2019 Energy and Climate bill²⁵ replaces the Factor 4 target for 2050 with a so-called "carbon neutrality" target by the same date. It modifies other French energy policy objectives in relation to the LTECV:
 - The target for the reduction of fossil energy consumption in 2030 compared to 2012 has been increased (from 30% to 40%).
 - The target for reducing the share of nuclear energy in the electricity generation mix to 50% was postponed from 2025 to 2035.

17. Ministry of Ecology and Sustainable Development, Climate Plan 2004.

18. Energy Program Bill of 13 July 2005 establishing France's energy policy priorities.

19. Bill 2009-967 of 3 August 2009 programming the implementation of the Grenelle Environmental Forum (or Grenelle 1 Bill).

20. Bill 2010-788 of 12 July 2010.

21. Energy Transition for Green Growth Bill 2015-992 of 17 August 2015.

22. Decree No. 2015-1491 of 18 November 2015 on national carbon budgets and the national low-carbon strategy, Ministry of Ecology, Sustainable Development and Energy, national low-carbon strategy (November 2015).

23. Ministry of the Environment, Energy and the Sea, Multi-Annual Energy Plan (2016).

24. Ministry of Ecological and Inclusive Transition, Climate Plan 2017 (July 2017).

25. Energy and Climate bill, No. 1908, filed on Tuesday 30 April 2019.

26. IPCC, Special Report on Global Warming of 1.5°C (2018), Chapter 1.

27. Common statement on the long-term strategy and climate ambitions of the EU.

28. Greenhouse gas emission limits set for five-year periods (four years for the first budget) (scope of the Kyoto Protocol as reported to the UNFCCC).

29. This refers to France's emissions since the pre-industrial era, which are partly responsible for the climate changes currently being observed

30. Draft national low-carbon strategy, Ministry of Ecological and Inclusive Transition (December 2018).

31. Particularly in terms of carbon pricing, but also in terms of adaptation, climate finance and capacity building.

32. <https://www.oneplanetsummit.fr/une-coalition-pour-faire-la-difference-5>

33. <https://www.ecologique-solidaire.gouv.fr/locde-france-et-mexique-lancent-paris-collaborative-green-budgeting-au-one-planet-summit>

However, the commitments made within this national and international framework and their implementation are largely insufficient to achieve the objectives set.

- At the international level, full implementation of the commitments of countries up to 2025 and 2030 as proposed in 2015 in the Paris agreement would imply that greenhouse gas emissions will continue to increase until 2030, more slowly than in a world without climate action, but still largely insufficient to stabilise future global warming. Without a strengthening of the ambitions, this would imply an increase of 3-4° C by 2100.²⁶
 - The Paris agreement stipulates that countries' commitments must be revised upwards every five years – starting in 2020 if possible. The first collective assessment will take place in 2023.
 - The European Union's commitments presented in 2015, including France, provided for a 40% reduction in greenhouse gas emissions compared to 1990 levels by 2030. In June 2018, 14 European Union countries, including France, issued a joint declaration calling on the EU to revise its contribution upwards by 2020.²⁷
- At the national level, the SNBC is isolated and is marginally operational. The first SNBC failed to meet the first carbon budget²⁸ that France set itself. In legal terms, the SNBC is only binding for multi-year energy planning (PPE), which limits its structural effects for the development of other laws and programmes, thereby limiting its impact. The current framework is legally and politically too weak to move France towards carbon neutrality by 2050.

Like all European Union countries, France has an important role to play in the transition to a low-carbon economy which is resilient to climate change. Its targets must be ambitious as it has significant historical responsibility, a high carbon footprint due to its imports, and the ability to take action.

- France's national targets must be compatible with its commitments under the Paris agreement and take its historical responsibilities into account.²⁹
- Emissions associated with products imported and consumed by the French are not explicitly taken into account in the quantified national targets. In

2015, the carbon footprint of each French person is estimated at 11 tonnes of CO₂-equivalent per person per year, when total consumption in the territory is taken into account, compared to 6.6 tonnes of CO₂-equivalent per person per year when only emissions generated within the territory are recorded (see Section I.3).³⁰

- France has demonstrated its ability to take action and to stimulate global initiative. France has coordinated or contributed to several international efforts aimed at responding to climate change by supporting and enhancing countries' commitments, for example:
 - The Climate Plan published in July 2017 commits France “to form a coalition of Member States ready to strengthen their national and supranational mitigation actions without delay”.³¹
 - The Declaration of the Coalition for Carbon Neutrality at the “One Planet Summit” in Paris in December 2017, commits the signatories (including France) to develop low-carbon and climate-resilient development strategies in the long term as quickly as possible and by 2020³², according to the terms of the Paris Agreement.
 - At the same summit, France, Mexico and the Organisation for Economic Cooperation and Development (OECD) launched the “Paris Collaborative Action on Green Budgeting”, to help governments integrate climate commitments under the Paris Agreement, as well as other environmental commitments, into their tax policies³³.
 - French actors support the central role of cities and regions in climate action through their membership of international initiatives such as the Climate Chance Association, created after the “Climate and the Regions” Summit in Lyon prior to COP 21, and the C40 Cities Climate Leadership Group (C40).

Box 2: The national low-carbon strategy (SNBC)

The SNBC sets out a roadmap for France's policy of reducing greenhouse gas emissions, in a manner which is economically sustainable in the medium-to-long term.³⁴

- The SNBC defines national greenhouse gas emission limits in the short and medium terms, known as “carbon budgets”. These are set by decree and defined for consecutive periods of five years (with the exception of an initial period of four years). Carbon budgets are set for territorial emissions excluding emissions from land use, land use change and forestry (LULUCF), and excluding international transport.
- The SNBC emissions reduction trajectory is based on scenarios common to the Multi-Annual Energy Plans. The SNBC baseline scenario, known as “With Additional Measures” (“Avec Mesures Supplémentaires”, or AMS), illustrates one path to achieving the SNBC targets. It proposes a combination of additional public policy measures that would enable France to hit its climate and energy targets compared to existing measures.³⁵
- The first SNBC (SNBC1), published in 2015 and adopted by Decree³⁶, defined France's first three carbon budgets for the periods of 2015-2018 (442 million tonnes of CO₂-equivalent (MtCO₂eq) per year), 2019-2023 (399 MtCO₂eq per year) and 2024-2028 (358 MtCO₂eq per year).³⁷
- The review of the SNBC started in the middle of 2017. It was the subject of a prior consultation through an online questionnaire that received nearly 13,000 responses, as well as meetings involving administrations, non-governmental organisations (NGOs), economic actors and representatives of local authorities and trade unions.
- In December 2018, the Government presented its draft revision of the national low-carbon strategy (SNBC2), which is still under discussion.³⁸ This project takes into account the new carbon neutrality target and is based on an updated AMS scenario adapted to the new target and recent emission trends. In particular, the project revises upward the second budget for 2019-2023 (421 MtCO₂eq) and presents the fourth carbon budget for the period 2029-2033, coming in at 299 MtCO₂eq. Advices on the SNBC2 project have been published by the Environmental Authority, the Economic, Social and Environmental Council (CESE), and the National Council for Ecological Transition (CNTE), which we have taken into account. This report includes the advice of the High Council on Climate on the SNBC2 project.

34. The Energy Transition and Green Growth Bill, Article 173 (V), Draft National Low Carbon Strategy, Ministry of Ecological and Inclusive Transition (December 2018)

35. Existing measures cover all measures implemented before 1 July 2017

36. Decree No. 2015-1491 of 18 November 2015 on national carbon budgets and the national low-carbon strategy

37. Carbon budgets excluding land use, land use change and forestry (LULUCF). Budgets adjusted in 2018 for technical reasons related to changes in GHG accounting methods for inventories.

38. Draft national low-carbon strategy, Ministry of Ecological and Inclusive Transition (December 2018).

Actions are already being taken to implement and commission France's public policy goals.

- The SNBC aims to help ensure that the multitude of national programming plans and exercises with climate action objectives are strategically aligned. The construction of the AMS baseline scenario and strategy guidelines was discussed with stakeholders through an Information and Guidance Committee, as well as working groups and a public questionnaire.
- The PPE, which establishes the government's 10-year action priorities (over two periods of 5 years) regarding energy for mainland France, must be designed to be compatible with the SNBC. Corsica and the French overseas territories have specific autonomous PEPs.
- Regional and sub-regional energy and climate plans are key elements in organising the contribution

of the territories to France's climate goals. These exercises have helped encourage mobilisation and dialogue between stakeholders in dealing with environmental issues.

- Within French governance, the Ministry of Ecological and Solidarity Transition (MTES) manages climate and environmental policies. The Ecological Defence Council (CDE), the Economic, Social and Environmental Council (CESE), the National Council for the Ecological Transition (CNTE) and the new Citizens' Convention have complementary roles to play to speed up and support the low-carbon transition and ensure that it is ambitious, effective, appropriate and fair.³⁹
- The High Council on Climate provides independent insight to assess compliance with the emissions reduction trajectory relative to the carbon budget and to recommend corrective actions if necessary.

39. The CDE includes the Prime Minister and a group of Ministers and has the goal of defining the priorities of the ecological transition. The CESE, the third constitutional assembly of the Republic after the National Assembly and the Senate, advises the Government and Parliament and gives advice on plans and draft laws falling within its remit. The CNTE, chaired by the Ecology Minister, and composed of 6 colleges, is the forum for dialogue on the ecological transition and sustainable development. The Citizens' Convention on Climate Change is an assembly of 150 French citizens drawn at random and has the task of formulating proposals to deal with global warming.

40. With a probability of at least 50%. Pathways not exceeding 1.5°C or up to 1.6°C over the course of the century and then returning to 1.5°C before 2100. IPCC, Global Warming of 1.5°C (2018), Executive Summary and Chapter 2.

41. With a probability of at least 66%.

1.2 The 2050 carbon neutrality target in the revised national low-carbon strategy is consistent with the objectives of the Paris Agreement and the latest scientific knowledge, but it does not cover all of France's responsibilities as emissions from international aviation and shipping and from imports are not included.

Carbon neutrality for all GHG by 2050 as stipulated in the draft SNBC2 is in line with the emissions reduction level required to limit global warming to 1.5°C by the end of the century, if other countries have similar levels of commitment, depending on their specific circumstances (historical responsibility, socio-economic context, etc.).

- According to the global scenarios presented by the Intergovernmental Panel on Climate Change (IPCC), being in line with the Paris Agreement implies that global net CO₂ emissions are reduced to zero. CO₂ emissions must reach net zero around 2050 to limit warming to 1.5°C⁴⁰, and around 2070 to limit global warming to 2°C⁴¹.

- Beyond reaching net zero for CO₂ emissions, pathways that limit global warming to 1.5°C show deep reductions in the emissions of other GHG, in particular methane (CH₄) and nitrous oxide (N₂O).
- The SNBC's target of reaching neutrality for all GHG by 2050 is therefore more ambitious than global emissions pathways compatible with limiting global warming to 1.5°C. It appears to us as appropriate in light of France's historical responsibilities and its ability to act, while recognising the difficulty of quantifying France's fair contribution to global action⁴².

42. Robiou du Pont, Y. *et al.* Equitable mitigation to achieve the Paris Agreement goals. *Nature Climate Change* 7, (2017); <http://dx.doi.org/10.1038/nclimate3186>

- The target of achieving neutrality for all gases, however, requires that a gas comparison agreement be reached. The 2018 IPCC Special Report separates CO₂ (which has a cumulative effect) from other factors with different lifespans acting on the climate. This approach should be reflected in the SNBC by clearly indicating the targets for each gas (see Box 4 for a list of recommendations specific to the SNBC).
- A later deadline for achieving carbon neutrality would not be compatible with France's responsibility on the international stage and a nearer deadline would only be useful if it were based on more in-depth studies demonstrating its socio-economic feasibility.

Carbon neutrality by 2050 is technically achievable based on available information.

- The global scenarios presented by the IPCC include four sets of options for achieving CO₂ neutrality by 2050, as well as scenarios enabling all-gas neutrality to be achieved by 2050.
- The Net Zero Report produced by the UK Committee on Climate Change⁴³ presents a detailed analysis of available options for each sector. Most of the options can be transferred to the French economy.
- The analyses presented in the draft SNBC2 are rigorous and, although the AMS trajectory presents risks, it is technically feasible.

Reducing GHG emissions by the draft SNBC's fourth carbon budget (2029-2033) is of the same order of magnitude as the global GHG reductions required to limit global warming to 1.5°C⁴⁴.

By legally adopting the objective of carbon neutrality for all GHG by 2050, France would maintain its position as one of the major leaders in global action against climate change, provided that emissions from international transport are taken into account and that emissions associated with French imports are controlled (see Box 3). Moreover, France must do more to support the efforts of other countries to encourage global commitments towards CO₂ neutrality by 2050 and deep reductions in other gases.

France's efforts are in line with those of other countries that have raised their targets. However, the definitions of neutrality, the legal status of this goal and its deadline vary (see Table 1).

43. <https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/> October 2018, (chapter 4, Cross-Chapter Box 11), global net anthropogenic emissions including LULUCF expressed in CO₂-equivalent

44. The budget amounts to 299 Mt CO₂eq per year on average over the period, corresponding to a 35% reduction in GHG emissions compared to 2015 (excluding LULUCF) according to the draft SNBC2, i.e. 42% compared to 2010, calculated on the basis of emissions excluding LULUCF of 512 Mt CO₂eq (Citepa inventory, Kyoto Climate Plan format, 2018). With LULUCF, the decrease is 46% compared to 2010 (based on 472 Mt CO₂eq in 2010 and 257 Mt CO₂eq per year on average over the period of the fourth budget). According to the IPCC report of

decrease by about 43% compared to 2010 levels by 2030 (interquartile range of 36 to 48%) in model pathways with limiter or no overshoot (22% with a range of 11 to 37% for 2°C pathways).

Table 1. Neutrality targets in different States

	Net Zero CO ₂ or all GHGs?	Date	Legal status	Use of international credits allowed?	International transport included?	Independent committee in place?
French targets	GHG ●	2050	Energy and Climate Bill 2019	Not allowed ●	Excluded ●	High Council on Climate (instated in 2018, Decree in 2019) ⁴⁵
Neutrality targets under consideration						
European Union	GHG ●	2050	Proposed by the European Commission	Not allowed ●	Uncertain ●	No
United Kingdom	GHG ●	2050	Introduced into law on 12 June 2019 ⁴⁶	Intention ⁴⁷ ●	Included ⁴⁸ ●	Committee on Climate Change (2008) ⁴⁹
New Zealand	All GHGs except Biogenic methane ●	2050	Zero Carbon Bill presented to parliament	Allowed ●	Uncertain ●	Interim Committee created in April 2018, permanent Committee proposed in the Bill ⁵⁰

45. Decree no. 2019-439 of 14 May 2019 on the High Council on Climate.

46. Must be adopted by both chambers within 21 days before being firmly fixed in law.

47. The UK Government says it wants to meet the targets without using international credits, but reserves the right to do so under certain conditions.

48. Not formally included in the law, but supported by the government and follows current practices.

49. Committee on Climate Change, UK Climate Change Bill (2008), Part 2.

50. New Zealand Ministry of the Environment, Proposed Climate Change Response (Zero Carbon) Amendment Bill.

I. IN SPITE OF A STRUCTURED INSTITUTIONAL FRAMEWORK, SET TARGETS HAVE NOT BEEN MET

Neutrality targets under consideration						
	Net Zero CO ₂ or all GHGs?	Date	Legal status	Use of international credits allowed?	International transport included?	Independent committee in place?
California	Uncertain ●	2045	Decree	Uncertain ●	Uncertain ●	Independent Emissions Market Advisory Committee (2017) ⁵¹
Sweden	GHG ●	2045	Law	Allowed ●	Excluded ●	Climate Policy Council (2018) ⁵²
Denmark	Uncertain ●	2050	Law	Uncertain ●	Uncertain ●	Climate Change Council (2015) ⁵³
Norway	GHG ●	2030	Parliamentary Agreement	Allowed ●	Excluded ●	Climate Risk Commission (2017) ⁵⁴
<p>Other countries and regions have committed to or intend to achieve neutrality by 2050 in the context of their national contributions to the Paris Agreement or strategic documents (without legislation), e.g. Ethiopia, Costa Rica, Bhutan, Fiji Islands, Iceland, Marshall Islands and Portugal. The most recent announcements on neutrality are those of Germany and Finland (May and June 2019).</p>						
<p>Source: Adapted from the UK Committee on Climate Change “Net Zero” report (May 2019)⁵⁵ and analyses conducted by the High Council on Climate.</p>						

51. California Environmental Protection Agency, Independent Emissions Market Advisory Committee.

52. Klimapolitiska raadet, The Swedish Climate Policy Council.

53. Klimaraadet, The Danish Council on Climate Change.

54. Commission on climate risk and the Norwegian economy.

55. Committee on Climate Change, Net Zero – The UK’s contribution to stopping global warming (May 2019).

Box 3: Recommendations specific to the draft SNBC2

Some aspects of the draft SNBC2 should be strengthened or clarified so as to increase its reach.

- **Set the levels of carbon budgets into law**, and not just Decrees. Carbon budgets must be fixed, excluding technical revisions. Their incentive power is lost if they can be revised outside of the national debate.

- **Lower the level of the 2nd carbon budget** (2019-2023) presented in this project, consistent with the long-term trajectory and the latest data on national emissions (see Section I.3).

- The overshoot of the 1st carbon budget for the period 2015-2018 (62 MtCO₂eq) is lower than expected (72 MtCO₂eq). At a minimum, these data should be taken into account in the 2019-2023 carbon budget review.
- At best, the SNBC2 should maintain the targets set by SNBC1 (excluding technical changes) so that it retains its incentivising power.

- **Link emissions related to international aviation and shipping** to France's carbon neutrality target, for the following reasons:

- They are the responsibility of France, and including them in the national target would encourage France to make additional efforts to implement international mechanisms aligned with carbon neutrality.
- To ensure that France's carbon neutrality target for 2050 is at least as ambitious as that recommended by the UK Committee on Climate Change (see Table 1), and to

encourage other countries to raise their targets as well.

- Because there are opportunities to reduce and offset these emissions through carbon sinks.

- **Make additional proposals regarding imported emissions** at the national and European levels. Improve the characterisation of imported emissions, clarify how these emissions will be reduced in a manner consistent with the 2050 carbon neutrality target.

The conditions for achieving the carbon neutrality target must be clarified to remove ambiguities. The goal remains vague in its implementation.

- **The non-use of international credits for achieving neutrality for all gases by 2050 must be clarified and included in the 2019 Energy Bill.** The draft SNBC2 scenario aims to achieve carbon neutrality by 2050 without using carbon credits⁵⁶, but this exclusion does not appear in the Energy and Climate Bill. The lack of legal commitment raises the question of how this goal can be put into practice and questions the practical feasibility of neutrality without compensation. The way in which this exclusion will be implemented must be explained.
- **The targets for each gas must be better spelled out in the SNBC2, in particular for each sector**, in order to be able to monitor the progress made and to quantify the impact on the climate using several methods to compare greenhouse gases (e.g. 100-year global warming potential, that better takes into account short-lived climate forcers). The greenhouse gas comparison agreement must be specified.

56. The draft SNBC stipulates that, in some cases, a greenhouse gas emitter can offset its emissions by acquiring "carbon credits" generated by projects designed to prevent carbon emissions or sequester them.

- **Some emissions cannot be reduced to zero by 2050: these are the so-called “incompressible” emissions.** The SNBC states that anthropogenic carbon sinks will balance the net climate effects of these emissions. Monitoring of these emissions, as well as the potential of carbon sinks, must be done for each SNBC to ensure that their compensation will actually be possible.

To better ensure the success of the future SNBC, its strategic orientations should be prioritised as of now and accompanied by a timetable of deadlines.

The SNBC requires the implementation of profound structural changes. It must set their implementation deadlines over time, particularly in order to anticipate the risks of subsequent blockages and lock-ins (“carbon lock-in”) due to the system inertia of the systems (transport infrastructure, building heating requirements, and particularly energy infrastructure).

- Achieving neutrality for all gases will require efforts in all sectors of the economy to ensure reductions in emissions of CO₂ and other GHG:
 - Energy consumption must be decarbonised through energy sobriety, energy efficiency and the decarbonisation of energy vectors, particularly in France for transport and heating.
 - Emissions from non-energy sectors must decrease sharply, particularly emissions of CH₄ and N₂O from industrial processes, materials, agriculture and waste.
 - Net land-based and coastal carbon sinks must be developed and maintained and precise targets established in order to preserve and increase the storage of carbon in organic matter in the ground and to better manage forests and the use of bio-sourced products.
 - New technologies for the capture, use and geological storage of CO₂ must be developed to complement natural storage in land-based resources.⁵⁷
- Acting on these levers will require significant changes in all sectors and these must be clearly specified. For example, low-carbon mobility requires adequate

infrastructure. The energy retrofitting of buildings requires major structural changes in industry as well as training. The structural changes, the key dates for their implementation and their potential impacts on citizens and biodiversity must be identified.

Risks and blocking points must be assessed and integrated into the development of operational goals and action plans. The scenario underlying the draft SNBC2 presents potential risks, uncertainties and blocking points. They have been insufficiently explored. They must be studied and must lead to the definition of operational objectives which take the associated uncertainties into consideration, for example:

- Achieving the carbon neutrality target implies a high dependency on carbon sinks, biomass and bioeconomics⁵⁸. At the same time, the draft PPE indicates that the biomass sector is lagging behind the 2018 target and lagging more significantly behind the 2023 target.⁵⁹ Moreover, although the draft SNBC2 proposes a forest management scenario aimed at improving resilience to climate change,⁶⁰ risks remain as to the forests and soils’ ability to store carbon as a result of global warming.
- The SNBC scenario proposes significant electrification of energy consumption (transport, industrial processes, heat, etc.), without spelling out the operational conditions required to achieve these objectives. The baseline scenario relies on strong hypotheses, such as 100% of new cars being electric (or hydrogen-powered) from 2040 onwards, electrification of a number of processes and use of renewable energy in the agricultural sector or 70% of industrial sector consumption being electrified by 2050.⁶¹ This scenario presents risks given the potential limitations of electricity generation

57. The revised AMS scenario considers that approximately 15 MtCO₂eq will be sequestered by these technologies in 2050.

58. The bioeconomy encompasses all activities related to the production, use and transformation of bioresources (bio-sourced materials and chemicals) in order to sustainably meet food needs and a portion of materials and energy needs, while preserving natural resources and guaranteeing the production of high quality environmental services. See the 2018-20 action plan of the Bioeconomy Strategy for France.

59. Draft PPE, see biomass section on page 61.

60. Draft National Low Carbon Strategy (December 2018) forest/land sector section on page 25 and Sum-

(development of renewable energy, planned reduction in nuclear power generation, use of power plants powered by fossil fuels in situations of stress such as during peaks in demand or temporary loss of low-carbon generation capacity), the technical, economic, geo-strategic and environmental constraints linked to the manufacture and use of batteries, or the transformation time needed to set up the infrastructure and networks necessary for the electrification of transport.

mary of the baseline scenario (March 2019) on page 28.

61. Draft National Low Carbon Strategy (December 2018), Summary of baseline scenario (March 2019).

62. Draft National Low Carbon Strategy, Ministry of Ecological and Inclusive Transition (December 2018), pages 17 and 33.

63. The recent annual reduction rates are calculated on the basis of changes in emissions between the period of the 1st SNBC1 carbon budget (2015-2018) and the four previous years (2011-2014). The rates expected by 2025 represent the average rates of change between the 3rd (2024-2028) and 2nd (2019- 2023) carbon budgets in the draft SNBC2.

64. The analysis elements of this non-referenced section are derived from analyses conducted by the HCC using data from the GHG emissions inventories from Citepa, the SNBC1 and the draft SNBC2.

- Some equipment and infrastructure (transport, energy, building sectors) have very long lifespans: decisions taken in the short term may lead to subsequent blocking points that prevent compliance with the GHG trajectory of the SNBC⁶². The process for avoiding “lock-in phenomena” in commitment decisions is not well defined. The government must identify these risks and the ways of avoiding them and give clear signals to public and private actors.

Compliance with budgets is imperative and emissions reductions cannot be postponed. The draft SNBC2 sets out a fourth carbon budget for 2029-2033 corresponding to a 35% reduction in GHG emissions compared to 2015, but France did not meet the first carbon budget set in 2015 for the period 2015-2018 (see Section I.3). The causes of this overshoot must be understood in order to guide actions to meet future budgets.

- The causes of overshoot of the first carbon budget and the expected difficulties in meeting the second budget must be understood, and implementation methods must be modified to make them effective. The failure to meet with the first budget demonstrates shortcomings and must lead to corrective actions being taken.
- Each missed carbon budget makes it less likely that the next budget will be met, due to the need to accelerate the implementation of already ambitious measures. Moreover, missing a budget implies an accumulation of additional emissions, which increases France’s historical responsibility and weighs on the credibility of its climate action.

Implementation, monitoring and evaluation of the SNBC should be more consistent and systematic. The SNBC’s indicators must be small in number,

quantified, given alongside a precise timetable and remain stable with regard to revisions of the SNBC. The government must take ownership of these indicators and clearly communicate them to all actors involved in the transition. It is important to break down the objectives of each strategy from the points of view of both public policies and investment strategies, and to monitor indicators before developing new ones. This will enable an understanding of the structural causes of observed delays and the operationalisation of the strategy to make up for them. It is also important to monitor the work and investments already completed and to accurately assess their results in terms of reducing GHG emissions.

I.3

The 1st carbon budget set in 2015 covering the period from 2015-2018 has been exceeded by 62 MtCO₂eq, according to preliminary data produced by CITEPA. The average decrease in emissions of 1.1% per year for the period 2015-2018⁶³ is far too small and much lower than the expected reduction of 1.9% per year underpinning the 1st budget; emissions decreases must be set in motion or scaled up in practically all major sectors of the economy in order to exceed decreases of 3% per year by 2025 and to uphold the commitment to carbon neutrality in accordance with the trajectory of the draft SNBC2.

The trends in national and sectoral emissions are reviewed in this section in order to assess whether France has achieved its objective and whether the trajectory is in line with the targets set in the 2nd and 3rd carbon budgets. The SNBC1 targets are used to assess the consistency of recently observed trends with the long-term target low-carbon trajectory. The targets of the draft SNBC2 are used to comment on the achievement of future goals and of carbon neutrality by 2050.⁶⁴

The 1st carbon budget published in 2015 in the SNBC1 sets maximum GHG emissions thresholds for 2015-2018, providing a legal framework for reducing national emissions and an indicative framework for reducing emissions in each sector. Although the SNBC sectoral trajectory is only indicative, possible deviations from the trajectory in certain sectors of the economy should be offset by better results in others in order to meet the official budgets set in the Decree. Furthermore, delays observed in one sector require analyses to identify action levers and to strengthen its capacity to implement its transition in line with the goal of neutrality by 2050.

GHG emissions in France fell by 19% between 1990 and 2018 (excluding LULUCF). The carbon budget set by the SNBC1, 442 MtCO₂eq per year, was exceeded by 62 MtCO₂eq in total over the period 2015-2018⁶⁵ (excluding LULUCF), i.e. an overshoot of 3.5%.

GHG emissions fell by 19% between 1990 and 2018 (excluding LULUCF). This decline involved a reduction in the carbon intensity of the national gross domestic product (GDP) (which increased by 51% over the same period) common to the majority of OECD countries⁶⁶. In 2018, emissions (excluding LULUCF) fell by 4.2% compared to 2017 due to a drop in energy consumption.⁶⁷

The most recent data show that emissions reductions between 2015 and 2018 were insufficient, in particular with regard to the targets set in the SNBC1:

- The rate of reduction in emissions between 2015 and 2018, by an average of 1.1% per year,⁶⁸ was clearly insufficient when compared with the expected decline of 1.9% per year in the SNBC1 trajectory, which the draft SNBC2 suggests will ramp up to 3.3% from 2025 onwards.
- The building and transport sectors, two of the biggest emitters (see Box 4), have accumulated significant delays compared to the trajectory set out in the SNBC1. Emissions in the industrial and agricultural sectors are in line with the SNBC1 trajectory, although the targets for this sector are very unambitious. The energy transformation and waste sectors emitted less than anticipated in the SNBC1.
- Over the period of the first budget, the LULUCF sector's carbon sinks captured only 33 MtCO₂EQ

per year on average, compared to the planned figure of 55 MtCO₂EA per year, which moves us even further away from the SNBC1 trajectory. The deviation from SNBC1 is multiplied by 2.4 when LULUCF is taken into account (see Table 2).

- When looking at emissions per gas, CO₂ emissions were higher than those set out in the SNBC1 (the target was exceeded by 5%). CH₄ emissions are 1% below the target budget (falling slightly faster than expected in the SNBC1).⁶⁹ N₂O emissions are also 1% below the first target budget (increasing at a slower rate than expected in the SNBC1).⁷⁰ Emissions of fluorinated gases were in line with the set target.

67. The reduction in emissions in 2018 compared to 2017 can be explained by a fall in energy consumption due to a milder winter (harshness coefficient at 0.94 and 0.98 respectively), and by an increase in the production of electricity from hydraulic sources (rainfall surplus) and greater availability of the nuclear fleet (fewer shutdowns). Data: CITEPA

68. The recent annual reduction rates are calculated on the basis of the changes in emissions between the period of the 1st carbon budget of the SNBC1 (2015-2018) and the four previous years (2011-2014). The rates expected by 2025 represent the average rates of change between the 3rd (2024-2028) and 2nd (2019- 2023) carbon budgets of the draft SNBC2.

65. The 2018 data are preliminary. Source: CITEPA.

66. The decoupling of GHG emissions and GDP is observed in most OECD countries during this period. Some of the underlying factors are common (globalisation of trade leading to the export of industrial production, decline in the use of coal and an increase in renewable energy), while others stem from specific policies. For many countries, the reduction in emissions is due to electrification, a factor that has played a lesser role in France due to the weight nuclear-generated electricity.

69. CH₄ emissions decreased faster than expected in the SNBC1. They are stagnating in the agriculture sector. The fall was mainly derived from the waste sector (decline in quantities put in landfills) and, to a certain extent, to the energy (gas distribution) and residential sectors. Source: CITEPA.

70. N₂O emissions increased less quickly than expected in the SNBC1. The increase was mainly due to farming (crops) and chemicals. Source: CITEPA.

71. Of which 87.2% from cars, 6.3% from aviation, 4.2% from buses/coaches/trams, 1.9% from power-driven two-wheeled vehicles, 0.4% from trains.

72. Of which 91.5% from heavy goods vehicles, 8% from waterways and 0.5% from trains.

73. The Global warming potential of N₂O over 100 years is 298 times higher than that of CO₂ per mass unit, and that of methane is 25 times higher.

Box 4: Where do France's greenhouse gas emissions come from?

French national emissions were estimated at 445 MtCO₂eq in 2018. In addition to its national emissions, France is responsible for a portion of emissions related to international transport (aviation and shipping), and its carbon footprint includes emissions related to imports.

The transport sector accounted for 31% of national emissions in 2018 (137 MtCO₂eq in 2018). Its emissions arise from passenger transport (60%⁷¹ of emissions from this sector), freight transport⁷² (21%), and light commercial vehicles (19%).

The building sector accounted for 19% of national emissions in 2018 (84 MtCO₂eq). Direct emissions from this sector include housing (59%) and the tertiary sector (41%). They mainly arise from the use of gas and heating oil for thermal uses (mainly for heating, but also domestic hot water and cooking), as well as fluorinated gases used as refrigerants. Emissions from electricity and district heating are excluded as they fall under the energy transformation sector. Emissions from biomass (wood energy) are also excluded because they are recorded in the LULUCF sector.

The agricultural sector accounted for 19% of emissions in 2018 (86 MtCO₂eq). Emissions from this sector come from livestock farming (48%), crops (41%), as well as agricultural tractors, machinery and boilers (11%). Agricultural emissions are primarily linked to biological processes. These include CH₄ (45% of GHG emissions from agriculture in CO₂eq) emitted by enteric fermentation in ruminants and, to a lesser extent, by animal droppings and their processing. They are also linked to N₂O (43% of GHG emissions from agriculture CO₂eq) mainly emitted by agricultural soils after mineral or organic nitrogen fertilisation⁷³. The remaining emissions include CO₂ (12%) from the energy (oil products and natural gas) consumed by tractors and farm machinery, as well as boilers for heating agricultural greenhouses. Soil carbon stock variations are excluded because they are recorded under the LULUCF sector.

The manufacturing industry sector accounted for 18% of emissions in 2018 (79 MtCO₂eq). This sector's emissions come mainly from chemicals (26%), the manufacture of non-metallic minerals (cements, lime, glass, etc.) (22%), ferrous metals (20%) and agri-food (12%). A portion of the emissions are related to industrial processes such as the manufacture of cement and the use of solvents, in addition to energy combustion.

The energy transformation sector accounted for 10% of emissions in 2018

(46 MtCO₂eq). Emissions from this sector come mainly from electricity production (47%), oil refining (20%), other energy processing industries (waste incineration with energy recovery) (16%), district heating (8%), coal coking in the steel industry (6%) and the extraction/distribution of gaseous fuels (3%).

The waste sector accounted for 3% of emissions in 2018 (14 MtCO₂eq).

These emissions are not discussed in this report.

In addition to national emissions, land use, international transport emissions and the carbon footprint can also be measured. These sources are compared to total national emissions (445 MtCO₂eq):

Land use, land use change and forestry (LULUCF) have a net carbon sink effect (-32 MtCO₂eq per year), which offset 7% of national emissions in 2018.

The LULUCF sector records changes in carbon stocks related to forest management, changes in soil use (artificialisation, reforestation, return to grassland, etc.) and changes in carbon stocks for soils used for the same purpose (for example, annual crops remaining as annual crops).

Emissions from international transport⁷⁴ added 23 MtCO₂eq to national emissions in 2017 (+5%).

They are not taken into account in emissions reported to the United Nations Framework Convention on Climate Change (UNFCCC), nor in the carbon budgets defined by the SNBC1 and the draft SNBC2. They cover aviation (76%⁷⁵) and non-domestic shipping (24%).

Net imported emissions accounted for 60% of national emissions in 2015 (271 MtCO₂eq) and are added to them to give the carbon footprint

(731 MtCO₂eq). These emissions reflect the impact of lifestyles in France. They are associated with products and services consumed in France that originate from abroad, and for which emissions are recorded elsewhere; minus those associated with products and services produced in France and consumed abroad.

–

Source: CITEPA data in Climate Plan format, Kyoto scope, 2018.

74. Emissions from international transport include emissions from international air, sea and river bunkers. This represents fuel consumed on French territory.

75. Aviation's greenhouse gas footprint accounts for only a fraction of its impact on the climate. This also results from NO_x emissions leading to the formation of ozone and the degradation of methane; stratospheric water vapour; condensation trails (most significant effect); sulphate aerosols (cooling effect); soot. Several studies have proposed that a radiative forcing index be calculated, which would then be multiplied by direct CO₂ emissions from the combustion of aviation fuels in order to take all these effects into account. The calculation of the climate footprint of the air travel sector converges around a factor of 2. Sources: Jungbluth and Meili, 2018; Fahey and Lee, 2016.

Table 2. Comparison of emissions with the 1st carbon budget (SNBC1)

	2015-2018 carbon budget (MtCO ₂ eq)		Deviation from the SNBC1	
	Actual	SNBC1	MtCO ₂ eq	%
By sector				
Transport	553	506	47	9%
Buildings	354	305	49	16%
Agriculture	347	349	-1	0%
Industry	321	320	2	0%
Energy transformation	197	218	-22	-10%
Waste	58	71	-12	-18%
By gas				
CO ₂	1358	1292	66	5%
CH ₄	226	228	-2	-1%
N ₂ O	166	168	-2	-1%
Fluorinated gases	80	80	0	1%
Total				
Total excl. LULUCF	1830	1768	62	4%
UTCATF	-133	-222	89	-40%
Total with LULUCF	1697	1546	151	10%

NB: Emissions generated over the period of the 1st carbon budget (2015-2018) correspond to the sum of the emissions between 2015 and 2018. SNBC1 emissions represent the expected emissions according to the SNBC1. The deviation from SNBC1 is the cumulative difference between actual emissions and expected emissions during the period.

Notes: CITEPA data in the Climate Plan format, Kyoto scope, 2018 and SNBC1.

Table 3. Comparison between observed rates of decline and those expected by the 1st carbon budget (SNBC1)

	2015-2018 compared to 2011-2014	Budget 1 (SNBC1) compared to 2011-2014
Transport	0.1%	-2.1%
Buildings	-1.9%	-5.5%
Buildings (weather-corrected)	-1.5%*	-
Agriculture	-0.1%	0.0%
Industry	-1.8%	-1.9%
Energy transformation	-2.6%	0.0%
Waste	-3.0%	1.8%
Total CO ₂ eq excl. LULUCF	-1.1%	-1.9%
UTCATF	-2.1%	11.2%
Total CO ₂ eq with LULUCF	-1.0%	-3.3%

Note: The recent annual reduction rates are calculated on the basis of the changes in emissions between the period of the 1st carbon budget (2015-2018) of the SNBC1 and the four previous years (2011-2014).

* Only the change for 2015-2017 compared to 2011-2014 is calculated, due to the unavailability of climatic correction coefficients for 2018.

Notes: Citepa data in Climate Plan format, Kyoto scope, 2018 & SNBC1.

Emissions from the transport sector increased by 10% between 1990 and 2018. Growth in demand in this sector was stronger than gains in emissions achieved in parallel. Improvements in vehicle efficiency and final energy carbon content (agrofuels +7% and electrification +0.4% of final transport energy) did not offset growth in demand and the fall in vehicle occupancy rates. Apart from 1995-2010, when the modal share of rail increased by three points for passengers, the modal changes observed were slanted towards high-carbon modes (power-driven two-wheeled vehicles, heavy goods vehicles).⁷⁶

- Recent emissions in the transport sector are almost stable, while a decline of 2.1% per year was expected by the SNBC1, a decline that should accelerate to 2.6% per year by 2025 according to the draft SNBC2.
- On average, during the period of the 1st carbon budget, the increase in emissions from passenger transport and light commercial vehicles was largely

offset by the decrease in emissions associated with freight transport.

Emissions from the building sector fell by 10% between 1990 and 2018. With climate variability corrections⁷⁷ (which corrects winter heating demand for weather fluctuations), emissions have only fallen by 4% since 1990.⁷⁸ This relative stagnation is the result of opposing developments. Emissions linked to energy consumption (mainly CO₂) fell thanks to energy efficiency improvements in buildings and improvements in the carbon content of energy, as fossil gases replaced fuel oil and coal. However, these gains were partly offset by an increase in floor spaces requiring heating, as well as by the strong growth in fluorinated gases (HFC and PFC⁷⁹) used as refrigerants (deployment and/or intensification of the use of air conditioning).

- The rate of decline of emissions from the building sector was 1.5% per year, on average, over the period 2015-2018 (1.9% without the correction for climate variability), while a decline of 5.5% per

76. Chiffres clés du transport (2019) et Comptes des transports (transports voyageurs, 2017)

77. The coefficients used to reconstitute emissions corrected for climate variability were calculated on the basis of French energy consumption balance. These are emissions that would have been observed if the heating needs for the period in question had been equal to the average needs calculated over a certain reference period (1986-2015). <https://www.statistiques.developpement-durable.gouv.fr/bilan-energetique-de-la-france-pour-2017>

year was expected in the SNBC1 trajectory, with increasing ambitions over the next carbon budgets.

- During the period of the first carbon budget, the fall in emissions was due more to housing than to the tertiary sector. Fluorinated gas emissions are stagnating, with an increase from housing offset by a fall in tertiary sector emissions.

Emissions from the agriculture sector fell by 8% between 1990 and 2018. This decline is the result of an intensification of farming and livestock rearing systems and practices, rather than a shift towards ecological agro-farming practices. CH₄ and N₂O emissions decreased thanks to a reduction in the size of the bovine stock (fewer, more productive animals) and sales of mineral nitrogen (rationalisation of nitrogen fertiliser spreading).⁸⁰ CO₂ emissions from energy consumption decreased thanks to a growing proportion of biofuels in the energy mix.

- Emissions from the agriculture sector were practically stable during the period 2015-2018 (-0.1% per year). They are in line with the stability target stipulated in SNBC1 for this sector. A decline of 1.4% per year is expected by 2025.
- On average, during the period of the first carbon budget, the reduction in CO₂ emissions from machinery and engines was partly offset by an increase in crop-related N₂O emissions. Methane emissions from livestock farming are stagnating.

Emissions from the industrial manufacturing sector fell by 46% between 1990 and 2018. This decrease is explained by improvements in processes and energy efficiency gains. The 2008 economic crisis had secondary effects. The chemical industry recorded the sharpest decline, notably with a drastic decrease (-93%) in N₂O emissions linked to the production of adipic and nitric acids.

- The reduction in emissions in the industrial manufacturing sector was 1.8% per year on average between 2015 and 2018. This decrease is in line with the expected trajectory in SNBC1. The rate of decline in emissions expected in the draft SNBC2 is 2.6% per year by 2025.
- During the period of the first carbon budget, decreases stemmed primarily from mineral product processes (construction materials), chemical

industry processes and metallurgy associated with ferrous metals.

Emissions from the energy transformation sector fell by 41% between 1990 and 2018, but have stagnated since 2014. Regarding electricity generation, coal and heavy fuel oil power plants have gradually been replaced by gas power plants, and increases in demand were covered by nuclear and renewable energy. In terms of refining, the fall in emissions is explained by the closure of six facilities due to a slight fall in domestic demand, but above all by a restructuring of the sector (imbalance between petrol and diesel, international competition with corresponding emissions allocated to countries where the refining takes place).

- The emissions reduction rate in this sector was 2.6% per year on average between 2015 and 2018, faster than the SNBC1 trajectory, which did not anticipate any change at all during the recent period. However, a rate of decline of 5.8% per year is forecast by 2025 in the draft SNBC2.
- During the period of the first carbon budget the largest decreases were in electricity production (milder winters) and oil refining (improvement of refining processes for imported crude oil).⁸¹

The net annual carbon sink of the LULUCF sector increased by 44% between 1990 (-22 MtCO₂eq per year) and 2018 (-32 MtCO₂eq per year). The evolution of forest sinks (development of forested areas, growth of forests and their exploitation) largely explains the changes in LULUCF emissions since 1990. Land use changes have had a relatively stable emissions footprint since 1990.

- During the period from 2015-2018, the LULUCF net carbon sink fell by 2.1% per year on average due to forestry,⁸² while the SNBC trajectory forecasted an annual increase of 11%. The near-stagnation of net carbon sinks is expected to continue until 2030 in the forest management scenario adopted by the draft SNBC2.⁸³

Emissions from international transport increased by 40% between 1990 and 2017.

Since 2013, the increase in air sector emissions (+6%), resulting from increases in demand, has been offset by a fall in maritime sector emissions (-24%), particularly following the 2008 crisis, but also due to competition between major European ports. Since 2013, emissions

78. Corrected change in climate variability was only calculated for the period between 1990 and 2017, due to the unavailability of climate correction coefficients for 2018.

79. HFC = hydro-fluorocarbons, PCF = perfluorocarbons

80. Environment & Agriculture - Key figures – 2018 edition

81. Crude oil imports stagnated between 2015 and 2018. The reduction in emissions can be explained by three factors: the closure of the Dunkirk SRD site, the closure of the La Mède site for conversion to a bio-refinery, as well as the proportion of gaseous fuels used in refining processes, which now accounts for a larger share than liquid fuels, leading to a reduction in emissions at constant activity levels.

82. Source: Inventory of CITEPA – CCNUCC - KP CRF table

83. The draft SNBC2 uses a dynamic forest management scenario as a reference in order to improve climate change adaptation capabilities, which delays the increase in the sector's sink effect.

from international aviation have increased three times faster than domestic aviation.

The carbon footprint of French people increased by 20% between 1995 and 2015 (1995 and 2017, being the data start and end points).⁸⁴ Since 1995, emissions from imports have doubled while those from domestic production (excluding exports) have fallen by a fifth.⁸⁵ The weight of GHG emissions linked to French imports is increasing. They now exceed domestic emissions (excluding exports) since 2010. In 2015, France's carbon footprint reached 11 tCO₂EQ per capita, by comparison, national emissions are estimated at 6.6t CO₂EQ per capita.

84. The carbon footprint analysis focuses on CO₂, CH₄ and N₂O emissions in mainland France.

85. <https://www.ecologique-solidaire.gouv.fr/sites/default/files/Projet%20strategie%20nationale%20bas%20carbone.pdf>

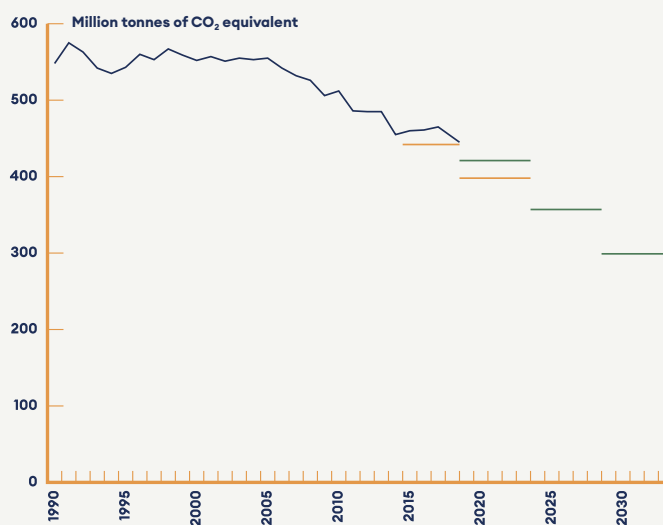
The SNBC defines national ceilings for greenhouse gas emissions (so-called carbon budgets). To meet these budgets, average emissions must remain below the ceilings. The 1st carbon budget (2015-2018) was exceeded by 62 MtCO₂eq. Every budget missed moves us away from neutrality.

Only “national emissions” have a firm target. The targets for each sector are indicative.

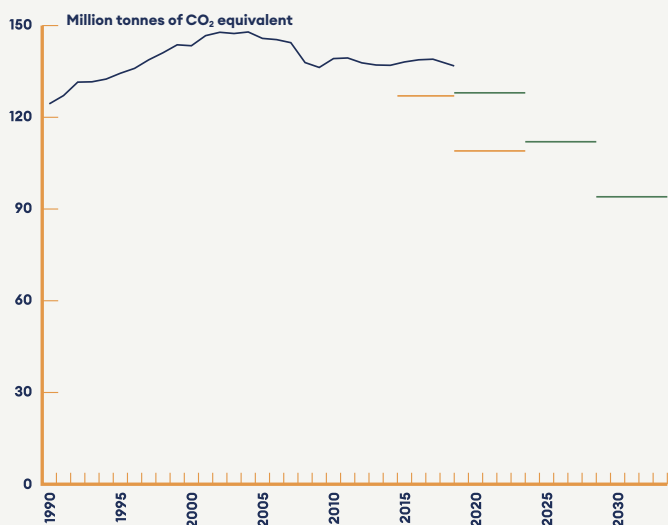
International transport data from the “Third biennial report by France to the United Nations Framework Convention on Climate Change” (2017), all other data from the draft SNBC2.

- Budgets defined in the SNBC1
- Budgets defined in the draft SNBC2

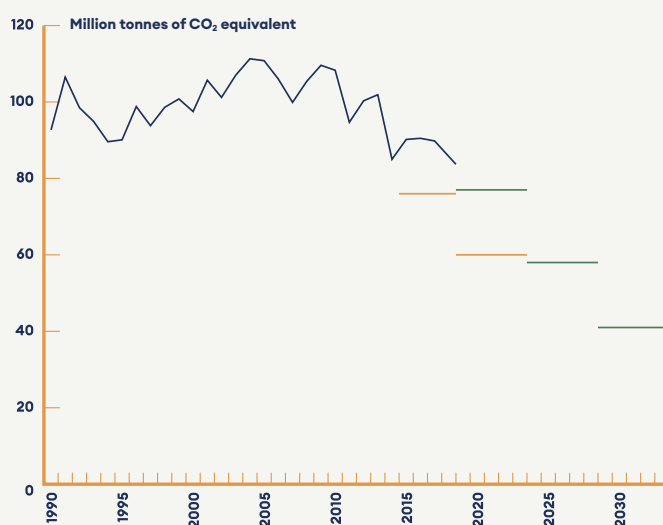
National emissions



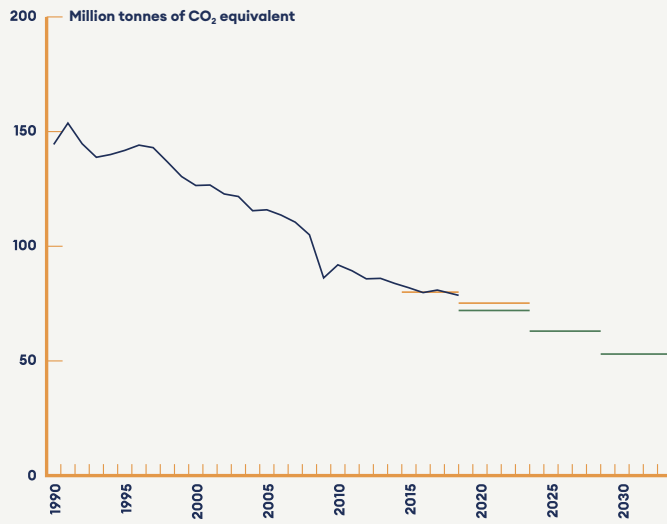
Transport



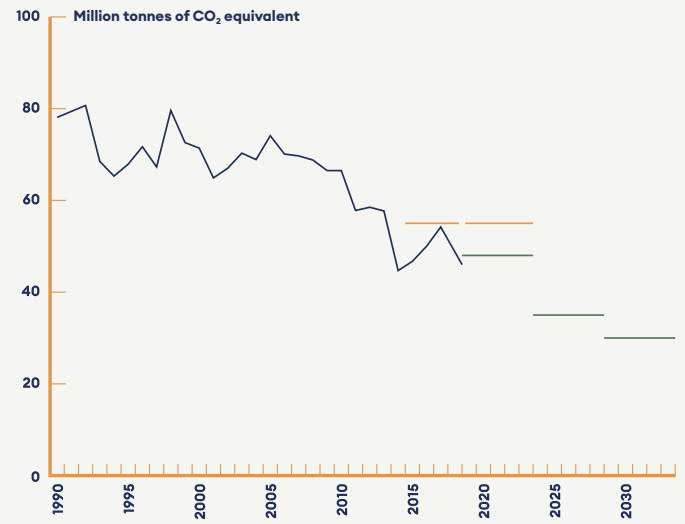
Buildings



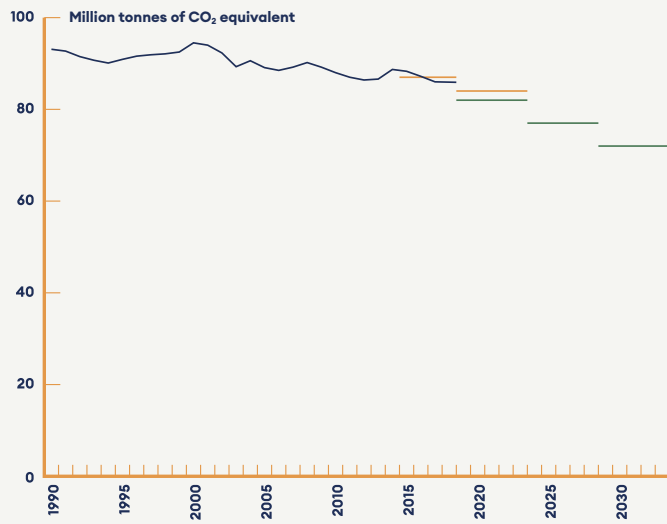
Industry



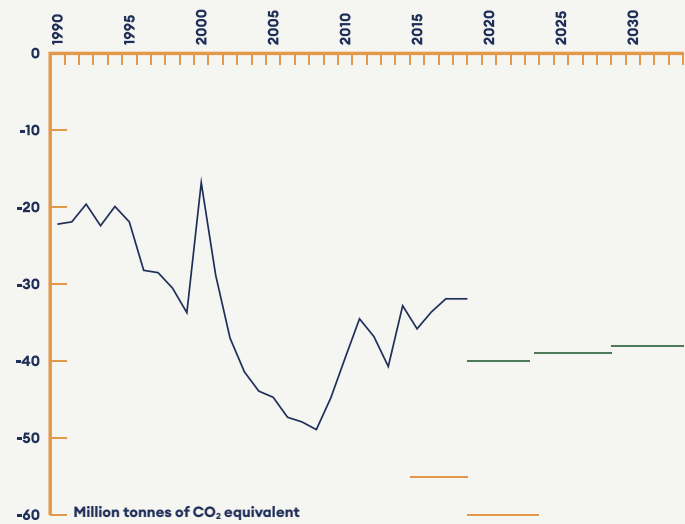
Energy transformation



Agriculture

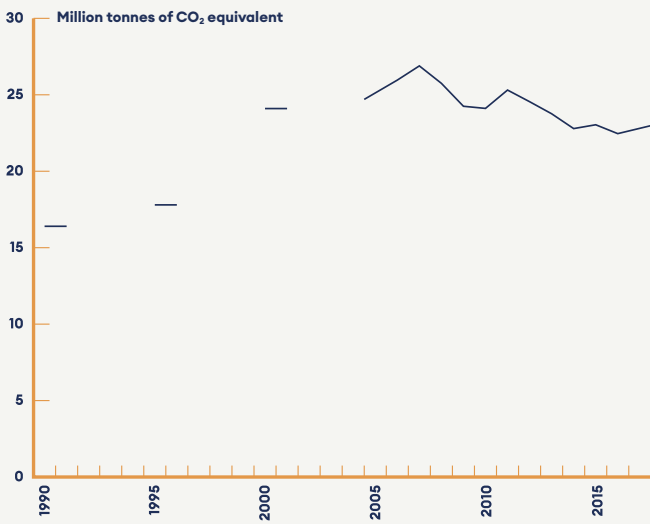


Carbon sinks

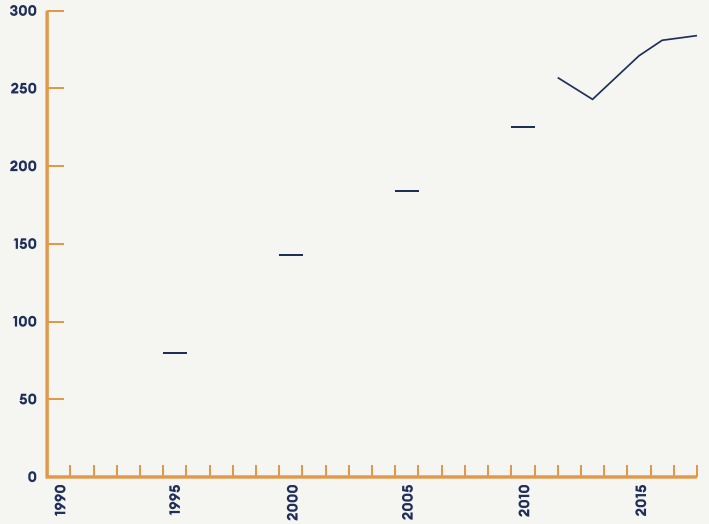


- Budgets defined in the SNBC1
- Budgets defined in the draft SNBC2

International transport



Imported emissions



II. IDENTIFY AND RESOLVE BLOCKING POINTS

Section I highlights that the national GHG emissions reduction targets have not been met for key sectors (transport, buildings). In Section II, the report examines roadlocking points that hamper actions towards a decline in long-term emissions from the

perspective of the structural changes that should be in place, as well as related socio-economic factors. This initial analysis is not exhaustive and is intended to be supplemented by the forthcoming work by the High Council on Climate.

II.1 The structural changes needed to accelerate the reduction in greenhouse gas emissions are insufficient and poorly monitored.

Structural changes include infrastructure system transformations, investment in low-carbon and energy efficient options, disinvestment in GHG-intensive industries, adaptation of supply chains, education and training.

Monitoring these is more difficult than monitoring emissions due to a lack of data and indicators. A systematic approach should be developed which covers all sectors, as well as underlying factors such as investments, major projects and state-owned enterprises. A table of indicators associated with structural changes would make it possible to anticipate the effects on emissions in order to be able to judge government actions over the period of a carbon budget without waiting for its impacts on emissions during the following period.

Nevertheless, the available evidence, even if incomplete, shows a lack of consistency and long-term vision regarding progress in the structural changes needed to achieve carbon neutrality.⁸⁶

For transport, many of the structural changes associated with the SNBC1 scenario have not been implemented, or not at the expected pace, even when public policies were in place to support them. Most factors⁸⁷ in the SNBC1 scenario are not following the intended trends (apart from demand for goods transport and the unit consumption of new light commercial vehicles).

- Passenger transport: growing demand, delays in electrification and a lack of modal shifts over the 2015-2018 period.
 - Demand for passenger transport (passenger.km) grew almost three times faster than anticipated in the SNBC1 (1.1% per year versus 0.4% per year)⁸⁸. Demand is a systemic factor linked to several areas (transport, employment, industry, spatial planning, infrastructure) and which does not have dedicated policies aimed at moderating it.
 - A minor modal shift (0.1 percentage points per year) towards cars occurred, whereas the SNBC1 scenario included shifts (0.4 percentage points per year) to rail, active modes (cycling, walking, etc.) and public transport.
 - The occupancy rate of cars seems to have stabilised since 2015. The result was a change of -0.2% per year compared to the previous period, whereas the SNBC1 scenario was based on growth of +0.7% per year.
 - The decarbonisation of passenger vehicles in the SNBC1 is based on increases in volumes of agrofuels, electrification of the sector and a reduction in consumption per vehicle, but developments have been slower than expected:
 - ’ Challenges associated with the sustainability and global footprint (life cycle analysis, land use) of 1st generation biofuels have led to revisions of development policies

86. The analysis elements of this non-referenced section are derived from analyses conducted by the HCC based on data from the French energy balance sheet (2018), the RTE electricity balance sheet (2018), the transport accounts (2018), the key transport figures (2019), the Evolution factors for emissions of CO₂ linked to energy (2018), SNBC1, PPE1 and the draft SNBC2.

87. Demand, modal distribution, optimisation of uses (filling rate or tonnage per vehicle), energy efficiency of vehicles, carbon intensity of transport energy.

88. The % per year indicated for SNBC1 transport corresponds to the average annual growth rate between 2015 & 2030 in the SNBC1 scenario. The percentage points per year corresponding to the average annual variation in the SNBC1 scenario between 2015 and 2030.

89. Since 2006, approximately 50% of homologated emissions gains have not been achieved under actual conditions of use, as the homologation proce-

dures highlight gains that are difficult to achieve in actual use. The introduction of the WLTP cycle and protocol at the end of 2018 aimed to improve consistency between homologation and actual use (ICCT study "FROM LABORATORY TO ROAD" 01 2019 - page 45).

90. <https://ccfa.fr/brochure-analyse-statistiques/>

91. Includes LCV freight transport (as not differentiated in the SNBC1 scenario)

92. Le transport ferroviaire de marchandises dans l'UE: toujours pas sur la bonne voie – Cours des comptes Européennes - 2016

93. Regulation EU 510/2011

94. In the residential-service sector, changes in consumption by type of energy during 2015-2018 compared to 2011-2014 were as follows: -0.7% per year for natural gas, -3.7% for fuel oil, -3.4% for coal, +0.4% for electricity, +2.5% for thermal renewable/waste and +3.0% for heat sold. For natural gas, the average change of -0.7% per year results from a -1.7% decline per year in the residential sector and a +0.9% increase per year in the tertiary sector. Source: French energy audit 2018.

in their sectors, slowing down their development.

- ' The proportion of electric passenger cars (electric and rechargeable hybrid) reached 2.1% in 2018, a figure of 9% was targeted in the SNBC1 scenario.
- ' The average decrease in homologated CO₂ emission⁸⁹ from new passenger cars was 2.1% per year between 2015 and 2018, while an average decline of 6.2%/year was predicted in the SNBC1 scenario. After falling significantly (3.4% per year) between 2007 and 2015, homologated CO₂ emissions have increased slightly since 2016 due in particular to the fall in sales of diesel vehicles and the increase in market share of energy-intensive vehicles⁹⁰ (heavy and not aerodynamic, 4x4s, SUVs, Crossovers).
 - Domestic aviation (including for overseas departments) saw passenger traffic.km grow by 1.4% per year, higher than demand for passenger transport (1.1% per year), and without structural changes that could reduce emissions in this sub-sector having been identified.
- With regard to goods transport and light commercial vehicles, the trajectory has not changed, raising the question of whether public policies are compatible with the decarbonisation targets for this sub-sector.
 - Although demand for goods transport⁹¹ (tonne.km) remained stable, it exceeded the 2.3% moderation target expected in the SNBC1 scenario.
 - The modal share of road transport remained stable, whereas the SNBC1 scenario aimed at a transfer of 0.3 percentage points per year to other modes, mainly rail. The consistency of public policy on these modes with the decarbonisation targets must be questioned, particularly in view of decisions such as the absence of an environmental tax, or the fuel tax exemptions for certain activities. Since Germany and Switzerland have experienced growth in the proportion of rail use, feedback from them should be analysed.⁹²
 - The average tonnage of heavy goods vehicles was expected to increase by 0.9% per year on average in the SNBC1 scenario, but it remained virtually stable at 0.1% per year over the first budget period.
- Homologated consumption by light commercial vehicles fell by 2.8% per year, faster than targeted in the SNBC1 (1.7% per year). The implementation of average annual fuel consumption targets for light commercial vehicles⁹³ stimulated consumption gains for these vehicles.
- National and regional investments are currently not conducive to the implementation of the SNBC. The Infrastructure Guidance Board and the Government's role in corporate governance are two levers that could be used to push through the necessary structural changes.
 - Within the transport sector, the rail sector is characterised by the State governance of key players in the sector and the ambitions of the SNBC1 regarding modal transfers (passengers and freight).
 - ' As such, in addition to the public policies governing this sector, the absence of modal shifts towards rail raises questions about the alignment of State actions, given its governance role regarding the structural transformations required by the SNBC1.
 - The opening up of rail transport to competition has led to fundamental changes: it has changed the levers of influence over this sector. These types of transformations must be regulated in order to remove potential obstacles and blocking points and facilitate structural changes that are conducive to the transition to carbon neutrality.

In regards to buildings, structural changes have been too slow in relation to the trajectory required to achieve the objectives of the SNBC1. This is despite the fact that actions have focused on energy consumption for heating existing buildings, which is the largest source of emissions reduction in this sector. A significant proportion of the measures recommended in the SNBC1 to accelerate these structural changes have still not been implemented. These shortcomings are all the more problematic as they keep part of the population in a situation of energy insecurity.

- All buildings: energy consumption is stagnating.
 - Once corrected for climate variability, energy consumption in the residential/tertiary sector is nearly stable (-0.3% per year) while the SNBC1 anticipated a fall of 1.6% per year.⁹⁴
 - Specific electricity consumption by housing, which corresponds to the electricity used

II. IDENTIFY AND RESOLVE BLOCKING POINTS

for services that can only be provided using electricity,⁹⁵ increased slightly (+0.3% per year),⁹⁶ while the SNBC1 aimed to reduce these (-0.2% per year), in particular thanks to better information about good practices, the deployment of regulation systems and the use of price signalling.

- Regarding existing building stock: non-performing renovations and delays in the elimination of the most carbon-intensive heating systems.
 - The quality of energy renovations was largely insufficient to meet the target of 500,000 major renovations per year set by the SNBC1. Approximately 1.7 million individual housing units per year⁹⁷ underwent energy renovation between 2014 and 2016, but only 87,000 renovations per year improved them by 2 classes or more (or around 5%).⁹⁸ Similarly, while the trend has been upwards since 2013, only 33,000 renovated housing units (of which 98% were public) were BBC-labelled in 2017, the BBC label being the goal for the housing inventory to achieve by 2050, according to the SNBC1.⁹⁹
 - The elimination of domestic fuel oil and coal heating systems is increasing at half the speed forecast by the SNBC1 (4% per year versus 8% per year). Consumption associated with these carbon-based energies still represented 12.9% of the net energy consumption of the buildings sector in 2017 (coal = 0.1% and fuel oil = 12.8%).
 - The suitability of the policies targeting the most inefficient housing units must be questioned. Nearly half of the rented housing units in the private inventory are energy inefficient.¹⁰⁰ Greater attention should be paid to existing mechanisms and those required to renovate rental housing with a view to achieving the objective of eradicating extreme energy inefficiency by 2028.
- New housing: additional floor space and more gas heating systems.
 - The construction of new housing affects around 1% of the stock per year and mainly involves additional housing to meet needs.¹⁰¹ This results in an increase in total floor space requiring heating.
 - The proportion of new housing equipped with fossil gas heating has increased, mainly in the public sector,¹⁰² but this did not neutralise the

downward trend in fossil gas consumption in the residential sector between 2015 and 2018 (-1.7% per year).

- The Energy Performance Assessment (diagnostic de performance énergétique, DPE), which provides information about a building's energy performance, is not reliable enough to inform users or support the SNBC.
 - A single dwelling can be assigned to different energy classes depending on the surveyor establishing the DPE,¹⁰³ this calls into question the reliability of the information provided to users regarding their environmental and economic impacts, and therefore the ability of this system to reduce energy consumption and limit GHG emissions.
 - Training and control of assessments, the calculation methods used and the lack of performance guarantees must be re-evaluated to improve the reliability of DPEs.
 - The absence of a requirement of results and mechanisms for controlling the majority of thermal renovation operations (even when they receive financial support), means that the results are poor and reliable data is not available to correctly assess the progress regarding the targets set by the SNBC and the effectiveness of renovation aid.
 - Many measures recommended by the SNBC1 to enable the objectives to be achieved in this sector have not yet been implemented, in particular those providing support to developers, removing barriers to investment, structuring professional sectors, controlling specific electricity consumption, strengthening regulatory requirements on the performance of buildings, improving knowledge and supporting research and innovation.
- Regarding energy,** structural factors have not progressed quickly enough in relation to the objectives targeted by the first Multi-annual Energy Plan (Programmation Pluriannuelle de l'Énergie 1, PPE1).¹⁰⁴
- Regarding fossil fuel-based energy, after corrections for climate variability, only coal has seen consumption fall to levels close to those expected by the PPE1. Oil consumption halved compared to expectations, while gas consumption increased slightly.

95. Electricity consumed for heating, hot water production and cooking is not specific electricity, since other energies can also be used. However, washing machines, dishwashers, fridges, freezers, electronic and multimedia devices, etc. cannot operate without electricity.

96. Data from Ceren enables energy consumption in housing to be attributed to specific uses (heating, hot water, cooking and specific uses).

97. This represents around 5% of the housing stock in France, which included 36 million homes on 1 January 2018 (INSEE).

98. According to the latest Tremi survey (Ademe, 2017) on the renovation of individual houses between 2014 and 2016. The energy impact of the work described by the respondents is assessed using modelling.

99. Observatoire BBC, Le BBC par étapes, Etat des lieux des initiatives (2018).

100. 47.8% of rented private housing units have a DPE energy label of F or G ("Les ménages et la consommation d'énergie" – Théma – March 2017)

101. Sitadel data.
102. See the report entitled “Evaluation prospective des politiques de réduction de la demande d’énergie pour le chauffage résidentiel”, Cired, 2018 (Figure 13, Ceren Data).
103. “DPE-Stop à la loterie”, “UFC-Que Choisir”, September 2017 issue.
104. In order to implement the SNBC1, the PPE1 specifies the energy action priorities and sets 10-year targets that must be compatible with the SNBC1.
105. The first offshore wind projects selected under the calls for tenders launched between 2011 and 2013.
107. I4CE, Panorama des financements climat 2018 (landscape of climate finance in France).
108. In the comparison with the investment needs of SNBC1, the agriculture and industry sectors were excluded due to the trajectory not being overly explicit. Significant differences in scope are also to be noted for buildings, transport and energy, between the I4CE landscape of climate finance and the comparison with SNBC1.
- Primary coal consumption fell by 24.7% in 2018 compared to 2012. The target set by the PPE1 is -27.6% over this period.
- Primary oil consumption fell by 7.0% between 2012 and 2018, compared with an expected fall of 15.6%.
- Primary consumption of natural gas increased by 1.2% between 2012 and 2018, compared with an expected fall of 8.4%.
- The renewable energy deployment targets set out in the PPE1 were only partially achieved, according to the data for 2017. The most significant delays were seen in solar and offshore wind¹⁰⁵ for electricity, as well as biomass and thermal solar for renewable heat.
 - Regarding electricity generation, the targets for onshore wind, hydro-power, wood-energy and methanisation should be achieved. They will be missed for solar, offshore wind, marine energy and electric geothermal energy.
 - Regarding renewables-based heating/cooling, they should be exceeded for biogas and heat pumps. They are expected to be missed for biomass, thermal solar, low and medium-energy geothermal, as well as for the volume of renewables in heat/cold networks.
 - They are also likely to be missed for injections into the methane gas network from the anaerobic digestion of biomass.
 - These observations reflect delays in the overall transformation of the energy sector targeted by the SNBC1: an increase in electricity demand due to the electrification of transport, deployment of agrofuels and biogas and the development of heat and solar thermal networks, etc.
- For LULUCF, the recent reduction in the net carbon sink effect runs contrary to the SNBC1 scenario and raises questions about existing support structures and those required to support an increase in forest sinks and/or greater absorption of carbon by the soil.**
- Climate-related investment (public and private) increased during the period of the first carbon budget to EUR 41.4 billion in 2018 (an increase of 4% per year on average), but this remains lower than the estimated investment required to achieve the SNBC1 trajectory.¹⁰⁷**
- Climate-related investments are investments that contribute directly or indirectly to GHG reductions and the energy transition. They are calculated using publicly-available information.
 - In 2018, climate investment related to buildings (€20.7 billion), transport (€12.7 billion), energy transformation (€6.7 billion), industry (€1.0 billion) and agriculture (€0.4 billion).
 - Within the assessed scope,¹⁰⁸ the investment level deemed necessary to comply with the trajectory of the first carbon budget (2015-2018) was 1.5 times higher than the achieved investment level. This discrepancy is mainly due to the fact that investment levels in buildings, transport, production and energy networks are too low.
 - Investments with negative effects on the climate amounted to €75 billion in 2017.¹⁰⁹ They did not significantly fall (-0.2% per year) over the period of the first carbon budget compared to the 2011-2014 period. These investments maintain the use of fossil fuels in France. This mainly concerns the purchase of combustion-powered vehicles (98% of total investments with negative effects on the climate) in a context in which alternatives to combustion-powered cars are not yet sufficiently accessible or competitive.
 - Climate-adverse investments were almost twice as high as climate-friendly investments over this period.
109. The value of climate-adverse investments has been updated by I4CE. It is slightly higher than in the 2018 landscape of climate finance due to the inclusion of some additional items.

II.2 It is essential that the social and economic implications of achieving carbon neutrality are taken into account to ensure the success of the low-carbon transition. The transition will involve major investments and disinvestments which will have heterogeneous impacts on the different sectors of society. The distribution of costs must be taken into account to ensure that the low-carbon transition is both fair and perceived as being fair. Environmental implications (possible benefits and disadvantages associated with health, biodiversity, air, water and soil quality) must also be taken into account.

Low-carbon transition measures could contribute to worsening inequality and increasing energy poverty.

For example, without compensation mechanisms, the carbon tax will have a greater impact on households with the lowest incomes, on average, as they spend a larger share of their income on energy.¹¹⁰ Standards and regulations can also be regressive and have greater impacts on low income households.¹¹¹ Particular attention must be paid to the unfair nature of these instruments. Sufficiently strong support measures must be put in place to help households and to correct the regressive effects of low-carbon transition measures, while maintaining the goal of reducing GHG emissions.

Conversely, other low-carbon transition measures can help reduce inequalities and improve the quality of life of low-income households. Anah's "Habiter Mieux" programme and the "energy poverty" energy saving certificates target low-income households to support them in the energy transition. Ensuring that these measures work well for low-income households is essential to the success of the low-carbon transition.

For the same level of income, low-carbon transition measures can have highly heterogeneous effects for households. The carbon tax, for example, increases heating bills for households using fuel oil or coal more than any other type of energy source. An energy transition which is fair and acceptable for all will therefore have to take these differences into account. To this end, well-targeted supporting measures will be necessary, but the difficulties associated with implementing them should not be underestimated and it is important to ensure that the compensation measures adopted in this regard do not cancel out the incentivising effect of the tax on reducing emissions. While certain measures follow these lines,

such as conversion premiums, their performance and environmental effectiveness must be assessed in order to understand what works and how this can be strengthened.

Companies and sectors of the economy are also affected differently by the low-carbon transition. For them, this transition presents both risks that need to be taken into account, and numerous opportunities to be seized. These risks and opportunities can be classified into four categories:¹¹²

- **Regulatory.** Environmental regulation, in particular through taxation and standards, is a source of profound change in the business sector.
- **Technological.** Low-carbon technological innovations are likely to be a game changer in certain sectors such as energy production with the development of renewable technologies.
- **Market-based.** The climate emergency may push consumers to change their consumption preferences (energy supply, air travel, meat consumption, etc.), thereby boosting certain markets and reducing demand in others.
- **Reputational.** A pro-active company in the low-carbon transition may benefit from a reputational advantage that those lagging behind in this area will not. Conversely, companies involved in lobbying or misinformation campaigns may see customers and financiers walk away.

In this context of corporate uncertainty, the State has an important role to play. Support for companies in the low-carbon transition must in particular take into account the following two issues:

110. According to the CAE (note No. 50), an increase in the climate-energy contribution to the level expected before the freeze in 2022 (€[86.2]/tCO₂) coupled with the catch-up in the diesel tax, represent an outlay of nearly 1% of disposable income for the bottom 10% of poorest households, versus 0.3% for the richest 10%.

111. Levinson, A. (2019). Energy efficiency standards are more regressive than energy taxes: Theory and evidence. *Journal of the Association of Environmental and Resource Economists*, 6(S1), S7-S36.

112. Classification from the 2016 report of the Task Force on Climate-related Financial Disclosure (TCFD) - page 24.

- The management of unrecoverable assets (stranded assets). The low-carbon transition involves making certain assets obsolete before they are fully amortized (in particular fossil energy-reliant assets), leading to financial stress on companies that may have significant economic and social consequences. Public authorities have a role to play in assessing and preventing these harmful consequences.
- Encouraging low-carbon innovation. Companies wishing to initiate a low-carbon transition approach may be held back by the risks involved in the process. Public authorities have the legitimacy to take action to support corporate risk, insofar as risk-taking is likely to generate collective benefits.

During the transition, the financial sector will have a special role to play in the management of investment and disinvestment, which will be essential for achieving carbon neutrality. The financial sector will be the subject of future work conducted by the High Council on Climate.

The consequences of the transformation on employment and training must absolutely be taken into account. The goal is to provide professional retraining for employees in sectors that emit large quantities of GHGs, to move them to sectors that are compatible with carbon neutrality. The public authorities have an important role to play in this respect, particularly through their role in continuing training, the economic development of territories and the transformation of sectors.

Only a few indicators enable the monitoring of the social dimensions of the SNBC1 and its appropriation by society, and these have not been sufficiently evaluated or integrated. Strategic indicators such as support for citizens in their transitions, or the adaptation of initial and ongoing training, must be created. An assessment is needed to clarify the impacts of the SNBC pathway on social aspects and to plan the necessary supporting measures.

- Background indicators include the population exposed to energy vulnerability and household transport and energy budgets. Energy vulnerability is the only indicator focusing on the redistribution and social effects of the SNBC1.
- The inclusion of the recommendation “Appropriation of issues and solutions by citizens” in public policies was considered to

have been satisfactory by the government,¹¹³ but a non-negligible proportion of the French population says they do not believe in climate change.¹¹⁴ Indicators allowing to monitor levels of understanding of climate change post-school and education system, and among the population as a whole, are still lacking.

- Indicators for monitoring aspects such as “supporting citizens in their own low-carbon transitions” and “adapting the system of initial and ongoing training to support the transformation of activities and territories” still need to be constructed.

Environmental impacts must also be anticipated and monitored, and actions to address them should be planned where appropriate. In particular, emission reduction measures must take into account their possible co-benefits on climate change adaptive capacity as well as their impacts on biodiversity, air quality and, more generally, health, the exploitation of natural resources, etc. The first of these will be addressed in more detail when climate change adaptation issues are included in the work programme of the High Council on Climate.

113. See the document “Suivi de la stratégie nationale bas-carbone” of January 2018.

114. Regarding appropriation of the issues, an OpinionWay survey for Primes Energie conducted in January and February 2019 indicates that 23% of the French population do not believe in global warming, 26% of respondents to an ADEME survey do not believe that global warming is caused by human activities (ADEME, BOY (Daniel), RCB Conseil, 2018, Les représentations sociales de l'effet de serre et du changement climatique—19th vague, 9p).

Box 5: Aspects of the great debate likely to inform the ecological transition

The great debate provides elements to be considered in the development and implementation of the low-carbon transition, even though caution should be exercised in interpreting the results due to the limited representativeness of the participants.¹¹⁵

- **The results of the great debate show a strong awareness of climate change and a broad potential for involvement in the low-carbon transition.** Climate change comes first among the environmental concerns of online respondents. Furthermore, 62% of respondents consider that their daily lives are affected by climate change and 86% feel that they can personally contribute to protecting the environment.¹¹⁶ These results confirm French society's commitment to the low-carbon transition.
- **Major synergies in environmental concerns have arisen from the great debate that can be used to reduce GHG emissions.** In fact, online contributions show that the two most important environmental concerns after climate change are biodiversity and air pollution. Many of the transformations required for the low-carbon transition are likely to create co-benefits for biodiversity and to improve air quality (for example, soil and agricultural management, or the end of combustion-engined cars). These results call for the best use of these synergies in the measures taken to reduce greenhouse gas emissions.
- **Improvements to public transport are a particularly popular way of combating climate change.** This measure was the one most frequently proposed in the various contributions to the great debate.¹¹⁷ At the same time, 32% of online respondents say they do not have alternative mobility solutions to personal cars. The great debate therefore strengthens the legitimacy of public authorities in investing in sustainable transport infrastructure.
- **The great debate has revealed reservations about environmental taxation in the national territory.** A majority of respondents said they were opposed to incentive taxation that would encourage virtuous behaviours in the areas of the environment and health. Moreover, 55% of online respondents do not believe that taxes on diesel and petrol will help change user behaviour. This result is inconsistent with studies on the effects of fuel prices on consumption.¹¹⁸ Understanding and addressing this hiatus is therefore essential. Conversely, an environmental tax charged at borders is popular, since 53% of respondents wish to tax imported products that degrade the environment.
- **Financial aid for the ecological transition is required, but existing levels of aid are unknown.** 22% of respondents mentioned financial and fiscal support to encourage changes in behaviour. At the same time, 58% of respondents said they

were not aware of measures to help with insulation, heating or travel, which contribute to the ecological transition. Lastly, with regard to revenues from ecological taxation,

51% of respondents believe that they should finance aid to support the French in the transition, and 36% are in favour of investment for the climate.

Sources: OpinionWay pour le grand débat national, La transition écologique, April 2019; OpinionWay pour le grand débat national, La fiscalité et les dépenses publiques, April 2019; Roland Berger, Bluenove, Cognito, Analyse des contributions libres, April 2019

115. The inhabitants of rural municipalities are, for example, under-represented in terms of contributions to the ecological transition: 9% of online respondents versus a 23% share of the French population.

116. The actions most frequently envisaged for personal contributions to protecting the environment involve waste (47.8% of contributions), cleaner transport (37.5%), energy consumption (18.5%) and food and agriculture (13.2%).

117. This is the primary solution proposed to combat climate change, with 14.8% of contributions. It is also the primary solution proposed to reduce air pollution, with 24.7% of contributions. Moreover, 53% of people who claim to be dependent on their private cars request public transport as alternative mobility solution.

118. A study by INSEE showed that a 1% increase in fuel prices reduces fuel consumption by around 0.7% in the medium term (Calvet, L., & Marical, F., 2011). Consommation de carburant: effets des prix à court et à long terme par type de population. *Economie et statistique*, 446(1), 25-44.)

III. THE NEED FOR GREATER CONSISTENCY BETWEEN PUBLIC ACTIONS AND CLIMATE COMMITMENTS

This last section examines the current governance framework and the conditions under which it could support the major structural changes needed to achieve the national low-carbon strategy. We first look at the framework laws and how they incorporate the SNBC and its carbon budgets. We then look at the available instruments and their implementation, lastly we look at regional and local actions and their relationship to national actions.

III.1 Low-carbon targets are not taken into account in non-climate laws, yet they can have major impacts on GHG emissions in the same way as climate laws do.

Non-climate laws have major potential impacts on GHG emissions. To date, only the Multi-Annual Energy Plan must be compatible (in the legal sense) with the SNBC, but a significant number of structural laws are decisive for the evolution of emissions, even if they do not fall within the fields of energy or the environment. These laws will impact the evolution of GHG emissions in the different sectors, but their positive or negative impacts on compliance with carbon budgets are not generally taken into account.

- Legal texts such as the Finance Bill and texts relating to spatial planning have both direct and indirect impacts on all emissions-generating sectors (transport, construction, agriculture, food, land use, industry, etc.).
- Sectoral texts such as the Mobility Orientation Bill (LOM), the Law on Access to Housing and the Redesign of Urban Planning (ALUR), the Law on Changes in Housing, Spatial Planning and Digital Technology (ELAN), the Law on Agriculture and Food (EGALIM), the Law on Health and the Law on the new Regional Organisation of the Republic (NOTRE Law), all have direct effects on their sectors, but also indirect effects on other areas impacting GHG emissions.

- LOM¹¹⁹: The Mobility Orientation Bill (see analysis in Box 6) will have significant direct effects on emissions in the transport sector with respect to the SNBC and GHG reduction targets. It will also have indirect impacts on GHG emissions, in particular through infrastructure projects on land artificialisation, the locations of habitats and economic and commercial activities (due to improved traffic flows).
- ALUR¹²⁰: This text covers access to housing and urban planning and will directly affect spatial planning and urban sprawl, which will have effects on the building sector, on the artificialisation of land and on transport demand associated with development. Moreover, through measures affecting the sector's economy (market regulation), this law may have an influence on changes in mobility constraints on populations.
- ELAN¹²¹: This law covers the renovation of housing stocks and the implementation of new building standards. It will impact the construction sector as well as the industrial and energy sector due to changes in demand for construction materials. One can also mention the issues raised by the "Tertiary Decree" (application of Article 17), the

119. http://www.assemblee-nationale.fr/dyn/15/dossiers/loi_orientation_mobilites

120. Law 2014-366 of 24 March 2014 for access to housing and the redesign of town planning

121. Law no. 2018-1021 of 23 November 2018 on changes in housing, spatial planning and digital technology

122. Law no. 2018-938 of 30 October 2018 for the balance of trade relations in the agricultural and food sector and healthy, sustainable and accessible food for all

- content of which is currently being defined and will have major impacts on energy performance, standards and the emissions trajectories of tertiary buildings.
- EGALIM¹²²: This law, which brings changes to food and agricultural production methods, has impacts on emissions from this sector, as well as the LULUCF sector, due to the associated changes in land use and transport demand associated with food.
- Reforms carried out for other reasons (liberalisation of rail and air transport, administrative streamlining duty of vigilance on the part of companies, banking sector regulation, decentralisation and local budgets, forest management, etc.) may have positive or negative impacts on the low-carbon transition, but these are not generally taken into account.
 - Projects are subject to socio-economic assessments which must include their GHG impacts through the value of the action for the climate (shadow price of carbon, taken from the Quinet commission, see box 7). They provide a current net socio-economic value, which is a multi-criteria performance indicator that evaluates economic and societal performance. However, these assessments cannot provide information as to levels of compatibility with the SNBC's carbon budgets.
 - An *ex ante* and *ex post* system for analysing draft laws with potential impacts on GHG emission pathways, and assessing their compatibility with the SNBC and its carbon budgets, must be defined and implemented in order to:
 - Ensure that the proposed measures do not give rise to changes that would hamper the structural transformations required to implement the SNBC.
 - Assess the impacts in terms of GHG emissions of these measures (within the sector but also from a systemic point of view) and their compatibility with the carbon budgets.

Box 6: Analysis of the drafting of the mobility orientation bill

The analysis of the Mobility Orientation Bill (version issued by the Senate¹²³) and its preparation for our report is a good illustration of the links between the SNBC and non-climate public policies. The draft LOM covers a large part of the mobility and transport sector and addresses a variety of issues, such as access to mobility, governance in conjunction with the organising mobility authorities (AOM), infrastructure programming, new mobility, active mobility and car-pooling. The LOM does not cover GHG transport issues on an exhaustive basis (air, freight and rail in particular). Our analysis of the LOM leads us to make the following observations:

The SNBC is not currently a structuring element in drawing up such a bill, even though it has significant potential effects on greenhouse gas emissions in this sector (e.g. car-pooling, infrastructure, bicycles and other active mobility modes, electric charging infrastructure).

Quantitative assessments of the effects of the measures of the Bill on greenhouse gas emissions are not sufficient to assess their compatibility with the SNBC nor their ability to contribute to the achievement of its objectives and carbon budgets. This is true for:

- Measures directly related to GHG emissions, e.g. car -pooling (by reducing vehicle traffic).
- Measures with indirect impacts and systemic effects, such as changes in traffic, demand, the artificialisation of land, or access to new employment pools due to shortening of journey times.

In fact, the level of greenhouse gas reductions from these measures have had little impact on decisions related to the drafting of the bill.

Some of the actors involved in drawing up the law have limited knowledge of the SNBC and its scenarios or are not sufficiently aware of the SNBC's specific targets to frame their proposals.

In the current governance system, the processes associated with the SNBC and the low-carbon transition do not implement the SNBC or manage GHG issues on a scope such as that of the LOM.

The LOM Bill is broadening the powers and responsibilities of the regions through the establishment of mobility organising authorities (which must handle climate issues). However, no framework or guidelines have been defined to ensure consistency between actions at the national and regional levels, and actions at the inter-regional level.

Quantitative assessments of the LOM bill should be conducted in order to check the consistency of the measures introduced with the SNBC trajectory, both for emissions and for the structural transformations required to achieve carbon neutrality. If necessary, additional measures should be taken to strengthen the alignment with the SNBC. As a priority, the assessments should focus on the development of car-pooling and active mobility, the expected contributions by the mobility organising authorities to climate objectives, the impacts and/or the contributions of investment programmes to the SNBC and its carbon budgets, as well as measures impacting demand.

In order to ensure that public policies are consistent with the SNBC, GHG impacts must be taken into account through the inclusion of an explicit quantitative assessment in interim arbitration processes. This assessment should accompany the bill when it is examined in Parliament. Avenues to consider include:

- Making the SNBC's carbon budgets binding for all legislation, which will need to demonstrate their compatibility with these budgets.
- Formally breaking down the SNBC's sectoral carbon budgets into specific targets (including structural transformation targets) for all levers included in the SNBC, such as the Strategy for Developing Clean Mobility.¹²⁴ The breakdown must include the management of risks and uncertainties.
- The implementation of a system of transversal indicators that can be adapted to both the national and regional scales: outcome indicators allowing the tracking of GHG emissions based on underlying factors such as energy consumption, and the implementation of indicators to monitor the structural transformations of the various sectors and their socio-economic conditions. These must be drawn up in line with the targets set out in the programming texts.
- Defining the assessment process used to quantify the GHG-related gains or penalties of a law, while ensuring that these methodologies properly incorporate all indirect, induced and systemic effects.
- As some public policies are implemented by the regions, methodologies, indicators and processes need to be shared to ensure linkages, consistency and the ability to consolidate at the national level (see section III.3).

123. <http://www.senat.fr/leg/tas18-084.html>

124. Clean Mobility Development Strategy in the PPE (2016)

125. https://www.iddri.org/sites/default/files/import/publications/wp0713_ar_renovation-energetique-france-allemande.pdf

Assessment and feedback are key factors in driving the transition effectively. The definition of carbon budgets and their enforcement will require the implementation of appropriate governance systems based on: the strategy underpinned by the SNBC, broken down into a transformation plan with targets and action plans anchored in transversal processes, monitoring indicators and management dashboards, and assessments allowing in particular feedback to be provided.

- To facilitate appropriate monitoring and decision-making processes, quantified assessments of public policies must be strengthened and systematised at all stages:
 - During development, in order to arbitrate the proposed structural guidelines and measures, with appropriate consideration of the associated GHG issues.
 - During implementation, to ensure that transformation takes place quickly and effectively.
 - Post-implementation, in order to upgrade public policies in a manner consistent with the objectives of the SNBC using actual feedback.
- Examples which illustrate the need for assessments and feedback include:
 - The transition from the SNBC1 to the draft SNBC2: there is no mention of feedback on the first budget, but significant changes are proposed for the next budgets and the associated scenario. Feedback would provide an understanding of the structural causes of delays and the strategies required to make up for them. Changes to monitoring indicators are also proposed, but without the prior critical analysis needed to put them into perspective with the SNBC1.
 - The LOM illustrates the process of drafting a text with measures (car-pooling, charging infrastructure, access to mobility, etc.) which will have significant impacts on GHG emissions (see Box 6). The issues can hardly be taken into account during arbitration without a quantified assessment in place. Consistency with SNBC budgets is therefore not guaranteed.
 - The Energy Transition Tax Credit system (CITE) is a scheme which supports the thermal renovation of housing. It has involved the use of substantial resources but its effectiveness is in doubt. An evaluation and analysis of the results would enable the system to be improved and made more effective, including through the integration of feedback from other countries, that of Germany for example, which has made aid conditional on performance levels being achieved¹²⁵, as well as experiments conducted by certain French regions and local authorities.

III.2 The entire system for combating climate change is currently too weak. It has not enabled the SNBC1 targets to be met and will probably not enable the draft SNBC2 targets to be achieved in its current state. The overall package of policies and measures, of which the carbon tax is a major element, must be reassessed, supplemented and strengthened.

The current climate policy framework in France is comprised of a number of varied instruments:

- The European market for exchangeable GHG emission quotas¹²⁶, to which major companies in the most energy-intensive sectors are subject.
- Environmental taxes, primarily including the climate-energy contribution (CCE), known as the “carbon tax”.
- Standards and regulations.
- Subsidies and public aid for the low-carbon transition.
- Government investment spending (especially on infrastructure and buildings).
- Information instruments (labels for example).

The economic, social and political success of the fight against climate change depends on the correct architecture of this framework, on each instrument being adjusted to the correct level of incentive or restriction, as well as on their evolution over time and their compatibility with objectives of social justice and transparency. Without this mechanism, GHG emissions have no associated cost (whereas there is a real cost for society and for ecosystems suffering damage related to climate change), which distorts the economic decisions of public and private agents. The emissions trading market, the carbon tax, standards and regulations, and subsidies set a price (or prices) for carbon. The price is explicit for the first two types of instruments, and implicit with the others. It strongly encourages agents to make choices which are aligned with the low-carbon transition,¹²⁷ in other words, to reduce their emissions and invest in low-emissions activities. The entire current climate policy framework must clearly be strengthened to comply with the carbon budgets.

The carbon tax is an effective instrument for reducing GHG emissions, but its base, its terms and the accompanying measures need to be reviewed in depth (see Box 8).

The fact that it has been rejected by a section of society could be explained by the rise in the price of oil and the remedial tax on diesel,¹²⁸ and also structurally due to its impact on household purchasing power, its regressive nature, the perception of injustice and opacity in its use, and scepticism about its environmental effectiveness in a context where many citizens do not see any specific alternatives enabling them to reduce their emissions. The government halted the increase in the carbon tax over time in December 2018¹²⁹ following the Yellow Vest protests. A resumption of the carbon tax increase should be preceded by the following actions¹³⁰:

- Correct the regressive effects of this tax and provide assistance to the most vulnerable households affected by it,¹³¹ for example using conversion premiums based on income, or the transfer of revenues generated by this tax to the lowest deciles.
- Establish full transparency on the use of tax revenues after consultation on the ways it should be used, for example through the Citizens’ Convention.
- Address exemptions from climate/energy contributions in order to improve their efficacy and fairness.¹³² Exemptions that could be reviewed at the national level affect national aviation and shipping, road freight transport, public passenger transport by road, taxis, non-road diesel, the agricultural professions and energy-intensive industrial facilities.

The other instruments mentioned above must be mobilised and strengthened in parallel. This involves targeting GHG emissions not covered by the carbon tax and improving the effectiveness of the carbon tax through complementary systems.

126. The Emission Trading Scheme (ETS), or the European Union Emission Trading Scheme – EU ETS.

127. It has been shown that a 1% increase in pump prices reduces fuel consumption by around 0.7% in the medium term (source: Calvet, L., & Marical, F. (2011). Consommation de carburant: effets des prix à court et à long terme par type de population. *Economie et statistique*, 446(1), 25-44.)

128. The government started bringing TICPE rates for diesel and petrol closer together in 2016 by increasing the rate applicable to diesel by €1c/l and by lowering the rate for petrol by €1c/l each year.

129. The Finance Bill 2019

130 Several organisations have looked at the conditions for a resumption of carbon tax increase, including CAE, I4CE and Terra Nova, OFCE and Iddri.

131. According to the CAE (note No. 50), an increase in the climate-energy contribution to the level expected before the freeze in 2022 (€86.2/tCO₂) coupled with the catch-up in diesel tax, represent an outlay of nearly 1%

of disposable income for the bottom 10% of poorest households, versus 0.3% for the richest 10%. Moreover, for the poorest decile of households, 10% lose more than €220 in purchasing power per year and per consumption unit.

132. GHG emissions affected by carbon tax exemptions account for more than 10% of national GHG emissions (excluding companies participating in the European carbon market); refunds related to TICPE exemptions (which includes the CCE) are expected to amount to €6.9 billion in 2018 (Source: I4CE – La contribution Climat Energie en France: fonctionnement, revenus et exonérations – October 2018).

133. Source: I4CE – Panorama des financements climat – 2018 edition

134. OECD, Fossil Fuel Subsidies France country memo (April 2019)

In particular, public authorities must invest in green infrastructure enabling households and companies to reduce their dependence on practices that emit large amounts of GHG. By developing alternatives, these investments reinforce the incentivising effect of the carbon tax. This is the case, for example, with low-carbon transport infrastructure (local railways, public transport, cycle paths, charging station networks). To assess the appropriateness of low-carbon investment (and all public investment in general), the State and local authorities must use the value for climate action provided by the Quinet Commission (see Box 7). Public investment in research into low-carbon technologies also has an important role to play.

Moreover, all public investments must be assessed in terms of their consistency with the SNBC and the structural changes that it implies. In 2017, climate-adverse fossil-fuel investments amounted to around €75 billion, almost twice the level of climate investments.¹³³ Public authorities contribute to this level both by directly purchasing fossil fuel-based equipment (mainly combustion-engine vehicles) and by investing in infrastructure associated with significant GHG emissions, such as motorways, airports and gas infrastructure.

Fossil fuel subsidies must also be abolished. As a member of the G7, France has committed to abolishing all fossil fuel subsidies by 2025 at the latest. This commitment is consistent with the low-carbon transition. However, the trajectory of fossil fuel subsidies in France is worrying. The OECD estimates indeed that these French subsidies have more than doubled in ten years, from less than €3 billion in 2007 to €6 billion in 2017.¹³⁴ This dynamic must be urgently reversed if the 2025 target is to be met. In the case of France, these subsidies mainly take the form of tax exemptions such reimbursement of fuel taxes for road transport. The goal is therefore to eliminate tax exemptions while supporting the companies and households affected by these cuts.

Box 7: The value for climate action¹³⁵

- **What is the value for climate action?**

The value for climate action is a reference figure, in Euros per tonne of CO₂, that local authorities use to assess and select actions that are useful in the fight against climate change. Aligning with the goal of carbon neutrality by 2050 will involve defining a multi-year trajectory in which the shadow price of carbon increases over time between now and 2050. The value of climate action is therefore: €87/tCO₂ in 2020, €250/tCO₂ in 2030, €500/tCO₂ in 2040 and €775/tCO₂ by 2050.

- **How is this calculated?**

It is calculated using technical/economic models simulating the timeline of available and foreseeable

technologies to be implemented and the investment required to achieve carbon neutrality.

- **How should it be used?**

This value helps governments and the various stakeholders to define the most relevant sectoral actions and investments required to achieve the climate target – and to launch them at the right time. Specifically, a value of €250/tCO₂ by 2030 means that any action that reduces emissions and has a cost of less than €250/tCO₂ makes sense for the community and should therefore be implemented. This also means that the profitability of a public investment project (e.g. public transport) must be credited with €250 for each tonne of CO₂ that it prevents.

Three sectors are not affected by the carbon tax: the energy-intensive sector (industry and energy processing), which is subject to the European CO₂ quota system, agriculture and carbon sinks.¹³⁶

Industry, energy transformation and agriculture accounted for 47% of national GHG emissions in 2017. The current system covering these three sectors is largely inadequate, particularly in view of the value of climate action. It must therefore be supplemented and strengthened. For example:

- Regarding industry and energy transformation, one possible measure would be to set a rising price floor for CO₂ emissions quotas.
- Regarding agriculture, the level and control of the environmental requirements linked to the Common Agricultural Policy (CAP) can be strengthened in order to induce more substantial changes in agricultural practices: biological nitrogen fixing using legumes (intermediate crops, protein crops, feed plants) as a substitute for mineral nitrogen fertilisers to reduce N₂O emissions, investment in the management of livestock effluent, changes in the use of animal feed, animal genetics and herd

management to reduce enteric methane emissions from ruminants. Action on food demand can be achieved by using the synergies between nutritional recommendations made by health agencies and low-carbon diets.¹³⁷

- Regarding carbon sinks, the following actions will be needed: mobilise agricultural land sinks (a target of 4 per 1000, in reference to the target of a 0.4% annual increase in carbon storage in the soil¹³⁸); conduct a consultation to resolve the current contradictions between the economic objectives of the Forests/Woods Plan and the increases in forest carbon sinks needed to achieve the goal of carbon neutrality by 2050 while adapting forests to climate change and simplifying administrative processes associated with the preservation of carbon sinks and forest management; study the compatibility between the targets for the storage of carbon in the organic matter of agricultural soils and the use of biomass for biogas; and develop a credible plan to stop the net artificialisation of agricultural land, the conversion of grasslands and the destruction of wetlands, which all constitute significant carbon sinks.¹³⁹

135. The value of climate action derives from the report drawn up by the Commission chaired by Alain Quinet and published in February 2019.

136. A carbon tax for carbon sinks would involve paying the owner of the sink for the amount of GHGs captured. It would be a negative carbon tax.

137. The report: 'Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems'. The Lancet (2019) sets out the principles of a food system that reconciles

Instruments targeting GHGs other than CO₂ must also be strengthened. We have already mentioned agriculture and its methane and nitrous oxide emissions. Particular attention must also be paid to fluorinated gases. Although they represented only 4% of national GHG emissions in 2015, their levels have more than tripled since 1990. The implementation of the regulation on fluorinated gases is currently defective.¹⁴⁰ Two urgent actions must be led:

- Ensure that reporting obligations in the fluorinated gas sector are met by stepping up controls and sanctions for non-reporting.
- Extend the perimeter of fluorinated gases covered by the fluorinated gas observatory in order to improve monitoring.

Good governance of the various instruments and levers available to reduce GHG emissions is essential, particularly regarding the design and execution of policy assessments. For example, Energy Savings Certificates (CEE), introduced in 2005, have ramped up over the last fifteen years and the government now sees them as one of the main instruments in the policy for controlling energy demand in France. However, a rigorous assessment of their actual impacts on reducing energy demand has not yet been conducted. Better knowledge of the effects of the various measures is essential to improve management of the energy transition, to reduce costs, and to achieve results in line with the national strategy.

individual health
with respect for the
environment.

138. The international
4 per 1000 initiative
'Les sols pour la sécurité
alimentaire et le climat'
was developed by
France after COP21 in
2015.

139. Peatlands cover
only 3% of the planet's
surface but store more
carbon than all the
world's forest (Source:
Joosten, Hans, et al.
"The role of peatlands
in climate regulation."
Peatland restoration
and ecosystem services:
Science, policy and
practice (2016): 66.)

140. The annual report
published in December
2018 (data for 2017)
by the fluorinated gas
observatory shows
that a large number of
players failed to comply
with their declaration
obligations.

Box 8: Recommendation for the follow up of the carbon tax

The available evidence shows that the carbon tax is a powerful economic tool for achieving the goal of carbon neutrality at the lowest cost to society as a whole. The current context in France has led to a freeze in the increase in the carbon tax in its current form, as the way it is currently designed means it is neither fair nor fully effective. Experience from other countries suggests that support from society is essential for the tax to be maintained and increased over the long term.¹⁴¹

It is therefore important for the government to develop a strategy for the implementation, trajectory and timetable of carbon taxation along the following lines: (1) an explanation of the incentivisation and non-budgetary purposes of the carbon tax (2) a review of the conditions for transparency on the use of tax revenues; (3) a review of the activities targeted by the tax,

so that it applies to as many actors as possible; (4) changes in the use of revenues and, in particular, in redistribution to the lowest-income households; and (5) investments in infrastructure that reduce dependence on high-emissions practices.

Increases in taxes on fossil fuels are major political challenges that require broad consensus. They form part of a longer-term approach in which lessons from past experience must be learnt. It is therefore important to find a consensus across all of society to develop and advance this aspect. The entire system for responding to climate change must be strengthened, particularly through the use of complementary tools, to compensate for the vacuum created by the freezing of the carbon tax, to target emissions not covered by the tax, and to increase the overall effectiveness of the effort to reduce greenhouse gas emissions.

III.3 The regional climate-air-energy policy plans could be strong levers for linking the national low-carbon strategy at regional and local scales. Energy and climate policy plans at these levels are key elements for organising the contribution of regional actors to France’s climate, air quality and sustainable development objectives. They also allow public engagement and enable widespread ownership of these topics.

The decentralised development of regional policy schemes (SRADDET, SRCAE, PCAET)¹⁴² has enabled the emergence and organisation of innovative initiatives within the context of these regulatory exercises. To this we can add voluntary actions for local authorities seeking to address issues specific to their region and to make an impact in this area.

Most regional public policies rely on regional observatories, whose work should be praised and their development encouraged to enable the production of regular, comparable and addable data.

- These observatories produce a variety of publications including thematic studies (on production potential, social perceptions, etc.),

141. See I4CE’s 2019 study titled “Fiscalité climat: la France peut apprendre des expériences étrangères pour avancer”.

142. A “Schéma Régional d’Aménagement, de Développement Durable et d’Egalité des Territoires” (SRADDET) is a regional planning document that specifies the strategies, objectives and rules fixed by the regions in several areas of regional planning. It includes the

analyses of local projects, guides for elected officials. They also conduct forward-looking work.

- Their experience, tasks and main areas of operation vary. They are increasingly called on by local authorities.¹⁴³ The levels of detail of the data provided by these observatories varies. In Auvergne-Rhône-Alpes (AURA), the Observatoire de l'énergie et des GES (OREGES) produces data on emissions of CO₂, CH₄ and N₂O from municipalities to the region as a whole, which are available between two and four years after the year they relate to. Other local authorities do not have advanced data-collection and synthesis capabilities. Some do not have observatories, others produce data on smaller spectra, sometimes several years late or on an irregular basis.
- Some observatories, such as AURA's, are engaged in a nascent process of harmonisation and sharing good practice at the regional and national levels, particularly in partnership with the ADEME, the CITEPA and the Réseau des Agences Régionales de l'Énergie et de l'environnement (RARE).¹⁴⁴

The resources available to local authorities to develop and implement their policy plans are limited, and regional inequalities exist in terms of financial, human, expertise and economic infrastructure resources. Constraints can arise from budgets, and also from decision priorities within local authorities. This has implications for the development, monitoring and evaluation of the plans. Similarly, this limits the ability of local authorities to coordinate ambitions and actions at the national, regional and local levels. As with national public policies, communities would benefit from clarifying their priorities and improving actions around climate, energy and environmental issues. The State can encourage and set an example to develop regional organisations and policies in this regard, although local ownership is necessary.

- The current mode of operation does not allow the regions to incorporate changes in the SNBC into their updated regional policy plans: regional schemes must both take into account the SNBC2 and be adopted by July 2019, before the draft SNBC2 is itself adopted. The timetable of deadlines for national, regional and

local strategies makes it difficult for the inter-municipalities and regions to take the SNBC2 into account.

- Heterogeneities exist in terms of the scope of emissions (all sectors, energy, climate-corrected, types of GHGs taken into account), the monitoring of consumption and the estimation of resources (types of energy consumed and metering methods, e.g. heat pumps, wood/logs), the identification of trends (reductions in regional emissions and their determinants) or the monitoring of renovation work (different levels of ambition, multiple definitions). These heterogeneities are the result of various structural choices, as well as differences in the levels and types of expertise possessed by the regions and local authorities.
- The current regulations do not provide for the harmonisation of regional targets. Even though ad hoc initiatives have been launched to enable data harmonisation, they have not yet been capitalised on. Overall comparison, assessment and monitoring are therefore very difficult – which was already the case for the previous generation of climate-energy policy plans.

Local authorities differ in terms of the physical resources available to them, their emissions profiles and their action options. Specific regional aspects and potentials for reducing GHG emissions also differ widely. It is important to define criteria, based on the capacities and characteristics of the regions (core activities, resources, etc.), for the required effort to be distributed fairly, similarly to international work on the distribution of ambition/current historic responsibility and of capacities.

- In-depth studies regarding the overseas communities and Corsica are required, which is also true for cross-border communities (natural resources, economic flows, demographics, mobility) and rural areas (particularly affected by the challenges of carbon storage in natural environments).
- Land use is critical to achieving carbon neutrality, and local authorities hold keys levers for action in this area. It will require coordination at all levels of public action as well as various types

“Schémas Régionaux Climat Air Énergie” (SRCAE). A Plan Climat-Air-Energie Territorial (PCAET) is a mandatory sustainable development procedure for inter-municipal public cooperation establishments.

143. CEREMA (2017), SRCAE national report – DGEC report, 115 p.

144. The RARE includes agencies and structures that conduct missions in the general interest in the field of sustainable development, at the regional level.

Box 9: The example of Réunion

Réunion presents challenges related to its isolated location, its steep terrain and its tropical climate, which are all very different from the situation found in mainland France:

- It is regularly affected by extreme climate events and has a highly carbon-intensive primary energy mix: 87% fossil fuel-based energy, including 25% coal and 60% oil.¹⁴⁵ Transport accounts for 49% of the island's emissions¹⁴⁶ (29% in mainland France¹⁴⁷) and 30% of transport energy consumption is in the aviation sector¹⁴⁸ (14% in mainland France¹⁴⁹).

- There are strong constraints on land usage and the preservation of ecosystems, considering that 40% of the island's area is classified as a UNESCO world heritage site.

The development of hydro-power, wind, photovoltaic and biomass plants must therefore reconcile several challenges, all the more so as demographic growth is adding new pressures on resources, the population having doubled between 1967 and 2007, when it exceeded 800,000 inhabitants.

of intervention (spatial planning, infrastructure, transport, etc.). Nevertheless, the condition of these carbon sink remains an under-addressed topic and data and analysis capabilities are still limited regarding these subjects. To be able to achieve goals such as carbon neutrality and “net zero artificialisation”¹⁵⁰, these gaps must be filled.

- While a relatively precise assessment is made in some regions (AURA for example), estimating stocks, flows and potentials, it remains partial. Based on CORINE Land Cover European satellite data, the most recent observations of which date back to 2011, forests and permanent grasslands are taken into account, but not other surfaces, soil conditions, species diversity or climatic conditions.
- Accounting for carbon sequestration is a recent development in some regions (e.g. 2016 in Normandy). These advances are positive, but the data must also be used within the SRADDET framework. Regarding these, the definition of specific objectives, a timetable, a detailed action plan and allocated resources, will all be essential to better manage carbon sinks and land use changes.
- In other regions, data is not available and this aspect has not yet been quantified.

The coordination, harmonisation and comparison of the various plans could be encouraged over time to

ensure that actions carried out at all levels are coherent. The central government (supported by its decentralised departments) could facilitate said coherence by setting up the conditions of an inter-regional and national dialogue – a common reference framework for structuring climate plans and a platform for discussion, for example. This would enable regional policy plans to contribute fully to France's climate objectives.

- Existing cooperation at the local level could be enhanced and strengthened as it improves the capacity for analysis and action at this level: regional bodies created to develop and monitor environmental policies, such as the Regional Conference on the Energy Transition in PACA, public interest groups, ad hoc institutions bringing together stakeholders within regions (universities, companies, local authorities, agencies, etc.).¹⁵¹
- Structures already exist to trigger sub-regional dialogue, such as the Territorial Conferences for Public Action (CTAP), consultative bodies chaired by the President of the Regional Council.
 - These conferences provide feedback and can support the coordination between the regions and the sub-regional territories as regards the development, implementation and monitoring of climate policy plans. These conferences are a tool that local authorities are now beginning to take ownership of.

145. Energy Observatory meeting (2018), Energy Audit, Île de la Réunion 2017. 2018 Edition

146. Ibid.

147. CGDD, Key climate figures. France, Europe and the World. 2019 edition.

148. Energy Observatory Meeting, Energy Audit, Île de la Réunion 2017. 2018 edition.

149. CGDD (2019), Bilan énergétique de la France pour 2017.

150. The Biodiversity Plan presented by the Government on 4 July 2018 sets a target of “zero net artificialisation”; Ministry of Ecological and Inclusive Transition, Biodiversity Plan (2018) p.6

Local communities emerge as key players in the energy transition, and drawing on a growing expertise. Energy/climate planning systems form the basis for the integration of the public policies they manage, within which consistency with the SNBC could be specified and the goals and action plans made explicit. They have an important role to play in achieving the goal of carbon neutrality (land use planning, transport, for example). These dynamics are promising, but their realisation requires removing a number of obstacles (in particular data, resources, the consistency of public policies).

151. Marvin et al. (2018), Trencher et al. (2014), Keeler et al. (2018), Wolfram et al. (2019), Déremont-Dorville (2018).

Carbon content: The relationship between greenhouse gas emissions and the amount of energy consumed.

Correction for weather variability: A coefficient used to estimate the energy consumption for heating if temperatures had been normal in relation to a reference period. The weather correction corrects energy consumption to allow comparisons over time with constant winter weather. Summer weather is not corrected for in terms of demand for cooling.

Domestic / national / regional emissions: Emissions produced in France.

Carbon footprint: The sum of emissions produced in France and emissions associated with imported and consumed products, minus the emissions associated with exported products.

Energy efficiency: The ratio between the result of an activity and the energy required for this activity. Energy efficiency applies to all technologies and practices that reduce energy consumption while providing the same end service.

Greenhouse gases: All gases that cause the temperature on the planet's surface to rise.

Carbon Neutrality: The achievement of a balance between anthropogenic greenhouse gas emissions and anthropogenic absorption of these same gases over a given period or from a certain date. This corresponds to neutrality for all gases, or the achievement of net zero emissions. Carbon neutrality covers all greenhouse gases and is therefore different from CO₂ neutrality, which only covers carbon dioxide.

Carbon sinks: Reservoirs that absorb atmospheric carbon (CO₂).

Energy sobriety: Energy sobriety involves reducing energy consumption through changes in behaviours, lifestyles and collective organisation.

Carbon tax: the carbon tax, also called the Climate-Energy Contribution (CCE), was introduced in 2014 in France. It is also known as the carbon component because it is not a specific tax, but a component of domestic consumption taxes (TIC) on fossil fuels, proportional to their carbon content. Starting at €7/t of CO₂, it was reassessed each year to reach €44.60 in 2018. It was not reassessed in 2019 following to the Yellow Vest protests. Certain economic sectors benefit from total or partial exemptions.

Low-carbon transition: A transition to a “decarbonised” economy and society in all sectors of activity.

TABLE OF CONTENTS

The position of the High Council on Climate within the policy landscape	7
Foreword	9
The members of the High Council on Climate	10
Acknowledgements	13
Recommendations	14
I. In spite of a structured institutional framework, set targets have not been met	16
II. Identify and resolve blocking points	38
III. The need for greater consistency between public actions and climate commitments	46
Central Concepts	58
Official texts relating to the High Council on Climate	60

Décrets, arrêtés, circulaires

TEXTES GÉNÉRAUX

MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET SOLIDAIRE

Décret n° 2019-439 du 14 mai 2019 relatif au Haut Conseil pour le climat

NOR : TRER1911732D

Publics concernés : tous publics.

Objet : installation, modalités d'organisation et de fonctionnement du Haut Conseil pour le climat.

Entrée en vigueur : le texte entre en vigueur le lendemain de sa publication.

Notice : le décret installe le Haut Conseil pour le climat. Il précise la composition du haut conseil et les modalités de son fonctionnement.

Références : le décret ainsi que les dispositions du code de l'environnement qu'il modifie peuvent être consultés, dans leur rédaction résultant de cette modification, sur le site Légifrance (<https://www.legifrance.gouv.fr>).

Le Premier ministre,

Sur le rapport du ministre d'Etat, ministre de la transition écologique et solidaire,

Vu le code de l'environnement, notamment ses articles L. 222-1 A à L. 222-1 E ;

Vu le code des relations entre le public et l'administration, notamment son article R. 133-1 ;

Vu le décret n° 2012-1246 du 7 novembre 2012 relatif à la gestion budgétaire et comptable publique ;

Vu le décret n° 2017-392 du 24 mars 2017 modifiant le décret n° 2013-333 du 22 avril 2013 portant création du Commissariat général à la stratégie et à la prospective,

Décète :

Art. 1^{er}. – Au chapitre II du titre III du livre I^{er} de la partie réglementaire du code de l'environnement est inséré un chapitre II *bis* ainsi rédigé :

« CHAPITRE II BIS

« HAUT CONSEIL POUR LE CLIMAT

« *Art. D. 132-1.* – Le Haut Conseil pour le climat, organisme indépendant, est placé auprès du Premier ministre.

« Outre son président, le Haut Conseil pour le climat comprend au plus douze membres choisis en raison de leur expertise scientifique, technique et économique dans le domaine des sciences du climat et de la réduction des émissions de gaz à effet de serre.

« Les membres sont nommés par décret.

« La durée du mandat est de cinq ans, renouvelable une fois. Lorsqu'un membre cesse ses fonctions, il est nommé un nouveau membre pour la durée du mandat restant à accomplir, après avis du président du Haut Conseil pour le climat.

« Dans l'exercice de leurs missions au titre du Haut Conseil pour le climat, les membres du Haut Conseil pour le climat ne peuvent solliciter ou recevoir aucune instruction du Gouvernement ou de toute autre personne publique ou privée.

« *Art. D. 132-2.* – Le Haut Conseil pour le climat rend chaque année un rapport qui porte notamment sur :

« 1° Le respect de la trajectoire de baisse des émissions de gaz à effet de serre, eu égard aux budgets carbone définis en application de l'article L. 222-1 A du code de l'environnement ;

« 2° La mise en œuvre et l'efficacité des politiques et mesures décidées par l'Etat et les collectivités locales pour réduire les émissions de gaz à effet de serre, développer les puits de carbone, réduire l'empreinte carbone et développer l'adaptation au changement climatique, y compris les dispositions budgétaires et fiscales.

« 3° L'impact socio-économique et environnemental, y compris pour la biodiversité, de ces différentes politiques publiques.

« Dans ce rapport, le haut conseil met en perspective les engagements et les actions de la France par rapport à ceux des autres pays. Il émet des recommandations et propositions pour améliorer l'action de la France.

« Ce rapport est remis au Premier ministre et transmis au Parlement et au Conseil économique, social et environnemental.

« Les suites données par le Gouvernement à ce rapport sont présentées au Parlement et au Conseil économique, social et environnemental dans un délai de six mois à compter de sa remise.

« *Art. D. 132-3.* – Le Haut Conseil pour le climat rend un avis sur la stratégie nationale bas-carbone et les budgets carbone ainsi que sur le rapport mentionné au II de l'article L. 222-1 D du code de l'environnement. Il évalue la cohérence de la stratégie bas-carbone vis-à-vis des politiques nationales et des engagements européens et internationaux de la France, en particulier de l'Accord de Paris et de l'atteinte de la neutralité carbone en 2050, tout en prenant en compte les impacts sociaux-économiques de la transition pour les ménages et les entreprises, les enjeux de souveraineté et les impacts environnementaux.

« *Art. D. 132-4.* – Le Haut Conseil pour le climat peut être saisi par le Gouvernement, le président de l'Assemblée nationale, le président du Sénat ou à sa propre initiative, pour rendre un rapport sur des questions sectorielles, relatives au financement des mesures de mise en œuvre de la stratégie nationale bas-carbone ou à la mise en œuvre territoriale des politiques climatiques.

« *Art. D. 132-5.* – Le Haut Conseil pour le climat établit et rend public son règlement intérieur, qui précise notamment ses règles de fonctionnement et les conditions dans lesquelles son président peut déléguer ses attributions.

« *Art. D. 132-6.* – Tous les avis et rapports du Haut Conseil pour le climat sont rendus publics sur son site internet.

« *Art. D. 132-7.* – Le Haut Conseil pour le climat est un organisme indépendant, hébergé par France Stratégie qui met à sa disposition un appui administratif, informatique et de communication.

« Le Haut Conseil pour le climat dispose d'un budget propre. Son président décide de l'emploi des crédits nécessaires à l'accomplissement de ses missions.

« Le haut conseil dispose d'un secrétariat qui assure, sous l'autorité de son président, le suivi et l'organisation de ses travaux.

« Pour la réalisation de ses missions, le haut conseil peut solliciter l'appui des services de l'administration compétents en matière de climat, avec leur accord. Il peut également passer commande de travaux ou études à des experts ou des organismes extérieurs à l'administration.

« Les membres du haut conseil peuvent percevoir une indemnité pour leur engagement dont le montant est arrêté par le Premier ministre.

« Les frais de déplacement et de séjour des personnes associées aux travaux du haut conseil sont remboursés dans les conditions prévues par la réglementation applicable aux personnels civils de l'Etat. »

Art. 2. – Le décret n° 2015-1222 du 2 octobre 2015 relatif au comité d'experts pour la transition énergétique est abrogé.

Art. 3. – Le ministre d'Etat, ministre de la transition écologique et solidaire, le ministre de l'économie et des finances, la ministre de l'enseignement supérieur, de la recherche et de l'innovation et le ministre de l'agriculture et de l'alimentation sont chargés, chacun en ce qui le concerne, de l'exécution du présent décret, qui sera publié au *Journal officiel* de la République française.

Fait le 14 mai 2019.

EDOUARD PHILIPPE

Par le Premier ministre :

*Le ministre d'Etat,
ministre de la transition écologique
et solidaire,*
FRANÇOIS DE RUGY

*Le ministre de l'économie
et des finances,*
BRUNO LE MAIRE

*La ministre de l'enseignement supérieur,
de la recherche et de l'innovation,*
FRÉDÉRIQUE VIDAL

*Le ministre de l'agriculture
et de l'alimentation,*
DIDIER GUILLAUME

Paris, le **05 AVR. 2019**

Madame la Présidente,

La transition écologique nécessite une transformation en profondeur de notre société, de notre économie, de nos comportements. Dans un contexte d'urgence à agir, rappelé par le dernier rapport du GIEC sur un réchauffement global d'1,5°C, chacun doit se mobiliser. Pourtant les émissions nationales de gaz à effet de serre ont stagné sur la période 2015-2017.

C'est dans ce contexte que le Gouvernement a, quelques semaines après son entrée en fonction, fixé un cap avec le Plan Climat, celui d'atteindre la neutralité carbone à l'horizon 2050. Cet objectif est non seulement indispensable pour contenir la hausse des températures mondiales, il est aussi réaliste et souhaitable, comme le montre l'exercice très riche de révision de notre stratégie nationale bas-carbone en cohérence avec cet objectif de long terme. La transition offre des opportunités importantes en termes de développement économique, d'emploi, de qualité de vie, de santé publique, de protection de la biodiversité.

Le Gouvernement a préparé un projet de feuille de route claire pour atteindre la neutralité carbone en 2050. Cette stratégie bas-carbone définit une trajectoire pour y parvenir, avec un engagement matérialisé par des budgets-carbone, et des orientations politiques à mettre en œuvre pour faire évoluer la façon de nous déplacer, de nous loger, de nous nourrir, de produire, de consommer, et de préserver nos forêts et de nos sols. La stratégie bas-carbone porte également sur les moyens de réduire l'empreinte carbone de nos importations, réorienter les flux financiers publics et privés, mener notre politique de recherche et d'innovation active vers des solutions bas-carbone, accompagner les transitions professionnelles et mobiliser les citoyens, qui sont de plus en plus nombreux à vouloir s'engager.

Cette transformation doit s'accompagner d'une gouvernance renforcée, et de bilans réguliers de notre politique climatique et de sa mise en œuvre dans tous les secteurs. C'est dans cet objectif que le Président de la République a installé, le 27 novembre 2018, le Haut Conseil pour le Climat dont vous avez bien voulu prendre la présidence.

Madame Corinne LE QUERE
Présidente du Haut Conseil pour le Climat

Sa mission sera d'évaluer si notre stratégie est cohérente avec les objectifs fixés, d'alerter si elle n'est pas mise en œuvre correctement, de recommander des actions correctrices le cas échéant : le Haut Conseil a vocation à être un tiers de confiance, chargé d'émettre des avis indépendants et objectifs sur l'action climatique du gouvernement et d'éclairer les débats de manière neutre. Vous veillerez en tant que Présidente à la bonne conduite des activités du Haut Conseil, qui sera formellement créé par un article de la loi énergie à venir.

En premier lieu, vous rendrez annuellement, avant le 1er juillet, un rapport sur le respect de la trajectoire de baisse des émissions de gaz à effet de serre, eu égard aux budgets carbone définis par décret. Vous évaluerez la mise en œuvre des politiques et mesures décidées par l'État et par les collectivités locales pour réduire les émissions, développer les puits de carbone et réduire l'empreinte carbone y compris les dispositions budgétaires et fiscales ayant un impact sur le climat. Vous évaluerez également l'impact socio-économique et environnemental de ces actions et leur financement. Votre réflexion devra s'attacher à mettre en perspective les engagements et les actions de la France par rapport à ceux des autres pays. Vous aurez toute latitude pour formuler des recommandations et propositions.

Tous les cinq ans, le rapport dû un an avant l'échéance de révision de la stratégie présentera une évaluation globale de la mise en œuvre de la stratégie nationale bas-carbone sur la période en vue d'éclairer la révision de cette stratégie.

En second lieu, vous présenterez de manière quinquennale un avis sur les projets de stratégie bas carbone et de budgets carbone. Vous examinerez notamment si la trajectoire de baisse des émissions de gaz à effet de serre est suffisante vis-à-vis de l'engagement de la France dans l'Accord de Paris, des engagements européens de la France, et de l'objectif de neutralité carbone en 2050. Le premier avis portera sur le projet de stratégie rendu public le 6 décembre 2018.

Les problématiques d'adaptation aux changements climatiques pourront être intégrées dans un second temps, notamment afin d'évaluer, d'ici un ou deux ans, le nouveau plan national d'adaptation adopté en décembre dernier, qui vise à mieux préparer la société française au changement climatique, en impliquant les principaux secteurs de l'économie et les territoires.

Pour l'année 2019, je souhaite en outre que vous puissiez intégrer dans vos réflexions les propositions issues du Grand Débat National, dont l'un des objectifs est de mieux accompagner les Français qui souhaitent agir pour le climat, et de faire évoluer la fiscalité environnementale pour la rendre plus juste et efficace. Je vous invite également à travailler avec le Conseil général de l'environnement et du développement durable et l'Inspection générale des finances, qui sont chargés d'une mission afin d'expérimenter, dès le budget 2020, un processus d'analyse de l'impact des instruments fiscaux et budgétaires de l'Etat et de leur capacité à orienter les investissements nécessaires. La France serait le premier pays à se doter d'un tel outil.

Le Haut Conseil pourra être saisi par le gouvernement, le Président de l'Assemblée nationale, le Président du Sénat ou à votre initiative, pour rendre un rapport sur des questions sectorielles, relatives au financement de la transition bas-carbone ou de mise en œuvre territoriale des politiques climatiques, au regard des budgets carbone et de la stratégie bas carbone. Vous voudrez bien me transmettre vos rapports et vos avis ainsi qu'aux commissions permanentes de l'Assemblée nationale et du Sénat chargées de l'énergie et de l'environnement,

et au conseil économique, social et environnemental. Le Gouvernement y apportera une réponse argumentée, qui sera présentée aux trois assemblées.

Pour mener à bien votre mission, vous pourrez vous appuyer sur une équipe, hébergée par France Stratégie. Vous pourrez également solliciter l'appui des administrations compétentes des différents ministères concernés par vos travaux, notamment du ministère de la Transition écologique et solidaire, du ministère de l'Économie et des finances, du ministère de l'Enseignement supérieur, de la recherche et de l'innovation, du ministère de l'Agriculture et de l'alimentation et du ministère de l'Europe et des affaires étrangères, ainsi que les équipes de France Stratégie.

Vous pourrez enfin solliciter l'appui d'experts extérieurs. Je tiens par ailleurs à votre entière disposition les services de France Stratégie et du réseau de conseils et d'organismes qu'il anime, pour un soutien tant au niveau des infrastructures que des moyens matériels, des ressources humaines et de la communication.

La force du Haut Conseil pour le climat sera son indépendance, son expertise reconnue par tous, ses moyens que j'ai souhaités à la hauteur des enjeux et des missions qui lui sont confiées. Je vous remercie d'avoir accepté cette mission et je sais pouvoir compter sur votre expérience et votre implication pour conduire ces travaux qui sont essentiels pour accélérer la transformation durable de notre société.

Je vous prie de croire, Madame la Présidente, à l'assurance de mes salutations les meilleures.



Edouard PHILIPPE

HAUT CONSEIL
pour le CLIMAT

Annual Carbon Neutrality report
June 2019

-

www.hautconseilclimat.fr
@hc_climat