France's 4th biennial report to the United Nations Framework Convention on Climate Change

January 2020

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Chapter I. Greenhouse gas emissions inventory

I.1- Developments since 1990

■ Emissions within the scope of the Convention from 1990 to 2017

Within the scope of the Convention, meaning the French mainland and all its overseas territories, greenhouse gas emissions amounted to 471.0 Mt CO_{2eq} in 2017 excluding the LULUCF (Land Use, Land-Use Change and Forestry) sector, and at 439.4 MtCO_{2eq} with this sector. They decreased by 14.5% between 1990 and 2017 excluding LULUCF, and by 17.0 % including this sector. An analysis of these reductions is carried out every year in the National Inventory Reports (NIR). For energy, the decreasing trend in greenhouse gas emissions since 1990 can primarily be explained by changes in the energy mix with a substitution of coal capacities with natural thermal gas plants, and by the development of renewable energies. In terms of industry, the trend observed is due to an improvement in industrial processes, by the increasingly service-based nature of the French economy, and by the resulting loss of manufacturing production sites. In the different business sectors, targeted mitigation policies (see Part III, which provides a precise description of the policies and measures put in place) have enabled us to compensate for the upward trend in emissions linked to population growth and increased economic activity in the 2000s. Total emissions excluding LULUCF[1] per inhabitant have decreased by 26.0% from 1990 to 2017[2]. When normalized to reflect Gross Domestic Product (GDP)[3], the effective drop in emissions excluding LULUCF has been 61%.

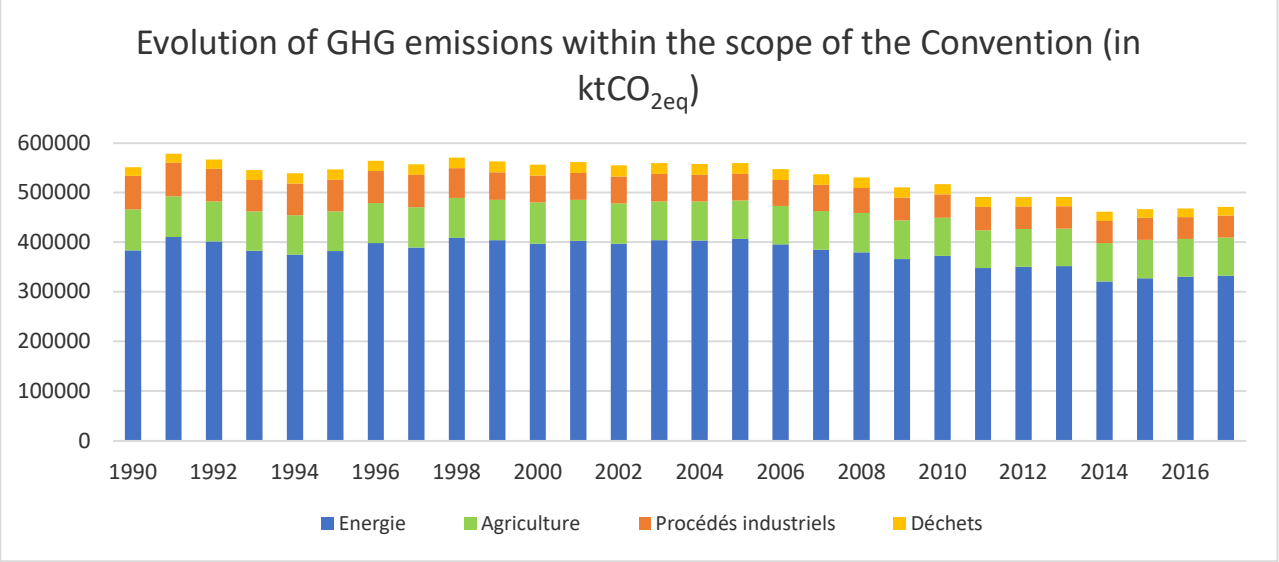

Figure 1.1: French emissions within the Convention scope from 1990 to 2017 excluding the LULUCF sector in ktCO_{2eq} - Source: 2019 submission, CRF format within the scope of the Convention, CITEPA / MTES

Over the more recent period, after a period of significant decrease between 2005 and 2009, due mainly to the establishment of the EU-ETS market (European Union Emissions Trading System), to energy efficiency policies and also to the economic crisis in 2008, greenhouse gas emissions stabilised between 2011 and 2013. Notable reductions were then observed for the year 2014: greenhouse gas emissions were 461.5 MtCO_{2eq}, i.e. **a decrease in emissions of 6.0% in 2014** compared to 2013. Around 50% of this decrease may be explained by the extremely mild climate conditions in 2014; the remainder of the gains may be attributed to reduction efforts since 2005. Emissions then resumed a slight rise. In 2015, emissions totalled 466.4 Mt CO_{2eq}; an increase of 1.1% compared with 2014. In 2016, emissions totalled 467.6 Mt CO_{2eq}; an increase of 0.3 compared with 2015. In 2017, emissions

[1]Land Use, Land-Use Change and Forestry

[2]French population on 1st January 2017: 66 991 000 inhabitants-1990: 57 996 401 inhabitants

[3] https://donnees.banquemondiale.org/indicator/NY.GDP.MKTP.CN.AD?locations=FR

totalled 471.0 Mt CO2e; an increase of 0.7% compared with 2016. The main sectors responsible for this rise were energy (+8.8% between 2016 and 2017), industry (+1.9%) and residential, commercial, institutional and service (+1.8%). For energy, this rise is mainly linked to reduced availability of the nuclear fleet and in hydro-electricity production means. For the industry and tertiary [residential-commercial-institutional-service] sectors, a rise in energy consumption has led to a rise in emissions.

- **Emissions within the Kyoto scope from 1990 to 2017**

In 2017, France emitted 464.6 $MtCO_{2eq}$, excluding LULUCF, compared to 459.9 $MtCO_{2eq}$ in 2015 and 460.6 $MtCO_{2eq}$ in 2016 in its territories on the mainland, Guyana, Guadeloupe, Martinique, Reunion, Mayotte, and Saint Martin (geographic scope of the Kyoto protocol). Between 1990 and 2017, the reduction within this scope was of 15.2%.

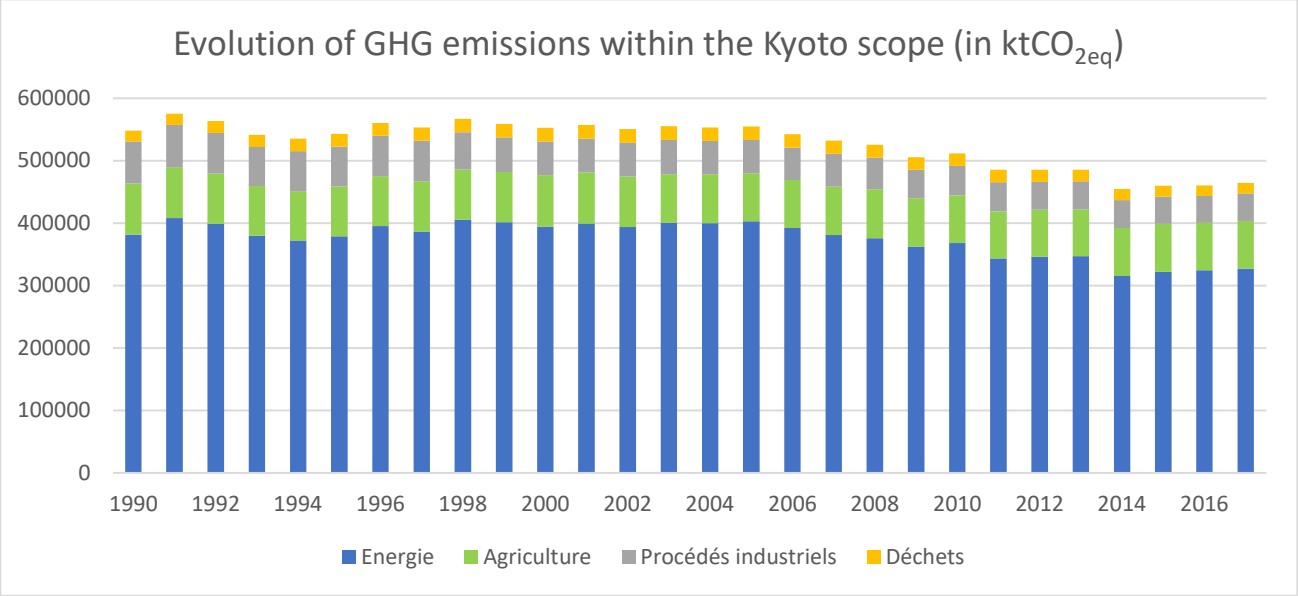

Figure 1.2: French emissions in the Kyoto scope from 1990 to 2017 excluding the LULUCF sector in $ktCO_{2eq}$ - Source: 2019 submission, CRF format within the scope of the Convention, CITEPA / MTES

I.2 – Evolution by gas since 1990 within the Kyoto scope

- **CO_2 emissions**

The figure below shows the evolution of CO2 emissions (excluding LULUCF) for the main contributing sectors. CO_2 emissions have decreased by 13.55% since 1990.

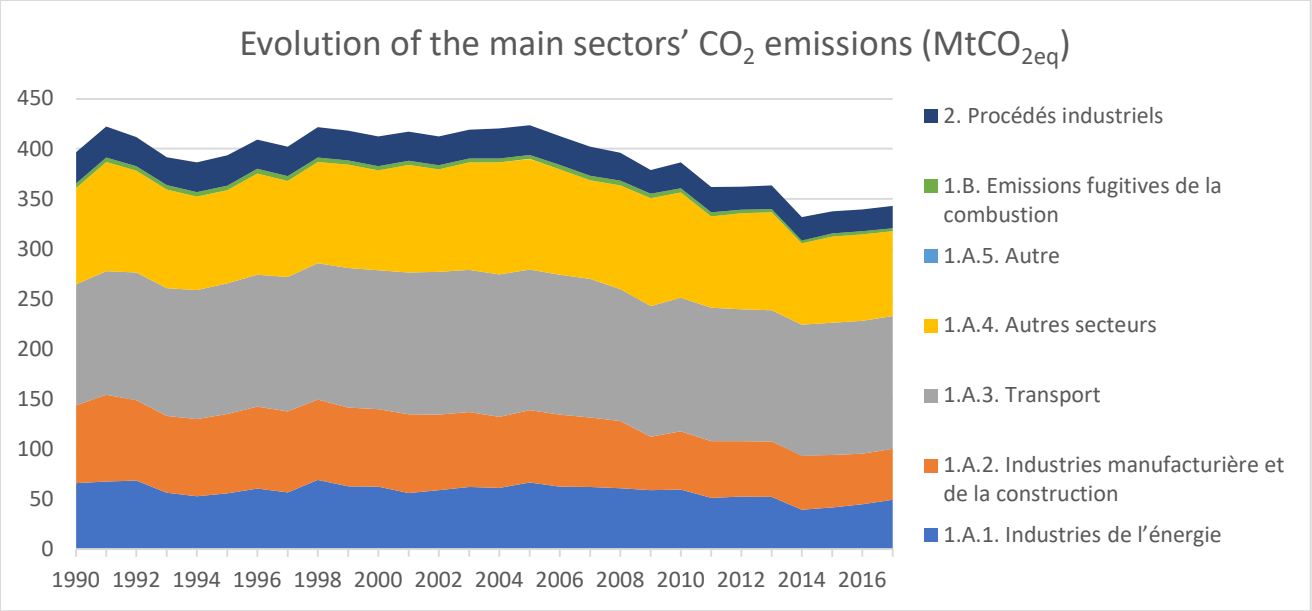

Figure 1.3: Evolution of French CO_2 emissions, for the main contributing sectors (in $MtCO_{2eq}$) - Source: 2019 submission, CRF format within the Kyoto scope, CITEPA / MTES

The transport and residential-tertiary sectors (included in 1.A.4) emit the most CO_2.

- **CH_4 emissions**

CH_4 emissions have decreased by 18.78% since 1990. Only in the waste management sector have emissions risen by 4.92%. The waste management and agriculture sectors contribute almost all of the CH_4 emissions; agriculture alone represents nearly 70% of the methane emissions.

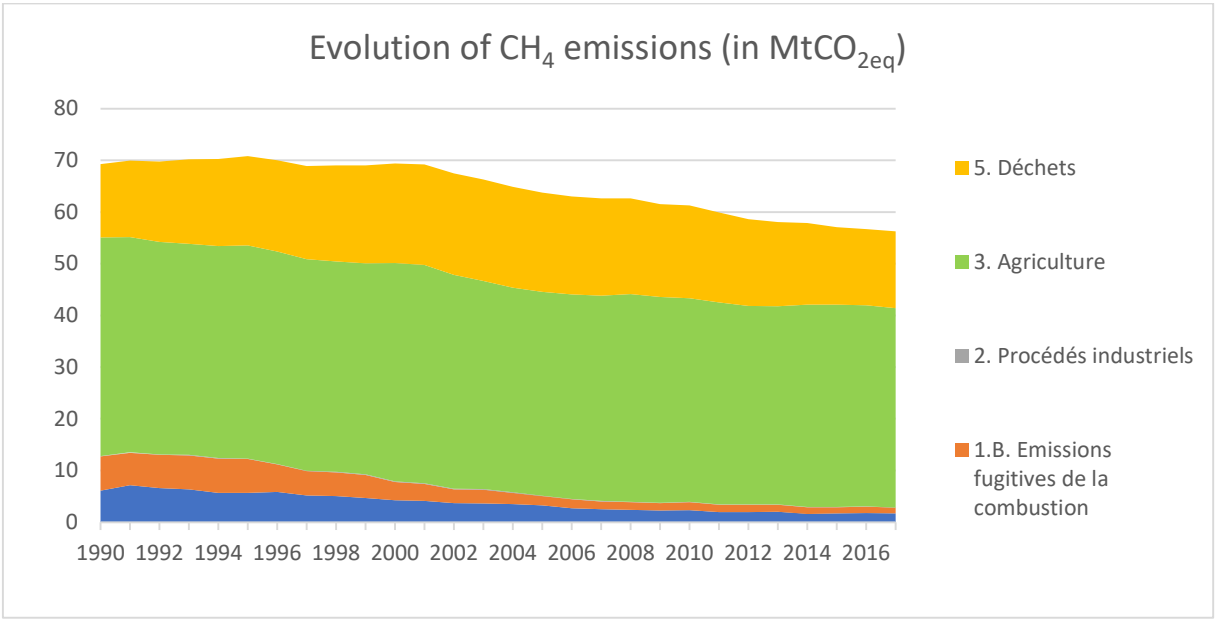

Figure 1.4: Evolution of French CH_4 emissions from the different sectors excluding LULUCF (in $MtCO_{2eq}$) - Source: 2019 submission, CRF format within the Kyoto scope, CITEPA / MTES

- **N_2O emissions**

Since 1990, nitrous oxide emissions have been reduced by 36.57%, mainly due to a decrease of nearly 94% in industrial process emissions, which made up 36% of the N_2O emissions in 1990. The share of N_2O emissions emitted from agriculture rose from 57.7% in 1990 to over 85% in 2017.

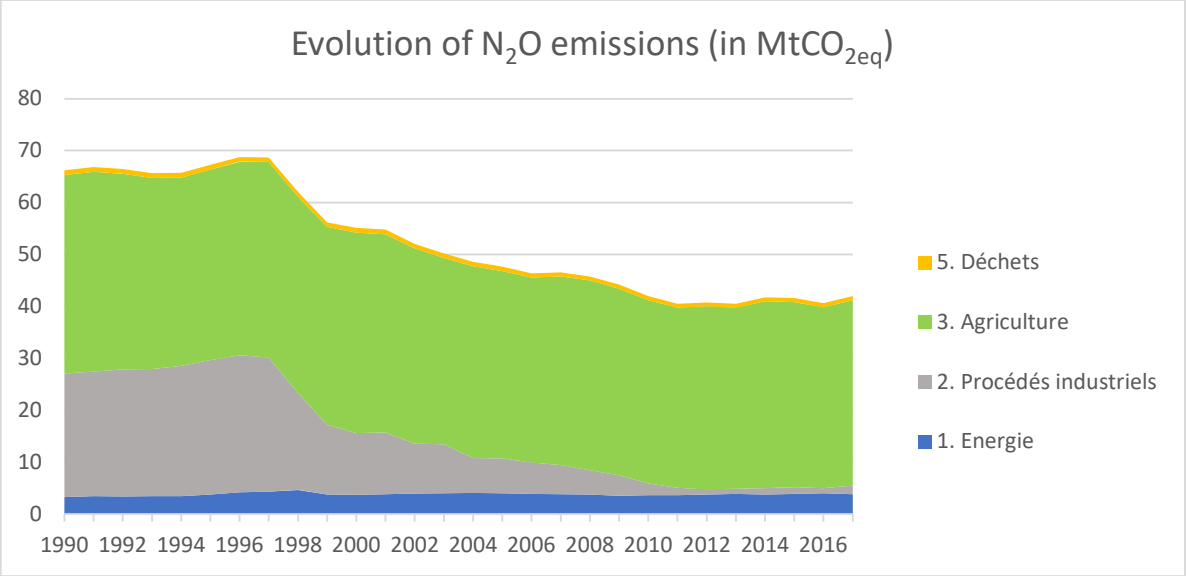

Figure 1.5: Evolution of French N_2O emissions from the different sectors excluding LULUCF (in kCO_{2e}) - Source: 2019 submission, CRF format within the Kyoto scope, CITEPA / MTES

- **Fluorinated gas emissions**

Fluorinated gas emissions have risen by +68% since 1990. This is mainly due to HFC emissions which have tripled since 1990 (+325%), when their use was widely developed to replace CFCs and PFCs.

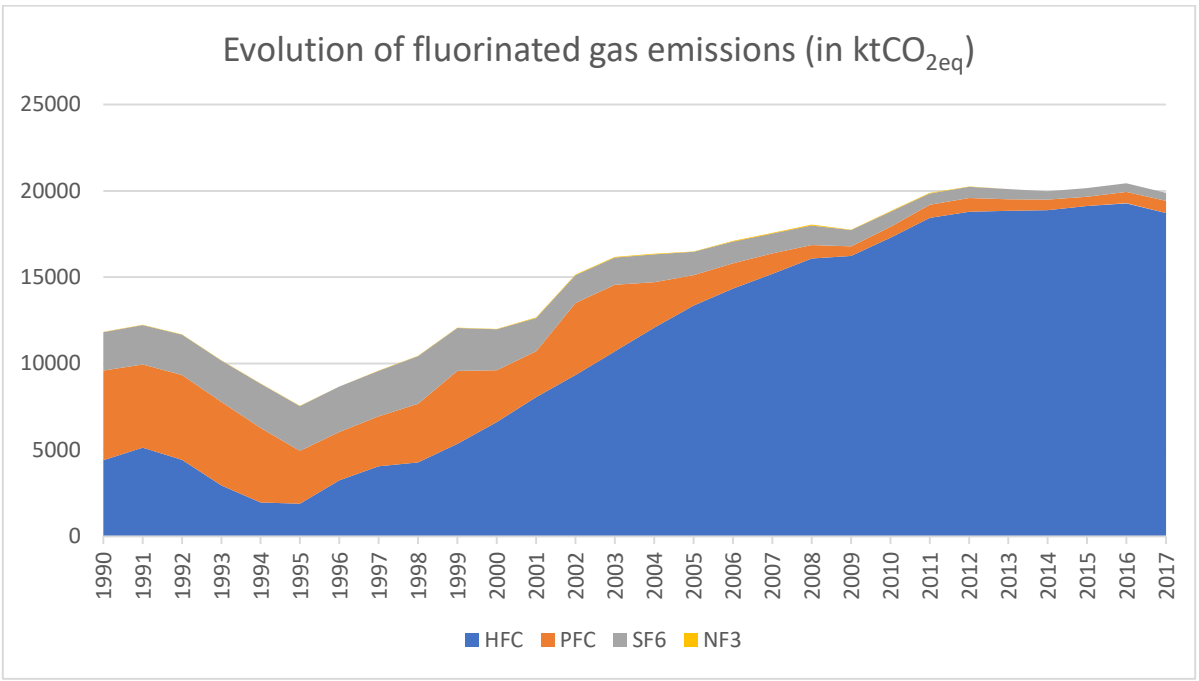

Figure 1.6: Evolution of French fluorinated gas emissions (in kCO_{2eq}) - Source: 2019 submission, CRF format within the Kyoto scope, CITEPA / MTES

I.3 - The National Inventory System

France has not changed its national inventory system since the last biennial report. The national inventory system complies with article 5.1 of the Kyoto Protocol (for more detail, refer to the description in the national inventory reports already submitted) It is based on the regulatory provisions of the SNIEBA order issued on 24th August 2011.

Regarding the French national registry, there has been no change since the last biennial report. The Caisse des Dépôts was appointed in 2004 by decree n° 2004-1412 to administer the national registry and to develop information systems to operate it and ensure its security. Nonetheless, traceability has been greatly improved with a view to greater transparency.

Since migration to the European Union registry in June 2012, it is the responsibility of the European Commission to supply, maintain and secure the national registry information system in accordance with the commitments of European Member States as Parties to the Kyoto Protocol and to the Convention, and as participants in the European Union Emissions Trading Scheme for Greenhouse Gas Emission Quotas (EU ETS Registry).

Chapter II. Emissions reduction targets in figures

II.1 - Introduction to goals, gases and sectors covered

■ At European Level

In 2008, the European Union set a range of greenhouse gas emission reduction goals that were combined into an action plan entitled the "Climate-Energy Package". The major objectives of this plan, referred to as the "3x20", steer the energy policy of each European state. Within the framework of the Energy-Climate Package, the EU has established internal rules that underpin the implementation of this objective by 2020 under the Convention. Goals have also been set for 2030 by the 2030 Energy-Climate framework.

The goals for 2020 in the Energy-Climate Package

The Energy-Climate package is a cluster of legislation adopted in December 2008 by the European Parliament. Through binding provisions, the legislation had the aim of becoming a global and sustainable environmental policy and combating climate change by drastically reducing greenhouse gas emissions by the year 2020. The main target for the European Union was set by the "3x20" directive:

- Reduce EU countries' greenhouse gas emissions by 20% compared to 1990 levels;
- Achieve a European energy mix that includes 20% renewable energies;
- Improve energy efficiency by 20%;

In order to meet this target, several directives were passed aimed at improving energy efficiency and reducing greenhouse gas (GHG) emissions in different sectors (Directive on CO_2 Emissions Quota Trading Scheme, Fuel Quality Directive, Regulations on CO_2 Emissions Reduction in New Cars, Renewable Energies Directive, "Shared Effort" Directive, and Carbon Capture and Storage Directive, etc.)

The goal to reduce GHG emissions by 2020 also constituted the EU's commitment within the framework of the UNFCCC. This goal has only been submitted by the EU-28 and not by each of the Member State, and there are no objectives specific to each Member State in the context of the Convention. For this reason, in the context of the Convention, France shares its quantified emissions reduction targets with all of the other EU Member States.

The Energy-Climate Package introduces a dual approach to achieving the 20% reduction in total greenhouse gas emissions compared to 1990 levels, France. This goal has been split into two sub-goals, one for ETS sectors (subject to the EU quota trading scheme) and another for non-ETS sectors (EU, 2009). Under the revised EU-ETS directive[4], a single EU-ETS cap covers the EU member States and the three non-EU member States taking part (Norway, Iceland and Liechtenstein), meaning there are no country-specific emissions caps for the sectors concerned. For the quotas allocated to sectors included in the EU ETS, annual caps have been set for the period from 2013 to 2020; these drop by 1.74% per annum, starting at the average level of the quotas issued by Member States during the second period (2008-2012). The annual caps entail intermediate emissions reduction goals in the sectors covered by the EU ETS for each year up to 2020. More information on the EU ETS and information on the use of market mechanisms in the ETS can be found in Europe's biennial report. Emissions not covered by the ETS are handled as part of the Effort Sharing Decision (ESD)[5]. The ESD covers emissions from all sources that do not come under the EU ETS, except emissions derived from international marine transport and from international and European air transport (the latter have been included in the ETS since the 1st of January 2012) and emissions and removals derived from land use, land-use change and forestry (LULUCF). It therefore covers a broad variety of diffuse emissions from a wide range of sectors: transport (with road transport first and foremost), buildings (especially heating), services, small industrial facilities, fugitive emissions from the energy sector, fluorinated gas emissions, agriculture and waste management. These sources currently represent about 60%

[4]Directive no. 2009/29/EC dated 23/04/09 amending directive 2003/87/EC in order to improve and extend the Community scheme for greenhouse gas emission allowance trading.

[5] Decision No. 406/2009/EC

of total greenhouse gas emissions in the EU. Whilst the EU ETS goal must be achieved by the EU as a whole, the ESD goal has been split into national goals to be reached individually by each Member State. In the ESD, national emissions targets are set for 2020, expressed as a percentage compared with 2005 levels. These targets have been converted into annual reduction target figures for the period from 2013 to 2020[6], expressed as Annual Emissions Allocations (AEAs). France's 2017 emissions level[7] came to 352,795,706 AEA, with a goal to reach 342,475,075 AEA by 2020. In 2017, the verified emissions of fixed installations covered by the EU-ETS (excluding aviation) were[8] 110,902,243 tCO_{2eq}, of which 4,060,464 tCO_{2eq} was for the aviation sector. With the total greenhouse gas emissions in 2017 assessed at 464,592,514 tCO_{2eq} (excluding LULUCF, in the KP format), the share of ETS emissions in France is of 23.8%.

The goals for 2030

Beyond the 2020 goals, the EU has set goals for 2030. In October 2014, the European Council adopted in its conclusions the main items that form the EU energy-climate framework for 2030:

- A binding target for internal reduction of at least 40% of greenhouse gas emissions by 2030 compared to 1990 levels. This binding target was communicated to the UNFCCC as a 'planned contribution determined at national level of the EU.' This is based on a 43% reduction of emissions covered by the EU ETS compared to 2005 and on a 30% reduction of emissions from non-EU ETS sectors compared to 2005;

- A binding target of at least 27% of renewable energy use by 2030;

- A goal to improve the indicative energy efficiency by at least 27% by 2030, which will be revised in 2020, keeping in mind a target of 30%.

- The LULUCF sector is also subject to regulation aiming to ensure a stability (rule known as "no debit") in the carbon sink by 2030 compared to a reference period.

Following these conclusions, the EU has adopted several implementing legislations to enable this goal to be met.

The ETS directive was revised at the end of 2018, to extend its application until 2030 with the reduction goal of -43% compared to 2005. This reduction goal will be obtained by reducing the GHG emissions cap by -2.2% per year (linear reduction factor) which is a faster rate than during the 2013-2020 phase (-1.7%/yr). The introduction of a reserve of quotas to be kept out of auction (market stability reserve) will also enable a reduction in the structural surplus of allowances, avoid recreating the surplus and ensure a greater stability in the price of carbon.

The reduction goals for emission from non-ETS sectors of -30% compared to 2005 were adopted in the context of the effort sharing regulation no. 2018/842. All the Member States must reduce their GHG emissions for the sectors concerned following a distribution of targets that is set in relation to the capacities of the Member States. **Thus the goal for France is a reduction of -37% compared to 2005.** This mechanism creates a system of multi-year allowances over the period reflecting the targets and introducing flexibilities permitting the Member States to comply with the allowances allocated to them through transfers between years or between Member States.

[6] Decision No. 406/2009/EC

[7] The emissions linked to the ESD were estimated at 353,149,750 tCO_{2eq} in annex X submitted in the context of the Monitoring Mechanism Regulation (MMR)

[8] The emissions linked to the EU ETS were estimated at 111,435,120 tCO_{2eq}, of which 4,935,020 tCO_{2eq} was for domestic aviation, in annex X submitted in the context of the MMR

The European Union has also adopted regulation no. 2018/841 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry (LULUCF). This regulation introduces a framework to ensure that the EU meets the objective of no relative debit for this sector, meaning removals higher than a continuation of current practices for forests and higher than a reference level for the land sector. The provisions of this regulation increase the value of CO_2 removals through the possibility of exchanges between Member States or a participation in the GHG emissions reduction targets outside the ETS.

The European directive on renewable energies has been revised (2018/2001) and the target set by the EU for 2030 is now higher than that adopted by the European Council in 2014. The new target for the development of renewable energies is thus to reach 32% of the energy mix by 2030.

The European directive on energy efficiency has been revised (2018/2002) and the target adopted by the EU for 2030 is also higher. The improvement in energy efficiency should thus be at least 32.5% by 2030.

Finally, the EU adopted a regulation on the Union's governance of energy and climate action (2018/1999), which sets out different internal governance mechanisms at the EU to implement these different regulations and to express the European and national policies in this domain. Thus, in the context of this regulation, the Member States should establish 10-year integrated National Energy and Climate Plans (NECPs), which should allow the EU to collectively meet the energy and climate targets set.

- **At National Level**

At national level, France has also set targets to reduce greenhouse gas emissions and energy consumption.

In particular, the energy climate law of 2019 confirmed the greenhouse gas emissions reduction goal of 40% in 2030 compared to 1990.

The law of 8 November 2019 relating to energy and the climate also initiated a goal to reach carbon neutrality by 2050 by reducing gross greenhouse gas emissions by a factor higher than six. The energy climate law states that "Carbon neutrality is understood as a balance on national territory[9] between anthropogenic emissions by the sources and the anthropogenic removal through greenhouse gas sinks, such as stated in article 4 of the Paris Agreement, ratified on 5 October 2016. The accounting of these emissions and removals is undertaken following the same methods as applied to the national greenhouse gas inventories submitted to the European Commission and in the context of the UN Framework Convention on Climate Change, without taking into account international carbon offsetting credits."

This law has also increased the target to reduce fossil fuel consumption; it is now set at 40% by 2030 compared to 2012. It also increases the target for the share of renewables in end-use energy consumption to 33% by 2030. Finally, the energy code stipulates a target to reduce end-use energy consumption by 20% by 2030, compared to the 2012 level.

[9] Including the overseas territories

Furthermore, the national low-carbon strategy (*Stratégie Nationale Bas-Carbone*, SNBC) defines the carbon budgets for the next three five-year periods, which are divided by sector. The budgets defined in the first SNBC[10] will soon be updated when this strategy is revised[11].

- **Update on the 2020 targets France has achieved**

As concerns the emissions not covered by the emissions trading scheme, France should achieve -14% compared to 2005, which corresponds to emissions of 342.4 $MtCO_{2eq}$ in 2020. In 2017, the French emissions for this sector reached 353.1 $MtCO_{2eq}$, i.e. a reduction of -11.6 % compared to 2005, below the 2017 allowance for France set at 358.2 $MtCO_{2eq}$. The GHG emissions of France were lower than its emissions allowances in the effort-sharing decision over the 2013-2017 period, constituting an allowance surplus of around 128 AEA, which could be used to some extent to ensure that France conforms to the reduction targets over the 2017-2020 period or could be transferred to other Member States.

The monitoring process is standardized for all European Member States by means of the regulation establishing a greenhouse gas emissions monitoring mechanism[12]. It is possible to use flexibility mechanisms under the ESD and ETS (for the use of Emission Reduction Units (ERU) and Certified Emission Reduction Units (CER) units in the framework of the ETS, see the European Union biennial report).

The ESD enables Member States to use flexibility clauses to meet their annual obligations, with a limit of 3% for the use of credits based on the projects being carried out by each Member State. If these credits are not used, the unused part for that year can be transferred to other Member States or reserved for the future needs of the member state until 2020.

Reporting tables relating to the emissions reduction targets can be found below.

[10] Cf. Decree no. 2015-1491 of 18 November 2015 relating to the national carbon budgets and the National Low Carbon Strategy (SNBC)

[11] A draft revision of the SNBC is available on the ministry's website: https://www.ecologique-solidaire.gouv.fr/strategie-nationale-bas-carbone-snbc

[12]Regulation (EU) no. 525/2013, dated 21/05/13, relates to a mechanism for monitoring and declaring greenhouse gas emissions, and for the declaration, at national level and within the European Union, of other information relating to climate change, and abrogates decision no. 280/2004/EC

Table 2(a): Reporting table

Description of Quantified Economy-wide Emission Reduction Target: Base Year[a]

Party	*France*	
Base Year / Base Period	1990	
Emission Reduction Target	% of Base Year/Base Period	% of 1990 [b]
	20.00	20.00
Period for Reaching Target	BY-2020	

a Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

b Optional.

Table 2(b): Reporting table

Description of Quantified Economy-wide Emissions Reduction Target: Gases and Sectors Covered[a]

Gases Covered		*Base Year for Each Gas (Year):*
CO_2		1990
CH_4		1990
N_2O		1990
HFCs		1990
PFCs		1990
SF_6		1990
NF_3		1990
Other Gases (Specify)		
Sectors Covered[b]	Energy	Yes
	Transport[f]	Yes
	Industrial Processes[g]	Yes
	Agriculture	Yes
	LULUCF	No
	Waste	Yes
	Other Sectors (specify)	

Table 2 (c): Reporting table
Description of Quantified Economy-wide Emissions Reduction Target: Global Warming Potential Values (GWP)a

Gases	*GWP values* [b]
CO_2	4nd AR
CH_4	4nd AR
N_2O	4nd AR
HFCs	4nd AR
PFCs	4nd AR
SF_6	4nd AR
NF_3	4nd AR
Other Gases (Specify)	

Abbreviations: GWP = global warming potential

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[b] Please specify the reference for the GWP: Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) or the Fourth Assessment Report of the IPCC.

The global warming potentials used to convert greenhouse gas quantities expressed in mass to CO2 equivalents are those from the 4th IPCC report in accordance with the decisions of the Climate Convention.

The LULUCF sector has been estimated as a carbon sink throughout the entire 1990-2020 period, on both a French and EU-wide scale.

It has not been accounted for in the 2020 goals set by the European Union Convention (and neither, therefore, by the French convention), but a European decision was adopted for this sector in 2013. This decision makes it compulsory for nations to implement action plans to reduce carbon emissions, increase removals and protect stocks.

Table 2 (d): Reporting table

Description of Quantified Economy-wide Emissions Reduction Target: Approach to Counting Emissions and Removals from the LULUCF Sector[a]

Role of LULUCF	LULUCF in Base Year Level and Target	Excluded

Abbreviation: LULUCF = Land Use, Land-use Change and Forestry.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

II.2 – Use of Market Mechanisms

Flexibility mechanisms are used, on the one hand, by operators within the ETS and on the other hand by governments to achieve the ESD goals presented above (for more information see the European Union biennial report).

The use of these flexibility mechanisms in the context of the ESD is subject to monitoring by the European Commission. As concerns the 2013-2016 period, only one Member State used the possibility of obtaining allowances from another Member State to cover their excess in GHG emissions in relation to their allocations. In 2016, GHG emissions in these sectors were higher than their allocations for that year in 6 other Member-States, but these Member States were able to comply with the agreement by using allowances from previous years (source European Environment Agency[13]).

In any event, France has not resorted to the use of any flexibility mechanisms to comply with its 2013, 2014, 2015 and 2016 targets, and does not expect to use any for the following years for ESD purposes.

[13] EEA Report, Trends and projections in Europe 2018

Table 2 (e): Reporting table

Description of Quantified Economy-wide Emissions Reduction Target: Market-based Mechanisms under the Convention[a]

Market-based Mechanisms under the Convention	*Possible Scale of Contributions* (*Estimated kt CO_2 eq*)
CERs	0.00
ERUs	0.00
AAUs[i]	0.00
Carry-over Units[j]	0.00
Other Mechanism Units under the Convention (specify)[d]	

Abbreviations:
AAU = assigned amount unit,
CER = certified emission reduction,
ERU = emission reduction unit.

[a] Reporting by a developed country Party on the information specified in the common tabular format does not prejudge the position of other Parties with regard to the treatment of units from market-based mechanisms under the Convention or other market-based mechanisms towards achievement of quantified economy-wide emission reduction targets.

[d] As indicated in paragraph 5(e) of the guidelines contained in annex I of decision 2/CP.17 .

[i] AAUs issued to or purchased by a Party.

[j] Units carried over from the first to the second commitment periods of the Kyoto Protocol, as described in decision 13/CMP.1 and consistent with decision XX/CMP.8.

Chapter III. Progress in achieving the target figures and relevant information - mitigation actions

III.1 – Design of policies and measures and institutional developments to meet the climate goals.

- **Institutional foundations**

At Government level

The Ministry for an Ecological and Inclusive Transition (French: MTES) aims to address the environmental and climate issues of the twenty-first century. The coordination and leadership of domestic policy for tackling climate change falls under the remit of the Department of Climate and Energy Efficiency (French: SCEE) within the Directorate General for Energy and Climate (DGEC), notably via its Department to Combat the Greenhouse Effect (French: DLCES).

With regard to climate change adaptation policy, the mission of the French National Observatory on the Effects of Global Warming (French: ONERC), created on 21 February 2001 by an initiative of the French Parliament, is to collect and disseminate information on global warming and extreme climate phenomena. The Observatory is attached to the Directorate General for Energy and Climate.

Other ministries also make essential contributions to the implementation of national climate policy, in particular the Ministry of Agriculture and Food, the Ministry of the Economy and Finance, the Ministry of Higher Education and Research, and the Ministry of Territory Cohesion and Relations with local governmental structures.

Public institutions are also involved in the implementation of public climate policies. In particular, the French Environment and Energy Management Agency (*Agence de l'Environnement et de la Maîtrise de l'Energie,* or ADEME) provides expertise and advice to companies, local authorities, public authorities and the general public, and participates in the funding of projects. The French National Housing Agency (*Agence Nationale de l'Habitat,* or ANAH) supports and funds energy retrofits for low-income households. The French Development Agency (*Agence Française de Développement,* or AFD) works on the implementation of France's Climate financing program in developing countries.

On the initiative of the President of France, the decree of 14 May 2019 created the *Haut Conseil pour le Climat* (High Council for the Climate), an independent organisation responsible for producing opinions and recommendations on the implementation of policies and measures aiming to reduce national greenhouse gas emissions and for assessing their coherence with France's climate goals.

Furthermore, the *Convention Citoyenne pour le Climat* (Citizen Convention for the Climate), founded in October 2019 by the French President, brings together 150 randomly selected citizens representative of the diversity of French society. The convention is asked to propose structuring measures, in a spirit of social justice, to ensure that greenhouse gas emissions are reduced by at least 40% by 2030 compared to 1990. The conclusions of these projects are expected in spring 2020.

Finally, an Ecological Defense Council has been founded, uniting the ministers primarily concerned by the environmental and climate stakes in order to co-ordinate cross-sectoral State action on the subjects identified.

At local authority level

Local authorities act alongside the national government as public contracting authorities, playing an important role in the fight against global warming through their assets, their direct activities, and more generally, by mobilising the country's fundamental economic and social fabric. Their local field of expertise and actions notably comprises managing transport policies, co-ordinating and supporting the building renovation sector, as well as increasing the value of the energy potential of their local area through their economic and town-planning policies.

Local authority climate action is structured around territorial planning instruments: Regional Planning, Sustainable Development and Territorial Equality Schemes (French: SRADDET) for the regions, and Territorial Climate-Air-Energy Plans (French: PCAET) for inter-municipality groupings of more than 20,000 inhabitants.

SRADDETs, introduced by article 10 of the NOTRe law in 2016, will assimilate several existing schemes, including the Regional Climate, Air and Energy Schemes (SRCAE), Regional Waste Prevention and Management Plans and Regional Transport/Intermodality Schemes. They serve as an all-encompassing program for planning, mobility, energy and the fight against climate change, developed by the Regions in cooperation with local authorities. SRADDETs set the strategic orientations and medium and long-term objectives for each regional territory, particularly in terms of climate change mitigation and adaptation, the fight against atmospheric pollution, energy consumption management, and the development of renewable energy sources and energy recovery, in accordance with the national objectives.

Although the process is decentralized, the creation of SRADDET includes consultation phases with central and local governments and groupings of the main local bodies concerned, as well as the EPCIs (public inter-municipality cooperation establishments). All of the SRADDETs should, in principle, be approved in 2020[14].

Territorial Climate-Air-Energy Plans (PCAET) replace the former Territorial Climate-Energy Plans (French: PCETs). They are obligatory for inter-municipality groupings of more than 20,000 inhabitants existing on 1st January 2017. Up until the end of 2016, establishment of the former PCETs only concerned local structures of over 50,000 inhabitants. The PCAET is a regional operational tool that defines strategic and operational objectives in order to mitigate climate change and adapt to its effects, develop renewable energy sources and optimize energy consumption in accordance with national and regional guidelines. It includes a diagnostic report, a strategy and targets (in precise figures), an action programme, and measures for monitoring and evaluation[15].

The foundations of the climate policy

The policy to reduce French greenhouse gas emissions has been strengthened in the last few years.

During the 2000s, policies to combat climate change were defined based on the successive Climate Plans.

In 2009 and 2010, via the Grenelle I and II laws, France committed to reducing greenhouse gas emissions by a factor of four by 2050 compared to the level in 1990 (factor 4).

In 2015, the Energy Transition for Green Growth Act (*Loi relative à la transition énergétique pour la croissance verte*, LTECV) set a goal to reduce greenhouse gas emissions by 40% by 2030 compared to 1990 and reiterated the "factor 4". Moreover, the LTECV instigated the first national low-carbon strategy (*Stratégie Nationale Bas-Carbone*, SNBC) which defines the directions to take in terms of combatting climate change and the carbon budgets, emissions caps that must not be exceeded, set for periods of five years by decree. The first SNBC was published in 2015.

In July 2017, the Government published a new **Climate Plan** to accelerate the energy and climate transition and the implementation of the Paris Agreement. This Plan sets ambitious priorities, in particular, achieving carbon neutrality towards the middle of the century, the elimination of "thermal sieves" within 10 years (with 4 billion euros earmarked for energy retrofit operations), discontinuing the sale of vehicles emitting greenhouse gases in 2040, shutting down the last coal-fired power stations by 2022, gradually phasing out hydrocarbon production in France by 2040, and redoubling of efforts in publicly-funded energy transition research.

[14] https://www.cohesion-territoires.gouv.fr/sraddet-un-schema-strategique-prescriptif-et-integrateur-pour-les-regions

[15]https://www.legifrance.gouv.fr/affichCodeArticle.do?cidTexte=LEGITEXT000006074220&idArticle=LEGIARTI000022476854&dateTexte=&categorieLien=cid

At the same time, a revision of the national low-carbon strategy was undertaken. This 2nd SNBC aims to achieve carbon neutrality by 2050 while retaining the intermediate goal of 40% in 2030 compared to 1990. Noting that the 1st carbon budget had been exceeded and that a certain inertia to initiating the transition was evident in the highest emitting sectors, the SNBC2 revises the 2nd carbon budget set in the SNBC1 upwards, includes the reinforced measures and guidelines of the Climate Plan of July 2017 and presents an adjusted scenario that would enable the set targets to be met by 2030. The 2nd national low-carbon strategy was published at the end of 2018 and is currently the subject of deliberation prior to its adoption in early 2020.

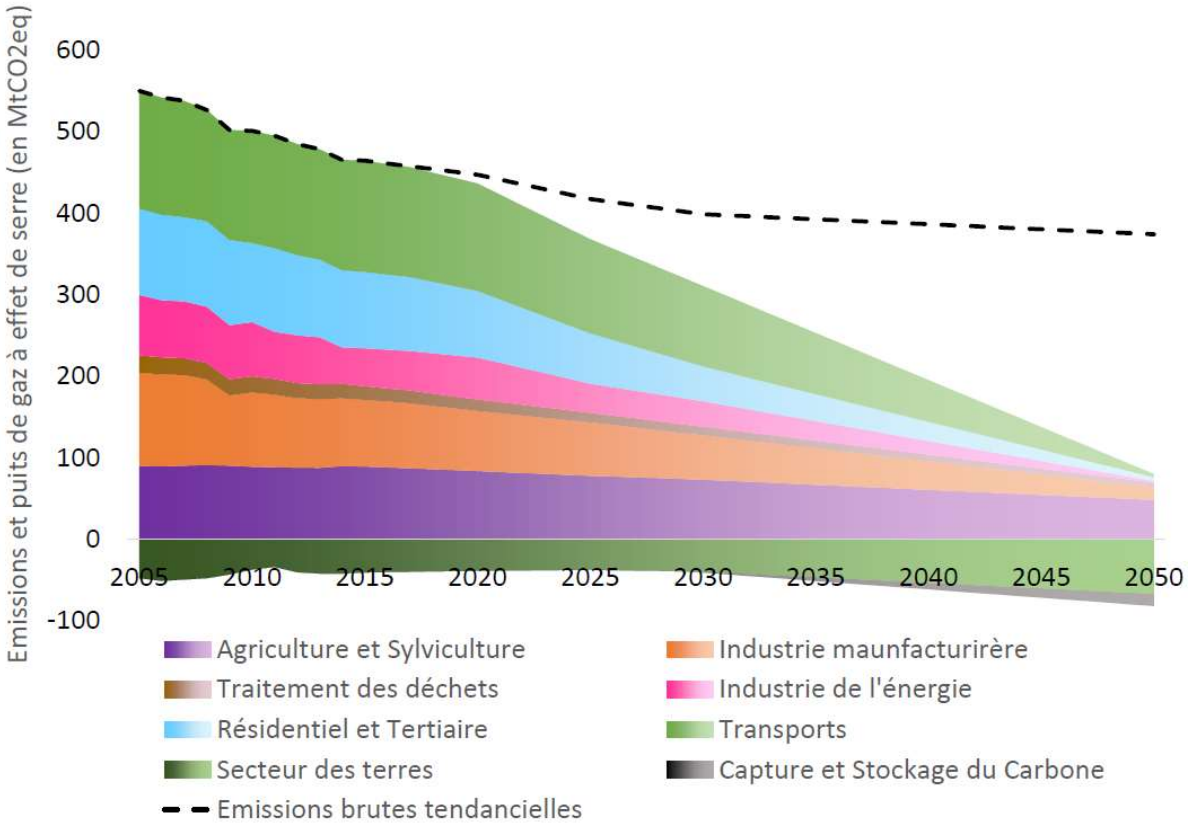

Figure 2.1 : Trajectory of emissions and greenhouse gas sinks on national territory between 2005 and 2050 in the WAM scenario of the SNBC 2

As previously indicated, the law of 8 November 2019 relating to energy and the climate enshrined in law the goal of carbon neutrality by 2050, stating that anthropogenic emissions should be decreased by a factor of at least 6, with the residual emissions being offset by anthropogenic removals. It reiterates the goal of reducing emissions by 40% by 2030. It also introduces a set of measures covering the different areas of the energy transition, notably relating to the fight against thermal sieves in the building sector as well as the creation or revision of the management, governance and assessment tools of the national climate policy. Other legal texts passed in 2019 or currently under scrutiny (the mobility orientation law, the law relating to the fight against waste and the circular economy) will complement the energy-climate law in the introduction of sector-specific measures to combat climate change (cf. part II.2).

Monitoring and evaluation of climate policy

The national low-carbon strategy is subject to regular monitoring based on a set of indicators, including results indicators (updated every year) and monitoring indicators of the SNBC guidelines. The contextual and environmental indicators complete this measure and provide a good perspective of the results[16]. This monitoring provides information to the stakeholders who participated in creating the SNBC, helps those working on revising it, and identifies any discrepancies between the targets and results in order to adopt the necessary corrective measures.

Moreover, every year, the government presents to Parliament, as an annex to the finance bill, a report presenting an assessment of the public and private financial means available to fund the ecological and energy transition as well as their compatibility with the amount of funding required in terms of the European commitments, the Paris Agreement and the 2030 agenda for sustainable development.

As part of its European reporting obligations as defined in the MMR, France must submit information every two years regarding the measures adopted, implemented or being planned to reduce its GHG emissions to the European Commission. It must also assess their impact (on GHG emissions and, whenever possible, on costs) and describe their prospects for reducing emissions in the medium term, in particular via the compilation of a forecasting scenario that accounts for measures already implemented. This information has been made public. The assessments of mitigation policies and measures published in the context of the MMR are made by the governmental department, DLCES. All the assumptions, calculation methods and assessment results in terms of greenhouse gas reduction and costs, are detailed in the following report: "France's 2019 Report in accordance with Article 13.1 of Regulation No. 525/2013".

Finally, the first and second national low-carbon strategies were subject to a macro-economic assessment to assess their economic and social impacts. The 2nd SNBC was also subject to a strategic environmental assessment, in order to assess the impact on the environment; the guidelines and indicators resulting from this assessment were integrated in the SNBC2 and the monitoring indicators.

Strengthening of institutional arrangements to ensure that the climate goals are met

The institutional arrangements to ensure that climate change policies are monitored and assessed have been strengthened since 2017.

The decree of 14 May 2019 created the *Haut Conseil pour le Climat* (High Council for the Climate, HCC), an independent organisation responsible for producing opinions and recommendations on the implementation of policies and measures aiming to reduce national greenhouse gas emissions and for assessing their coherence with France's climate goals.

Each year, the High Council for the Climate submits a report that looks specifically at: compliance with the trajectory for greenhouse gas emission reduction in regard to the carbon budgets set in the SNBC; the implementation and effectiveness of the policies and measures taken by the State and local governmental structures to reduce greenhouse gas emissions, develop carbon sinks, reduce the carbon footprint and develop adaptation to the effects of climate change; and the socio-economic and environmental impact, as well as the impact on biodiversity, of these different public policies. The high council produces recommendations and propositions to improve France's climate action. This report is submitted to the Prime Minister and transmitted to Parliament and the Economic, Social and Environmental Council.

Moreover, the High Council for the Climate provides its opinion on the National Low-carbon Strategy and the carbon budgets and assesses the coherence of the SNBC with France's national policies and its European and

[16] https://www.ecologique-solidaire.gouv.fr/suivi-strategie-nationale-bas-carbone

international commitments, particularly the Paris Agreement and the achievement of carbon neutrality by 2050, while taking into account the social and economic impacts of the transition for households and businesses, issues of sovereignty and environmental impacts. The High Council for the Climate submitted its first report in 2019 [17].

The Citizen Convention for the Climate and the Ecological Defense Council mentioned above have also recently contributed to strengthening France's climate governance.

■ Implementation of European policies

France's national policy fits into the wider framework of European climate policy. European climate policy is set out by the EU energy-climate packages for 2020 and 2030.

The implementation of a set of European provisions contributes to meeting the European targets mentioned in Chapter II.1, with, in particular:

- The ETS's emissions reduction target of 43% by 2030 compared to 2005 which translates as an increase of the annual reduction of the cap to 2.2% from 2021 onwards, replacing the current figure of 1.74%;
- The second sub-goal for the climate of -30% for non EU-ETS sectors is shared between the member States. The 2018/842 European regulation of 30 May 2018[18] sets **for France a target of 37% reduction in 2030 compared to 2005;**
- France's LULUCF obligations are currently those set by Europe (Decision 529/2013). They cover the communication of accounting information for forestry (afforestation, reforestation, deforestation, managed forests) in view of limiting or reducing emissions and of maintaining or increasing carbon removal for the accounting period 2013-2020. The 2021-2030 period is covered by the European regulation 2018/841[19]. **This new regulation sets a quantified target (neutral or positive balance), the accounting rules to be applied, as well as the flexibility mechanisms (between States; between commitment periods or with the ESR sectors)**;
- The directive on promoting the use of energy produced from renewable sources (directive 2009/28/EC) that sets a goal of 20% renewables in end-use energy consumption by 2020 for the EU, thus 23% for France. The European target for 2030 was originally at 27% of the share of renewables consumed but was made more stringent in the revision of November 2018[20]. It is now at least 32%, and 33% for France;
- The 2012 directive on energy efficiency (directive 2012/27/EU) was revised in December 2019 and completes the directive on energy services of 2006. It sets a common framework of measures to promote energy efficiency in the EU in order to ensure that the goal to increase energy efficiency by 20% by 2020 and at least 32.5% by 2030 is met. On this basis, France is required to transmit updates to its national action plan in terms of energy efficiency so as to meet these goals;
- The regulations on CO_2 emissions from vehicles (regulation no. 443/2009 modified by regulation no. 333/2014 relating to new passenger vehicles; regulation no. 510/2011 on light commercial vehicle emissions and regulation no. 2019/361 of 17 April 2019 (replacing the two previous regulations)) setting more stringent targets for 2030;

[17] The High Council for the Climate's 2019 report can be downloaded from the following website: https://www.hautconseilclimat.fr/rapport-2019/

[18] https://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=CELEX:32018R0842&from=FR

[19] https://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=CELEX:32018R0841&from=EN

[20] https://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=CELEX:32018L2001&from=EN

- The directive relating to promoting clean and energy efficient road transport (directive (EU) 2019/1161) setting targets for renewing the public fleets with low and very low emission vehicles over the periods 2021-2025 and 2026-2030.
- The implementation of the directive on ecodesign (Directive 2009/125/EC) which sets ecodesign requirements for energy-using products (bulbs, electric appliances, etc.);
- The regulation on fluorinated greenhouse gas emissions ("F-gas II" Regulation No. 517-2014 repealing "F-gas" Regulation No. 842/2006) which introduces a mechanism to gradually reduce the quantities of HFCs that can be placed on the market.

More details on the European policy are available in the EU's biennial report.

II.2 – Policies, Measures and their Effects

■ Transport

The transport sector is the largest emitter of greenhouse gases in France, representing 30% of emissions in 2017. The stakes are particularly high for road transportation, which alone accounts for 94% of the sector's emissions. Carbon dioxide (CO_2) is the main greenhouse gas emitted by transportation (96%) followed by fluorinated gases emitted by cooling and air-conditioning systems (2.7%) and other greenhouse gases (1.3%) such as nitrous oxide (N_2O) and methane (CH_4), emitted in low quantities during combustion.

Measures to reduce CO_2 emissions from the transport sector

The measures implemented to reduce CO2 emissions from the transport sector are mainly aimed at improving the energy efficiency of road vehicles, developing low-emission vehicles, promoting the development of biofuels and encouraging a modal shift.

The measures aiming to reduce greenhouse gas emissions from transport were strengthened in 2017, notably by strengthening the existing fiscal arrangements as well as through the measures in the mobility orientation law (*Loi d'Orientation des Mobilités*, LOM) of 18th November 2019.

In terms of programming, the LOM enshrines a goal of carbon-free land transport in France by 2050 and integrates the target of the 2017 Climate Plan by aiming to end the sale of new private cars and light commercial vehicles that run on fossil fuels by 2040.

The LOM provides details and a schedule for operational implementation of all the measures strengthening or extending the existing arrangement and creates new ones in order to promote low emission and alternative fuel vehicles, develop alternatives to private car use via active and shared mobility solutions, multimodal information and innovative solutions particularly in sparsely populated areas that are currently poorly served by public transport.

Improving the energy efficiency of new road transport vehicles

The energy efficiency of private passenger cars has improved a great deal as a result of several major measures:

- The **energy/CO_2 label** indicating the fuel consumption and CO_2 emissions of new vehicles, which has been mandatory in sales outlets since 2006, makes it possible to raise buyer awareness of their energy consumption and their emissions;

- The **bonus-malus** scheme, in place since 2008, aims to reward buyers of new cars emitting the smallest volumes of CO_2 by awarding them a financial bonus, and to penalise those who opt for higher emitting models - hence the bonus of some buyers is financed by the penalty ("malus") of others. The amounts and thresholds involved are reviewed periodically to maintain the incentive effect of the scheme. As of 1st January 2019, the penalty has applied to vehicles that emit over 117g CO_2/km, and equates to an increase on the purchasing price ranging from €35 to €10,500. The greater the vehicle's CO_2 emissions, the greater the purchasing penalty;

- The **tax on business vehicles** is an annual tax on vehicles owned by businesses (used to transport passengers) and includes a CO_2 emissions-based component for the vehicle;

- At European level, the **European regulations** set average emissions objectives for vehicle manufacturers for their new vehicles: regulation no. 443/2009 amended by regulation no. 333/2014 thus requires car manufacturers to lower the mean CO_2 emission levels of new passenger vehicles to **130 gCO_2/km in 2015 then 95 gCO_2/km in 2020 (with flexibility in enforcement up until 2022).** European regulation no. 2019/631 of 17 April 2019 sets more stringent targets for manufacturers: a 15% reduction in emissions by 2025 and a 37.5% reduction by 2030 compared to the emissions of 2021.

These various measures are inter-connected. On the one hand, the European regulations are designed to influence the supply of vehicles available to consumers by setting gradual performance objectives for new cars. On the other hand, the energy/CO_2 label and the bonus-malus system both influence demand for certain vehicles by encouraging consumers to choose the least polluting models. Average emissions per new passenger car in France decreased from 149 gCO_2/km in 2007 to 112 gCO_2/km in 2018.

For light commercial vehicles, European Regulation No. 510/2011 required manufacturers to progressively reduce average emissions of new vehicles to 175 gCO_2/km between 2014 and 2017. An average emissions target of 147 gCO_2/km was set for 2020. Average emissions per new light commercial vehicle in France decreased from 170.5 gCO_2/km in 2010 to 145.0 gCO_2/km in 2018. Regulation no. 2019/361 of 17 April 2019 sets more stringent targets: a 15% reduction in emissions by 2025 and a 31% reduction in 2030 compared to the emissions of 2021.

The new European regulation no. 2019/1242 also introduced requirements to reduce the emissions of new heavy vehicles with a reduction target of 15% by 2025 and 30% by 2030 compared to the level of emissions recorded over the reference period July 2019 - June 2020.

Figure 2.2: Average CO_2 emissions per new passenger car and per new light commercial vehicle; source: SDES, RSVERO

Development of low-emissions vehicles

The LOM enshrines the goal from the Climate Plan to end the sale of new private cars and light commercial vehicles using fossil fuels by 2040.

The National Low Carbon Strategy (SNBC) also aims to decarbonise vehicles by promoting progressive electrification of private cars in the vehicle fleet; for heavy vehicles, it promotes the development of a more diversified mix (electrification including using fuel cells with green hydrogen, development of gas vehicles with incentives to develop renewable gas).

The development of electric and plug-in hybrid vehicles relies on a set of measures:

- Within the bonus-malus scheme, **the bonus** provides subsidies for vehicles emitting less than 20g CO_2/km, which in practice is for electric vehicles, the only ones capable of obtaining such low levels. As of the 1st of September 2019, the bonus for electric vehicles amounts to €6000 (up to a limit of 27% of the acquisition cost). If the purchase of an electric vehicle is combined with the scrapping of a highly emitting thermal vehicle, a supplementary premium, known as the **conversion premium**, is paid. Plug-in hybrid vehicles are also eligible for the conversion premium.

- The **targets for incorporating low-emission vehicles (electric or plug-in hybrids) when renewing the fleets** have been set since 2015 for vehicles managed by the State, its public bodies and local authorities, and for vehicle rental companies, and operators of taxis and chauffeured cars. The LOM foresees increasing the targets to be reached for public fleets to align with the goals of the EU 2019/1161 directive, and extending the scope of the measure to include private companies directly or indirectly managing fleets of more than 100 vehicles.

- A set of measures aims to **promote the deployment of charging infrastructures for electric vehicles:** All **constructions** of certain types of building with a car park (tertiary, industrial, hosting a public service, constituting a commercial complex, cinemas) must **fit a section of the car parks with pre-equipment** to facilitate the subsequent installation of charging facilities for rechargeable electric or hybrid vehicles. The LOM strengthens these requirements by making it mandatory to pre-equip with electric recharge stations in all car parks with over ten spaces in new or renovated buildings, and all car parks with over twenty spaces in non-residential buildings by 2025. The installation of electric recharge stations in both the public and private

sector is eligible for **financial support**. Individuals who install recharge stations benefit from income tax credits totalling 30% of the cost incurred. Local authorities projects to install public recharge stations have benefited from subsidies through the Investments for the Future Programme (*Programme d'Investissements d'Avenir,* PIA) fund. Since 2016, the ADVENIR programme, funded through the Energy Economy Certificates scheme (*Certificats d'Economie d'Energie*, CEE), has covered 40% of the costs of supplying and installing recharge stations for businesses and public persons and 50% of the costs for collective housing, within the limit of maximum amounts per recharge station and per target type. The LOM encourages the introduction of **master plans for the installation of public recharge stations** at local government level and introduces a maximum reduction rate of 75% (instead of 40%) to cover the cost of connection for the stations open to the public.

In the context of the European regulation, the tightening of the emission reduction targets for new vehicles put on the market by manufacturers also contributes to the development of low-emissions vehicles.

The measures already taken have led to a growth in electric and plug-in hybrid passenger vehicles in France. In 2018, over 31,000 electric passenger cars and 14,500 plug-in hybrid passenger cars were registered, i.e. a 25% and 22% increase respectively compared to 2017 levels, although the market share of these types of vehicle remains generally low (2.1% of new vehicle registrations in 2018).

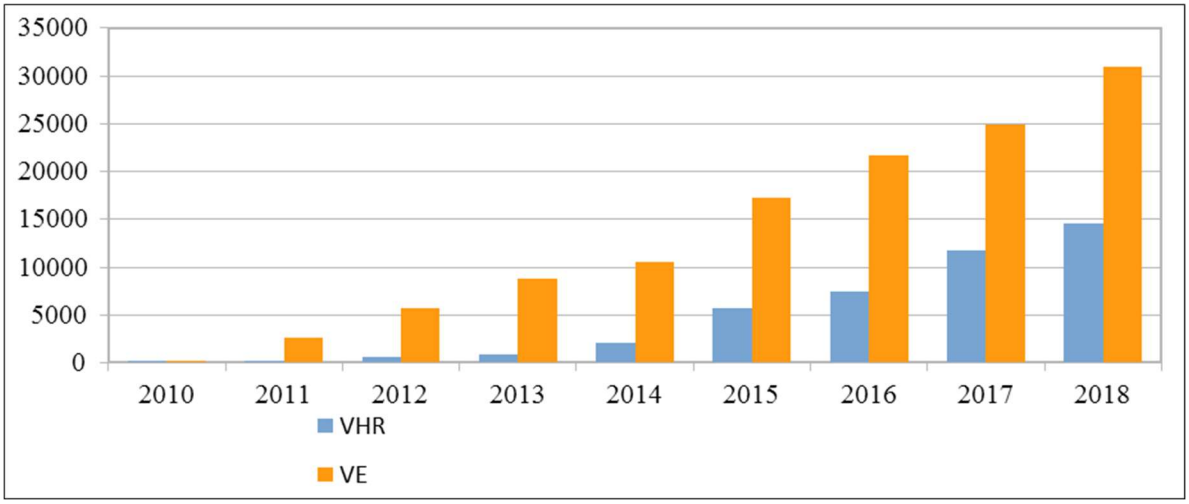

Figure 2.3: Evolution in sales of electric vehicles (French: VE) and plug-in hybrid vehicles (French: VHR); source: SDES, RSVERO

For vehicles used for public transport managed by the State and by local authorities (buses and coaches), the law makes it **mandatory to buy or use** at least 50% low-emission vehicles **when replacing the vehicle pool** for vehicles renewed after 1st January 2020, this will then rise to 100% of vehicles renewed after the 1st January 2025. The criteria defining the types of low emissions vehicles (electric, hybrid, natural gas for vehicles, biogas or biofuels from predominantly renewable sources) are set according to vehicle use, the areas in which they will travel and the local supply capacities of a given energy source.

Heavy vehicles and commercial vehicles of over 2.6t that run exclusively on one or several of the following energies: natural gas for vehicles, biomethane, ED95 fuel (ethanol), hydrogen and electricity, benefit from an extra depreciation scheme of 60% for heavy vehicles up to 16t (40% above this) and of 20% for light commercial vehicles above 2.6t.

The hydrogen plan aims to deploy regional hydrogen transport ecosystems, in particular via fleets of commercial vehicles: 5 000 light commercial vehicles and 200 heavy vehicles (buses, trucks, regional trains, boats) as well as the construction of 100 stations, supplied with locally-produced hydrogen by 2023; between 20,000 and 50,000 light commercial vehicles, 800 to 2000 heavy vehicles and between 400 and 1000 stations by 2028.

Developing biofuels

The **incentive tax on incorporating biofuels** (*taxe incitative relative à l'incorporation de biocarburants,* **TIRIB**) is high-incentive scheme to maximise the rate of biofuel incorporation while ensuring sustainability in the production of these fuels. The TIRIB is a tax paid by operators who do not meet the national biofuel incorporation targets for biofuels that meet the sustainability criteria in petrols and diesels. In 2019, the target rate of biofuel incorporations was set at 7.9%

Supporting modal shift

Supporting the modal shift towards transport modes that emit the least amount of CO_2 consists, in particular, of improving the availability of alternative transport services and infrastructures to road use, whether involving urban and interurban passenger transport or freight transport.

The national high-speed rail transport networks are well-developed, and investments in this area have been especially high in recent years, in particular with the construction of four new **high-speed lines:** Tours-Bordeaux, Brittany Pays-de-la-Loire, the East European high-speed line, and the Nîmes-Montpellier bypass (mixed passenger and freight line to free up the Nîmes-Montpellier axis), i.e. 757 km of additional new high-speed lines put into service between 2015 and 2020.

In terms of urban transport, **exclusive lane public transport systems** (*transport collectif en site propre,* TCSP) have been greatly developed in the large provincial agglomerations over the last 15 years. Since 2008, the State has been supporting exclusive-lane public transport projects carried out by transport authorities, co-funding these initiatives within the framework of calls for projects. Three calls for projects were launched between 2008 and 2013, addressed to transport authorities charged with high service quality metro, tramway or bus projects.

In Ile-de-France, the **Grand Paris des transports** project launched in 2013 aims to improve the public transport services available to passengers through improving information and network use, refurbishing and developing existing networks, building a new automatic metro network and developing a direct connection to the Paris-Roissy airport. In the long run, the plan is for 90% of the Ile-de-France population to have access to a station within 2 km. This new network will greatly improve journeys from one side of the city to the other, and will also help relieve pressure on the existing network. The objective is for all lines to gradually go into operation between 2019 and 2030.

Incentives to encourage cycling have also been introduced:

- To **facilitate bicycle parking**, there is an obligation to create secure parking spaces for bicycles during the construction of residential or office buildings, or when work is carried out on car parks, and the issue of secure bicycle parking must now be included as a point of discussion in the general assemblies of co-owned buildings;
- Businesses that provide a fleet of bicycles for free to their workers for their commute can benefit from **tax credits** equaling the costs generated by this scheme (limited to 25% of the purchase price for the fleet of bicycles). This scheme will be expanded at the end of 2019 to include long-term leases of bicycles (5 years for businesses with over 10 employees, 3 years for businesses with under 10 employees). The addition of a bicycle option in the tax arrangements for mileage expenses will also make it easier for businesses to cover the costs of professional journeys made by bicycle by their employees.
- Employers can pay part of their employees' costs for journeys made by bicycle (the bicycle mileage allowance is now replaced by the sustainable transport stipend created by the mobility orientation law (LOM)).

The Bicycle Plan of September 2018 strengthens these measures to remove the barriers that limit bicycle use and aims to triple the modal share of bicycle transport by 2023:

- Creation of a bicycle fund amounting to 350 million euros to support and expand local governments projects to create cycle routes, targeting route discontinuities in particular and to ensure the safety of all the users. In the context of the bicycle fund, a first call for projects was launched in December 2018. The call for projects aims to overcome any route discontinuities, particularly those created by large transport infrastructures. The project aims to promote the rehabilitation or introduction of continuities in the sectors that affect daily travel by establishing high quality links between workplaces, residences, especially social housing, and educational facilities and to better serve the multimodal transit hubs;
- Progressive general rollout of bicycle tagging and development of secure bike parks to combat theft and concealment;
- Development of cycling proficiency teaching and a bicycle culture at school.

The mobility orientation law (LOM) also introduces a package of measures that promote a modal shift:

- **Enhancement of public and shared transport:** a 40% increase in transport investments between the 2014-2018 and 2019-2023 periods to improve daily transport in particular;
- **A framework and tools to promote the development of alternatives to private cars** particularly in rural areas (car sharing, on-demand services, provision of car sharing vehicles).
- **Improved multimodal information** (display with a single click the transport data that provides all information on accessible travel options for a journey);
- A "**sustainable transport stipend**" which will enable all private and public employers to make contributions to the car sharing or cycling commute costs of their employees. This stipend can be up to €400/year, exempt from tax and social security contributions (€200/year for the public sector). The introduction of the stipend in each company is optional.

For freight, the Government encourages the use of rail, waterway or maritime modes of transport for the main link of the logistical chain, reserving road transport for the final leg of the journey (combined transport) within the framework of a financial support scheme**.** The current aid scheme has been implemented for the 2013-2017 period. The beneficiaries are combined transport service operators, or the freight forwarders. The purpose is to pay a flat-rate aid per intermodal transport unit - ITU (containers, swap bodies, semi-trailers, trailers) transshipped in a land or port terminal located on the French metropolitan territory and integrated into a transport chain including a pre- and post-road transportation to the extremities of the main link. The aim is to enable combined transport operators to establish a competitive pricing scheme in order to promote the development of this type of transport system.

An action area within the modal shift support policy consists of improving the information available to transport service users via the **transport services' GHG information** scheme. Services providers for freight, passenger transport or removal services will be obliged to provide information on the quantities of greenhouse gases induced by the services rendered to their clients.

Multi-faceted Measures

Since the introduction of the LTECV, local authorities have the possibility of deploying **low emissions zones,** where traffic restrictions can be introduced - depending on the type of vehicle - in order to improve air quality. The adoption of the mobility orientation law means that all urban areas of over 100,000 inhabitants are required to investigate the feasibility of this solution. Although these zones are mainly designed to exclude the most polluting vehicles in order to improve air quality, they can also promote low CO_2 emitting vehicles and a modal shift to alternative non-car transport.

Funded by the energy saving certificates scheme (*certificats d'économie d'énergie,* CEE), **the EVE Programme** (the French acronym for Voluntary Environmental Commitments - Transport and logistics) aims to support transport and logistics actors (hauliers, shippers and freight forwarders) to improve their energy and environmental performance. It is based on three voluntary schemes: Objective CO_2 (formerly named "*CO_2, les transporteurs s'engagent*" [hauliers are committed to reducing CO_2]) for goods hauliers and passenger transporters, FRET21 for freight forwarders and EVcom for shippers. The scheme also aims to create a platform where transport actors can exchange environmental data. This platform ensures that these different schemes are coherent, creates gateways between the actors and allows them to share tools.

- The Objective CO_2 scheme, resulting from a commitment charter initiated in 2008, plans to make GHG emissions assessment tools available for the introduction of a 3-year action plan for GHG reduction divided into four sections: vehicles, fuels, drivers, flow organisation.
- The FRET21 scheme aims to encourage and support shippers to reduce the GHG emissions generated by the transport of goods linked to their activity, by quantifying the environmental impact of their transportation and implementing actions to reduce their emissions over 3 years, divided into 4 areas: loading rates, distances covered, means of transport and responsible purchasing.
- The EVcom scheme is similar to the two previous schemes but aimed at freight forwarders. The 3-year reduction actions cover 4 areas: clean fleet, transport purchasing, client collaboration and the CSR approach (corporate social responsibility).

Policies and measures focusing on CO_2 emissions from international transport

Air travel

Intra-European flights are included in the European carbon market system (EU ETS). In effect, the European Union adopted directive 2008/101/EC of 19th November 2008 which modifies directive 2003/87/EC so as to include aviation activities in the European GHG emissions trading scheme The measure has been in force since 2012 for all flights leaving from or arriving in the European Union (a temporary suspension was however granted from the 24th April 2013 for international flights).

Moreover, France supports the work of the International Civil Aviation Organization (ICAO) to reduce international aviation transport emissions. From 2021 onwards, and in the context of the CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation), aviation companies will be required to offset their emissions exceeding the level of emissions in 2020 by buying carbon credits. In the first phase, only the companies from volunteering countries (including the European Union) will participate.

Maritime transport

In 2015, the European Union adopted Regulation no. 2015/757 which establishes a monitoring, reporting and verification system (MRV system) for CO_2 emissions from ships. As of 1st January 2018, maritime companies must monitor and report, on an annual basis, emissions from their ships for all intra-Union journeys and all journeys to the Union (between the last non-Union port and the first port of call located within the Union), all the journeys between a port within the Union and the first port of call outside the Union, as well as the CO_2 emissions produced in Union ports. These rules apply without distinction to all ships, whatever flag they fly. Public access to emissions-related data will contribute to removal of the commercial barriers that prevent the adoption of many negative-cost measures that would reduce greenhouse gas emissions from maritime transport.

Following the adoption of a global data collection system by the International Maritime Organization (IMO) in 2016, the European Commission decided to review the situation in order to align the EU's MRV with the IMO data collection system. In February 2019, the European Commission presented a proposal aiming to modify the EU's MRV regulation, in order to take due account of the global data collection system.

France supports the work of the IMO to encourage emissions reduction in international maritime transport.

Measures to reduce fluorinated gas (HFC) emissions from the transport sector

The **European Directive 2006/40/EC** of 17 May 2006 and the measures taken to transpose the measure into French law (Decree of 21 December 2007 on the reception of motor vehicles with regard to air conditioning systems) prohibit the use of fluorinated gases with a GWP greater than 150 in the air conditioning systems of motor vehicles, and also outline measures to limit leakage. As of 1st January 2011, the air conditioning systems of all new types of vehicles must work with a refrigerant fluid with a GWP lower than 150. As of 1st January 2017, this prohibition applies to all new vehicles. In practice, this entails replacement of the refrigerant gas R-134a (GWP of 430) with the gas R-1234yf (GWP of 4), leading to very substantial gains.

Table 3.1: Policies and measures in the transport sector

Name	Objective and/or Activity Affected	Greenhouse Gases Affected	Instrument	Status	Entity responsible	Estimated Emissions Reduction for a Given Year ($ktCO_2eq$)			
						2020	**2025**	**2030**	**2035**
Energy/CO_2 label for new cars for sale (*)	Improve vehicle energy efficiency	CO_2	Information	Implemented	MTES	2412[a]	4353	5409	6130
Ecological bonus-malus system for new vehicles (*)	Improve vehicle energy efficiency	CO_2	Fiscal, economic	Implemented	MTES				
Annual tax on company vehicles based on CO_2 emissions (*)	Improve vehicle energy efficiency	CO_2	Fiscal, economic	Implemented	MTES				
European regulation no. 333/2014 on CO_2 emissions standards for new passenger vehicles by 2020 (*)	Improve vehicle energy efficiency	CO_2	Regulatory	Implemented	MTES				
European regulation no. 510/2011 on CO_2 emissions standards for new light commercial vehicles by 2020 (*)	Improve vehicle energy efficiency	CO_2	Regulatory	Implemented	MTES	231	418	521	539
New European regulations no. 2019/631 of 17 April 2019 setting the emissions reduction targets for 2025 and 2030 for new cars and light vehicles and no. 2019/1242 for heavy vehicles	Improve vehicle energy efficiency	CO_2	Regulatory	Planned	MTES	ne	ne	ne	ne
Bonus upon purchase for electric vehicles and conversion premium (*)	Development of low-emissions vehicles / electric cars	CO_2	Fiscal, economic	Implemented	MTES	545[b]	2071	5469	9334
Development of charge infrastructures for electric vehicles: compulsory pre-equipment in some types of buildings and financial support for the installation of public and private charge stations (*)	Development of low-emissions vehicles / electric cars	CO_2	Regulatory	Implemented	MTES				
Obligation for State and local authorities to purchase electric and plug-in hybrid vehicles (*)	Development of low-emissions vehicles / electric cars	CO_2	Regulatory	Implemented	MTES				
Obligation for companies managing more than 100 vehicles to purchase electric and plug-in hybrid vehicles	Development of low-emissions vehicles / electric cars	CO_2	Regulatory	Planned	MTES	ne	ne	ne	ne

Obligation for the public transport organising authorities to purchase clean buses and coaches (*)	Development of low-emissions vehicles / electric cars	CO_2	Regulatory	Implemented	MTES	ne	ne	ne	ne
Incentive tax on incorporating biofuels (TIRIB) to encourage the introduction of biofuels (*)	Development of low-emissions vehicles / electric cars	CO_2	Fiscal	Implemented	MTES	8700	8300	7800	7800
Reduction of the Domestic Consumption Tax on Energy Products (*Taxe Intérieure de Consommation sur les Produits Energétiques* - TICPE) for natural gas for vehicles (*)	Development of low-emissions vehicles / electric cars	CO_2	Fiscal	Implemented	MTES	ne	ne	ne	ne
Extra depreciation scheme for the purchase of cleaner heavy vehicles (*)	Development of low-emissions vehicles / electric cars	CO_2	Fiscal	Implemented	MTES	ne	ne	ne	ne
Deployment of low emissions zones	Development of low-emissions vehicles / electric cars	CO_2	Regulatory	Implemented	Local authorities	ne	ne	ne	ne
Development of high-speed train lines (expansion of network since 2016) (*)	Modal shift to public transport and/or non-motorised modes.	CO_2	Planning	Implemented	MTES	452	441	434	425
Development of exclusive public transport lanes (*)	Modal shift to public transport and/or non-motorised modes.	CO_2	Planning	Implemented	Local authorities	ne	ne	ne	ne
Public transport infrastructures in the Île-de-France region: project for a new automatic metro called Grand Paris Express and transport component of the State-region plan implementation agreement (*)	Modal shift to public transport and/or non-motorised modes.	CO_2	Planning	Implemented	MTES, Île-de-France region	ne	ne	ne	ne
Half of the cost of the public transport pass borne by employers (*)	Modal shift to public transport and/or non-motorised modes.	CO_2	Economic	Implemented	Employers, MTES	ne	ne	ne	ne
Improvements in public and shared transport (mobility orientation law 2019)	Modal shift to public transport and/or non-motorised modes.	CO_2	Planning, Economic, Regulation	Planned	MTES, Local authorities	ne	ne	ne	ne
Development of secure parking spaces for bicycles in new constructions (*)	Modal shift to public transport and/or non-motorised modes.	CO_2	Regulatory	Implemented	MTES	ne	ne	ne	ne

Tax reductions for companies providing a fleet of bicycles to their employees for their home-work-place commute (*)	Modal shift to public transport and/or non-motorised modes.	CO_2	Fiscal	Implemented	MTES	ne	ne	ne	ne
Bicycle Plan to triple the share of bicycles in transport by 2024	Modal shift to public transport and/or non-motorised modes.	CO_2	Planning, Economic, Education	Implemented	MTES	ne	ne	ne	ne
Bicycle and car sharing sustainable transport stipend	Modal shift to public transport and/or non-motorised modes.	CO_2	Economic	Planned	Employers, MTES	ne	ne	ne	ne
Voluntary Environmental Commitments (EVE) programme for transport and logistics actors (*)	Vehicle energy efficiency / Demand management	CO_2	Voluntary agreements	Implemented	Haulage Companies, MTES	ne	ne	ne	ne
Combined transport assistance (*)	Modal shift to non-road transport	CO_2	Economic	Implemented	MTES	ne	ne	ne	ne
Mandatory provision of GHG information for transport services (*)	Modal shift to lower emitting transport	CO_2	Information	Implemented	Haulage Companies, MTES	ne	ne	ne	ne
Strategy to develop clean mobility in the 2019-2028 Multi-Annual Energy Plan	Cross-sectoral	CO_2	Planning	Planned	MTES	ne	ne	ne	ne
European emissions trading scheme (*)	Capping emissions from air transport	CO_2	Economic	Implemented	MTES	ne	ne	ne	ne
European system for the monitoring, reporting and declaration of CO_2 emissions from ships (*)	Setting up an MRV system for maritime transport	CO_2	Information	Implemented	MTES	ne	ne	ne	ne
Prohibition of certain fluorinated gases in the air conditioning systems of motor vehicles (*)	Reduction of fluorinated gas emissions (industrial processes), Substitution of fluorinated gases by other substances (industrial processes)	HFC	Regulatory	Implemented	MTES	940	2320	2830	2180
Mobility plans (urban travel plans)*	Modal shift to public transport and/or non-motorised modes.	CO_2	Planning	Implemented	Local authorities	ne	ne	ne	ne

Bike mileage allowance*	Modal shift to public transport and/or non-motorised modes.	CO_2	Economic	Imple-mented	MTES	ne	ne	ne	ne

An asterisk (*) means that the measure is included in the “with existing measures” scenario in the SNBC.
MTES: Ministry for Ecological and Inclusive Transition
ne: not existing
(a) and (b) Estimates for car efficiency reduction and for electric cars development are done globally and not for each indivual measure because of overlapping effects between measures. Estimates are described in :
- for the car efficiency measure : http://cdr.eionet.europa.eu/fr/eu/mmr/art04-13-14_lcds_pams_projections/pams/envwsc9fq/Report_2017_France_MMR_article_13_EN.pdf
- for the electric car development measure : http://cdr.eionet.europa.eu/fr/eu/mmr/art04-13-14_lcds_pams_projections/pams/pams/envxifeaq/FR_MMR_art._13_Rapport_2019.pdf/manage_document

The residential/tertiary sector

This sector represented 19% of national emissions in 2017. It is the second highest greenhouse gas emitting sector after the transport sector. The residential sector contributes 59.0% of the sector's emissions, and the tertiary sector contributes 41%. While the emissions from the residential sector decreased by around 14% between 1990 and 2017, emissions increased in the tertiary sector by 35% between 1990 and 2013 before decreasing by 11% between 2013 and 2017. Carbon dioxide (CO_2) is the main gas emitted and represents 84% of emissions from the building sector. The remaining 16% are shared between fluorinated gases (11%) and other gases such as nitrous oxide and methane (5%).

Measures aiming to reduce CO_2 emissions in the residential/tertiary sector

The main purpose of the measures implemented to reduce CO_2 emissions from the residential/tertiary sector is to improve the thermal performance of building shells, to encourage the use of high-performance heating equipment and of the lowest-carbon energy sources, and to improve the energy efficiency of other types of equipment (lighting, cooking, domestic hot water, specific electricity consumption). These factors are applied to both new and existing buildings.

a) For new builds

The energy performance of new buildings has been included in construction regulations since the first oil crisis in 1973. The thermal regulations applying to new buildings have since been gradually reinforced. All buildings whose construction permits were filed after 1st January 2013 are subject to the **2012 Thermal Regulation** (RT 2012). These buildings must have an overall energy consumption below 50 kWh/m²/year on average. This obligation has been applied in advance since 28 October 2011 for office buildings, schools for primary and secondary education, and early childhood centres. The requirement of 50 kWh/m²/year on average covers the consumption of heating, cooling, lighting, domestic hot water and auxiliary items (pumps and fans). In addition, this threshold is adjusted based on the geographic location, altitude, building use, average size of residences and the greenhouse gas emissions of the energies used. Regarding this last point, only buildings using wood-fired heating systems and low-CO_2 district heating networks may benefit from an adjustment of the primary energy consumption threshold - the maximum adjustment possible being set at 30%.

The **trial phase for "Positive Energy Buildings & Carbon Reduction (E+C-)" certification label** for the construction of exemplary buildings was launched at the end of 2016. This trial phase will pave the way for future environmental regulations for new buildings, which will standardize positive energy buildings and the deployment of buildings with a low carbon footprint throughout their life cycle, from design to demolition. This label establishes an innovative environmental standard for new buildings, bringing together requirements for both energy and greenhouse gas emissions in the building. Thanks to this double "energy" and "carbon" criterion, the project owner is able to choose the appropriate combination based on the specific characteristics of the local area, building typology and costs induced. The trial phase aims to field-test the balance between our environmental ambitions, the management of construction costs, and the ability of companies and equipment manufacturers to fulfil these ambitions. In this way, France is committing its building sector to move towards the construction of positive energy and low-carbon buildings.

To encourage property developers to construct exemplary buildings in terms of energy efficiency and environmental awareness, the Energy Transition for Green Growth Act of 17 August 2015 offers the possibility of obtaining a **'buildability bonus'** (bonus plot ratio) for this type of building. The relevant town planning authority may allow plot ratios to be exceeded by a maximum of 30% for new buildings which are energy-positive or which display exemplary energy or environmental features. This arrangement will enable the economic balance of these transaction to be improved and for the extra costs connected with exemplary status to be partly absorbed.

Furthermore, a technical and economic **feasibility study** of a building's various energy supply solutions must be carried out for all new buildings with a surface area exceeding 1000 m^2 that were built since 2008. This measure is designed to foster the use of renewable energy and high-efficiency systems. The scope of this measure was extended in 2014 to all new buildings of more than 50 m^2 (with the exception of individual houses or outbuildings and extensions of existing buildings).

Furthermore, a **"Biosourced building" certification label** was created in 2012 to contribute to promoting the use of local resources, to stimulating the local economic fabric and promoting the regional development and structuration of eco-industries, and to offer a wider range of materials and products for property developers. This label is assigned depending on 3 stringency levels defined by the law. For the property developers who apply, it aims to add value to new constructions that incorporate a significant share of biomass in the materials used.

Finally, the Energy Transition for Green Growth Act of August 2015 provides that new public buildings (constructed on behalf of the State, including its public bodies and local authorities) must set exemplary environmental and energy standards, and where possible shall be energy-positive with a high level of environmental performance. This obligation came into force in 2017.

The upcoming **environmental regulation for new constructions**, which is due to enter into force in 2020 (article 181 of the 2018 ELAN law - Evolution in Housing, Town Planning and Digital) superseding RT2012, will set innovative environmental standards for new buildings, and integrate requirements in various areas such as reducing energy consumption, developing the use of renewable energies and accounting for the greenhouse gas emissions in the whole life-cycle of the building (from its construction to its demolition and the entire use stage). The modalities of the upcoming environmental regulation will be based on feedback from the "Positive Energy Buildings & Carbon Reduction (E+C-)" trial.

b) Renovations to existing builds

The **energy renovation in buildings plan** (*plan rénovation énergétique des bâtiments*, PREB)**,** presented in April 2018, makes energy renovation a national priority and sets priority actions over the short term in order to: extend the reach of and improve renovations; increase grants to help all households pay for renovation works; make public buildings exemplary in terms of energy efficiency and involve the regions by mobilizing local actors. In particular, the plan foresees: the creation of a guarantee fund of over 50 million euros to help 35,000 low-income households per year; simplifying financial aid by converting tax credits for the energy transition into a premium (see further on) and by adapting the existing loans; improving the reliability of the energy labels for buildings and the energy performance certificates (*diagnostic de la performance énergétique,* DPE), in order to build trust in them; improving the training of professionals and the quality management of building work by reforming the RGE label (recognised as safeguarding the environment/*reconnu garant de l'environnement*) and by investing 30 million euros in training professionals and 40 million euros in innovation; stimulating widespread renovation of State and local government public buildings by investing 4.8 billion euros.

The Energy-Climate law (*Loi Energie-Climat,* LEC) of 2019 has made emissions reduction in the building sector a major area for action. The LEC aims to renovate all thermal sieves (housing consuming over 331 kWh/m²) by 2028, with an initial phase to inform and encourage homeowners to carry out renovation works over the 2021-2022 period, then a second phase where owners of thermal sieves will be obliged to carry out renovations by 2028, subject to sanctions to be defined at a later date.

These measures, in place since 2017, complement the existing arrangements.

- The regulations aim to guarantee quality in the renovations

The **Thermal Act** (French: RT) aims at ensuring a significant improvement in the energy performance of an existing building after its renovation. The applicable measures are the "global RT" and the "RT by building feature", and differ according to the scale of the work being carried out. For major renovations of buildings with a total area over 1000 m^2, the overall RT sets an overall energy performance target for renovated buildings, except for those built before 1948. For buildings of less than 1000 m^2 or for buildings of over 1000 m^2 undergoing light renovation, the RT by building feature defines a minimum performance level for each feature replaced or installed: in particular it applies to insulation (opaque and glass walls), heating, hot water production, cooling and ventilation equipment. The requirements of the RT by building feature became more stringent in 2017 (the new provisions came into effect on 1st January 2018).

The "**high energy performance" (*Haute Performance Energétique,* HPE) certification** for building renovations moreover supports and enhances the voluntary efforts of building contractors seeking to carry out efficient or highly efficient energy renovation projects (to then obtain the "**Low Consumption Building"** label or *Bâtiment Basse Consommation,* **BBC**). The label indicates that the building meets superior standards for energy efficiency and summer temperature management.

Finally, as of the 1st of January 2008, any building of over 1000 m^2 undergoing major renovation must, like any new building, be the subject of an energy supply **feasibility study,** to encourage the building owner to use a renewable source of energy or a high-performance system.

- Financial aid for renovation

To foster energy renovation, financial aid is available for private individuals and for social landlords. Private individuals can benefit from the eco-loan at a zero percent interest rate, and from the energy transition tax credit. Specific supplementary grants are in place for low-income households. Social landlords can obtain the social housing eco-loan.

The **energy transition tax credit (*crédit d'impôt pour la transition énergétique*, CITE)** makes it possible to deduct 30% of expenditure on certain energy performance improvement works from one's income tax. The objective of this scheme is to encourage individuals to carry out energy upgrade work on their homes while supporting the most efficient emerging technologies in terms of energy consumption reduction, thereby spurring markets towards higher performance standards. The CITE focuses on building works and more efficient equipment. The CITE will be reformed in 2020 to refocus on low-income households. It will be transformed into the "**Prime Rénov'"** (refit premium) from the 1st January 2020 for households with the lowest incomes, and from 2021 for middle-income households. It will be paid by ANAH at the time of the renovation. The rate of aid will be increased for households with the lowest incomes, so that public aid is a real catalyst of building work to escape fuel poverty.

The **zero-interest eco-loan (*éco-PTZ*)** enables recipients to benefit from a zero-interest loan of up to €30,000 to finance a range of energy renovation projects. It applies to property owner-residents or landlords. The performance criteria for building work eligible for the CITE and the éco-PTZ are identical, thus increasing accessibility and synergies between the two measures.

Since 2015, the main aid packages (éco-PTZ and CITE) have been subject to an **'eco-conditionality' requirement**: in order to benefit, individuals must use companies recognised as safeguarding the environment (*"Reconnues Garantes de l'Environnement",* or RGE). Indeed, the environmental competency of the contracting company employed to carry out the various aspects of the building refurbishments is an essential aspect of construction quality. In addition, the training of building professionals is supported via the **FEEBat training initiative** (training in energy savings for companies and artisans in the building sector) which benefits from financing under the energy savings certification scheme (CEE). This initiative allows professionals to benefit from energy savings training from approved providers under favourable financial conditions, available throughout the country. The

FEEBat initiative will be reinforced over the coming period for the energy saving certification scheme, and in accordance with the implementation of "eco-conditions" for incentive schemes: training objectives have been revised, increasing to 25,000 trainees per year, with new training providers integrated into the scheme in order to increase capacity.

In addition to the CITE and the éco-PTZ, the **French National Housing Agency (ANAH) aid scheme** helps property owner-residents or landlords living under a certain wealth threshold to carry out living space improvement renovations in the context of the "Living Better" programme. The programme also includes a specific support measure providing project management assistance to property owners.

Within the framework of the Energy Saving Certificates scheme (CEE), the **energy saving helping hand *(coup de pouce*) for households** plans to increase the premiums for some operations. For these, the applicants will be asked to commit by signing a charter in order to be awarded significant premiums, thus decreasing the sum remaining for them to pay during the renovation work. The premium increase concerns operations for which the applicant for the CEE signs one of the commitment charters: "Heating Helping hand" or "Insulation Helping hand". All households can benefit from this offer. The size of the premiums attributed will however differ depending on the household resource level. Households with the lowest incomes benefit from larger premiums. The 2019-2028 Multi-Annual Energy Plan aims to continue and boost the CEE helping hand to halt the use of fuel-oil boilers in favour of heat pumps, biomass boilers, combined solar systems, gas boilers with very high energy efficiency specifications in areas served with natural gas or a connection to a renewable heating network.

The **social housing eco-loan (éco-PLS)** is a reduced-interest rate loan - the rate varies based on project duration and the amount varies based on the energy savings achieved through the work funded by the loan. It is available in particular to low-rent housing organisations, semi-public companies, and municipalities owning or managing social housing, in the context of the thermal renovation of energy-inefficient residences. The éco-PLS finances energy saving work that will enable a dwelling to move from a primary energy consumption level of over 230 kWh/m^2/year to a consumption level below 150 kWh/m^2/year.

Besides financial aid, schemes have been set up to facilitate the financing of energy renovation work:

- a full legal framework has been established covering **third-party financing**. Third-party financing is an energy upgrade offer that includes the funding of the operation and post-construction monitoring, in such a way that the owner has no outlay to fund since the future energy savings will gradually repay all or part of the investment;

- a **guarantee fund for energy upgrades** was created by the Energy Transition for Green Growth Act (LTECV) of August 2015 to facilitate the funding of building work to improve the energy performance of existing dwellings. It enables banking institutions to benefit from a guarantee when making loans to owners of existing dwellings with modest resources who are funding energy upgrading work.

Furthermore, a **reduced VAT** (value added tax) **rate of 5.5%** applies to work to improve the energy performance of dwellings, thereby limiting the costs involved.

➢ Measures to provide information and support

Measures have been implemented to foster the provision of information to users on the energy performance of the buildings they occupy, and on existing renovation aid schemes:

- **energy performance certificates** (DPE) indicate a building's energy efficiency ratings, assessed on the basis of energy consumption and greenhouse gas emissions. The assessment also includes recommendations that will allow the buyer, property owner, landlord or renter to understand the most effective measures to save energy. Since 2006, a DPE must be established on the occasion of the sale of any building or section of a building, whatever its use (residential or tertiary). Since 2007, a DPE must be established for the rental of a dwelling or a building mainly used as a residence. Work is in progress to improve the reliability of the DPE;

- Condominiums built before 2000 comprising 50 lots or more and equipped with a collective heating or cooling installation were obliged to conduct a mandatory **energy audit** before the 1st of January 2017. This audit includes, for each building in the condominium, an estimation of the building's annual energy consumption for heating, cooling, domestic hot water production, lighting and ventilation. The audit must include proposals for building work intended to improve the building's energy performance;

- since 2012, an **environmental annex** (known as the 'green annex') must accompany the contract for recently concluded or renewed leases for business premises used for offices or shops with floor space exceeding 2000 m^2. Since July 2013, this annex has been mandatory for all existing leases. The environmental annex must include a description of the energy characteristics of the building's equipment and systems, their actual water and energy consumption and the quantity of waste generated by the building.

- Launched in April 2018, Ademe's campaign known as **"FAIRE" the French acronym for "Facilitation, Support and Information for Energy Renovation"** aims to make the public service that provides information and advice on residential energy renovation more understandable for citizens, and to encourage all public and private actors to embark on renovation. FAIRE is an umbrella label to unite and explain all the actors participating in energy renovation. A new programme, CEE Sare (French acronym for "support service for the energy renovation"), has been launched to support the deployment strategy of the FAIRE project.

Furthermore, various schemes aim to remove some of the barriers hindering the decision to undertake building renovation or other virtuous practices:

- The asymmetry between owner-landlords, who bear the cost of the works, and tenants, who benefit from the energy savings induced, is reduced via the possibility of **sharing cost savings between owners and tenants.** Following the completion of the energy saving renovations, an owner can request a monthly financial contribution from their tenant equal to half of the energy savings achieved for that month. This contribution is noted via a new indication on the tenant's official rent receipt, remaining valid for a period of 15 years. However, this participation is only possible if the landlord completes a package of efficiency operations including at least two actions, or one action enabling a minimum performance level to be reached, and if they have consulted their tenant beforehand;
- in a collectively heated building, the bills are usually broken down according to ownership share or in proportion to the surface area of the apartment, even if the heating consumption differs from one dwelling to another. **Individualised heating costs** involves making the occupant pay for their actual heat consumption. This gives the occupant more information on their heating use and encourages them to control their consumption. The Energy Transition for Green Growth Act of August 2015 sets out **a nationwide roll-out** of this scheme, which had hitherto been mandatory only for energy-inefficient residential buildings. The obligation to individualize heating costs is thus extended to all residential buildings, and to the tertiary sector, except where this is technically impossible or it has become necessary to change a building's entire heating installation.

- Renovation work obligations

One measure introduced in the LTECV of August 2015 is the **legal requirement to install thermal insulation during any major renovation projects** (restoration of a building's façades, re-roofing, or the conversation of garages, attics and other undeveloped spaces into living quarters) The measure ensures that each instance of major building work is treated as an opportunity for a contractor to carry out (at a reduced cost) energy-efficient refurbishments and therefore lower the building's energy requirements. The energy-efficiency refurbishment requirements apply to all contracting agreements entered into as of 1 January 2017 for buildings intended for use as residences, offices, commercial spaces, educational centres and hotels. The insulation installed must result in a level of thermal performance that complies with the thermal regulation for each building feature. In addition, insulation operations may benefit from financial aid packages (energy transition tax credits, zero-interest eco-loans, energy savings certificates).
For the tertiary sector, a particular effort is being made to **reduce the energy consumption of the State's building pool.** Several types of actions are being implemented: renovations to building exteriors and facilities, actions related to facilities and occupant management, reduction in amounts of space used by civil service departments. The objective is to achieve a 40% reduction in energy consumption in buildings owned by the State and its public bodies between 2012 and 2020.

Buildings, parts of buildings or collections of buildings used for tertiary sector purposes totalling more than 1000 m^2 are **obliged to take actions to reduce energy consumption.** For the years 2030, 2040 and 2050, they must achieve the following objectives: either a level of end-use energy consumption reduced by, respectively 40%, 50% and 60% compared to a reference level of energy consumption that can not date back to before 2010, or a level of end-use energy consumption set in absolute values, in function to the energy consumption of new buildings in the same category. The decree ("tertiary decree") under the ELAN law (Evolution in Housing, Town Planning and Digital) came into force in 2019.

The energy-climate law of 2019 creates obligations to renovate energy sieves by 2028. An initial incentive phase stipulates an obligation from 2022 onwards to carry out an energy audit if a thermal sieve is put up for sale or rent. This should contain proposals for building work specific to the building in question as well as the estimated cost, and should inform the buyer or tenant about their future energy spending. In a second mandatory phase, owners of thermal sieves will be required to carry out work to improve the energy efficiency of their property before 2028.

c) Increasing the energy efficiency of other types of equipment

The European Framework Directive 2009/125/EC establishes a framework for setting **eco-design** requirements applicable to energy-related products. All of the implementing regulations of the framework directive have been adopted to date. They cover a range of products, and particularly the following regulations that affect energy consumption in the residential/tertiary sector (specific electricity consumption, cooking, lighting and heating):

- horizontal regulations which apply in a systematic manner to all types of equipment, such as "stand-by and off" modes;
- regulations on so-called "white" products: refrigeration equipment, washing machines, dishwashers, tumble dryers; kitchen equipment such as ovens, extractor hoods and hobs; vacuum cleaners;
- regulations on electronic products: TV sets, computers and servers, decoders and external power supplies;
- regulations on air conditioning and heating systems: boilers (all fuels), water heaters, mixed heating, heat pumps and cogeneration, independent appliances; air conditioners and fans;
- regulations on lighting: domestic lighting.

Energy labelling (under Directive 2017/1369/EU) complements the scheme by encouraging consumers to buy the least wasteful products. The range of products subject to this obligation is gradually being broadened.

Measures to reduce HFC emissions from buildings

Fluorinated gas emissions in the building sector come from cooling equipment (domestic cooling for the residential sector and commercial cooling for the services sector), air conditioning systems and heat pumps. **European regulation no. 517/2014 (referred to as "F-Gas II")** establishes a set of provisions to limit fluorinated gas emissions from refrigeration and air conditioning equipment used in buildings, as well as in other sectors (industry and refrigerated transport) (cf. detailed description of the F-Gas II Regulation in Section B. 8. Cross-cutting policies and measures).

Table 3.2: Policies and measures in the building sector

Name	Objective and/or activity affected	Greenhouse gases involved	Instrument	Status	Entity responsible	Estimated emissions reduction for a given year (ktCO2eq)			
						2020	2025	2030	2035
Thermal regulation in new buildings (RT2012) *	Improve the energy efficiency of new buildings, and encourage the use of renewable energies.	CO_2	Regulatory	Implemented	MTES, MCT	3600	6300	9000	11700
Trial phase for the "Positive Energy Buildings and Carbon Reduction (E+C-)"* certification label	Improving the energy efficiency of new buildings, decreasing their carbon footprint and fostering resorting to renewable energies.	CO_2	Regulations, information (labelling), other measures (trial phases)	Implemented	MTES, MCT	ne	ne	ne	ne
Constructibility bonus *	Improve the energy efficiency of new buildings, and encourage the use of renewable energies.	CO_2	Economic Incentives	Implemented	MTES, MCT	ne	ne	ne	ne
Technical and economic feasibility study of the various energy supply solutions for the construction *	Fostering the use of renewable energy and more efficient systems in new buildings	CO_2	Regulation, information	Implemented	MTES, MCT	ne	ne	ne	ne
The "Biosourced Building" certification *	Adds value to new constructions incorporating biomass in the products used	CO_2	Regulation, information (certification label)	Implemented	MTES, MCT	ne	ne	ne	ne
Environmental regulation for new buildings (RE2020)	Improve the energy efficiency of new buildings, and encourage the use of renewable energies.	CO_2	Regulatory	Planned	MTES, MCT	ne	ne	ne	ne
Energy audits for thermal sieves	Incentives for energy upgrading of existing buildings (social housing)	CO_2	Planning	Planned	MTES, MCT	ne	ne	ne	ne

"FAIRE" the French acronym for "Facilitation, Support and Information for Energy Renovation"	Encourage energy renovation in existing buildings by improving the information provided to individuals regarding the energy upgrade of their dwelling	CO_2	Information	Implemented	Ademe	ne	ne	ne	ne
Energy renovation in building plans (PREB)	Incentives for energy upgrading of existing buildings	CO_2	Planning, Economic, Education, Information	Implemented	MTES, MCT	ne	ne	ne	ne
Energy and environment exemplarity of new public buildings *	Improve the energy efficiency of new buildings, and encourage the use of renewable energies.	CO_2	Regulatory	Implemented	MTES, MCT	ne	ne	ne	ne
Thermal regulation in existing buildings *	Increase the energy performance of existing buildings through renovation work	CO_2	Regulatory	Implemented	MTES, MCT	ne	ne	ne	ne
High Energy Performance (HPE) certification label for building renovations	Encouraging high-performance renovations of existing buildings	CO_2	Information	Implemented	MTES, MCT	ne	ne	ne	ne
Energy transition tax credit (CITE) *	Incentives for energy upgrading of existing buildings	CO_2	Fiscal	Implemented	MTES, MCT	ne	ne	ne	ne
Zero-interest Eco-loan (éco-PTZ) *	Incentives for energy upgrading of existing buildings	CO_2	Economic	Implemented	MTES, MCT	ne	ne	ne	ne
FEEBat initiative (Training in energy savings for companies and artisans in the building sector)*	Improving the quality of renovations by certifying the competency of professionals	CO_2	Education	Implemented	MTES, MCT	ne	ne	ne	ne
Grants from the French National Housing Agency (ANAH) *	Incentives for energy upgrading of existing buildings, reducing energy poverty	CO_2	Economic	Implemented	ANAH	ne	ne	ne	ne

Eco-loans for Social Housing (éco-PLS) *	Incentives for energy upgrading of existing buildings (social housing)	CO_2	Economic	Implemented	MTES, MCT	ne	ne	ne	ne
Third-party financing of energy-efficient renovation projects *	Incentives for energy upgrading of existing buildings	CO_2	Economic	Implemented	MTES, MCT	ne	ne	ne	ne
Guarantee Fund for Energy Upgrading *	Incentives for energy upgrading of existing buildings	CO_2	Economic	Implemented	MTES, MCT	ne	ne	ne	ne
Reduced VAT rate of 5.5% for renovation work to improve the energy efficiency of buildings*	Incentives for energy upgrading of existing buildings	CO_2	Fiscal	Implemented	MTES, MCT	ne	ne	ne	ne
Energy Performance Certificate*	Incentives for energy upgrading of existing buildings	CO_2	Information, Regulation	Implemented	MTES, MCT	ne	ne	ne	ne
Mandatory energy audit for condominiums*	Incentives for energy upgrading of existing buildings	CO_2	Regulation, information	Implemented	MTES, MCT	ne	ne	ne	ne
Environmental annex included in lease contracts for commercial and office premises*	Improving information on the energy performance of existing tertiary sector buildings	CO_2	Information, Regulation	Implemented	MTES, MCT	ne	ne	ne	ne
Sharing cost savings between owner and tenant*	Incentives for energy upgrading of rented accommodation	CO_2	Economic	Implemented	MTES, MCT	ne	ne	ne	ne
Individualized heating costs*	Encouraging the control of energy consumption in existing buildings	CO_2	Economic	Implemented	MTES, MCT	ne	ne	ne	ne
Obligation to install thermal insulation when undertaking major building renovations *	Increasing the number of energy upgrades in existing buildings	CO_2	Regulatory	Implemented	MTES, MCT	700	1500	2300	3100

Measures to reduce the energy consumption of the State's building pool *	Reducing the energy consumption of the public services sector	CO_2	Planning	Implemented	State services	ne	ne	ne	ne
Obligations to act to reduce energy consumption in the tertiary sector building pool	Increasing the number of energy upgrades in existing buildings	CO_2	Regulatory	Adopted	MTES, MCT	ne	ne	ne	ne
Ecodesign of products *	Improve the energy efficiency of other types of equipment (electronic products, heating and cooling appliances, lighting).	CO_2	Regulatory	Implemented	MTES	ne	ne	ne	ne
Energy certification *	Encourage consumers to choose products that consume less energy	CO_2	Information	Implemented	MTES, ME	ne	ne	ne	ne

An asterisk (*) means that the measure is included in the "with existing measures" scenario in the SNBC.
MTES: Ministry for Ecological and Inclusive Transition
ne: not existing

Industry

The manufacturing industry contributed to 17% of France's greenhouse gas emissions in 2017. Emissions from this sector mainly come from industries producing CO_2-intensive commodities such as metallurgy, chemicals or the manufacturing of non-metallic minerals (cements, lime, glass, etc.). CO_2 is the main greenhouse gas emitted by the manufacturing industry (90%), followed by fluorinated gases (6%) and N_2O (3%).

Measures to reduce CO_2 emissions from industry

The **European emissions trading system** (EU ETS) plays a structuring role by capping emissions from industrial facilities. This has been significantly reinforced for the 2021-2030 phase with the revision of the "ETS" directive that came into force in April 2018. This led to a sharp rise in the price of carbon, which rose from €6/tCO_2 on average for the year 2017 to €25/tCO_2 in 2019. The emissions from the sectors covered decreased by 4% between 2017 and 2018 at European level.

The reductions in greenhouse gas emissions in industry are also due to some cross-sectoral measures (detailed in the section entitled 'energy consumption reduction in all the sectors'): the **energy saving certificates scheme, Ademe's heat fund** and **the obligation to undertake energy audits** for large companies. The industry sector can also benefit from **Future Investments Programme (PIA)** funding for innovative projects in the field of the ecological and energy transition.

Some specific complementary measures for industrial businesses have also been introduced:

- the **Energy Eco-loan**, of between €10,000 and €100,000, makes it possible to fund purchases and installation work carried out by VSEs and small SMEs investing in equipment that fetches energy saving certificates;
- The ADEME's **"Decision-making aid"** mechanism subsidizes studies looking at energy efficiency in industry, including energy performance diagnostics (where these have not been made mandatory by regulations), as well as the setting up of energy management systems;
- the **PROREFEI training programme,** launched in 2018 and funded by the energy saving certificates scheme, aims to train those responsible for managing energy in businesses to make these businesses genuine energy knowledge centres, capable of designing, implementing and co-ordinating actions that improve the energy efficiency of their sites. It also aims to creates a network of energy 'experts' who will have access to feedback from across the European Union and to technical and regulatory oversight;
- The **INVEEST programme**, also funded by the energy saving certificates scheme, is aimed at finance actors (bankers, auditors, accountants, etc.). Through a training and support programme combining energy, financial and industrial expertise, this programme aims to accelerate the funding of energy efficiency projects in the industry sector;
- as of 1 January 2015, pursuant to Article 14 of Directive 2012/27/EU on energy efficiency, industrial facilities generating unused **waste heat** must carry out a **cost-benefit analysis** if they are either planning for a new facility or carrying out major refurbishments. This analysis makes it possible for an industrialist to evaluate the potential profitability of the unused waste heat through a connection to a heating or cooling network, and is accompanied by the implementation of solutions that are deemed cost-effective. The main industrial sectors affected by the measure are chemicals, glass, cement, lime, plaster, and paper-cardboard production, metal transformation and agribusiness;
- since 2016, companies that consume high levels of electricity can benefit from a **reduction in the tariffs for utilising public electricity systems** (TURPE). In return, they must implement an **energy performance policy** (implement an energy management system according to the ISO 50001 standard, reach a performance

target monitored by means of indicators subject to certification within 5 years, and develop an energy performance plan to reach this target);

- the **"2025 productive Pact"**, launched in 2019, aims to involve industry players in the transition, to encourage ownership of the issues by the actors involved in the transformation, and identify deadlocks in the regulation, gaps in the financing, and technological barriers. The ecological transition lies at the heart of these projects involving different work groups (particularly in improving the impact of the French energy transition, developing a hydrogen economy, accelerating the decarbonisation of industry, etc.). In particular, **the industrial sector have committed to devising long-term decarbonisation strategies.** The aim is to obtain commitments from every sector on climate goals that align with the SNBC and action plans to mobilise all means of decarbonisation.

Measures to reduce fluorinated gas emissions from industry

Perfluorocarbon (PFC) emissions from aluminium production have been subject to the **European emissions trading system** since 2013.

European Regulation No. 517/2014 (referred to as "F-Gas II") establishes a set of provisions to limit fluorinated gas emissions from cooling and air conditioning equipment, in particular industrial cooling (cf. detailed description of the regulation in Section B.8).

At the national level, the 2019 finance law foresees the introduction from 2021 onwards of a **tax on HFCs** whose rate should evolve in the following manner: €15 per tonne of CO2 equivalent in 2021, €18 in 2022, €22 in 2023, €26 in 2024 and €30 after 2025. The entry into force of this tax on the 1st of January 2021 has been arranged so that, before this date, it will possible to assess adherence to the commitments made by the professionals to reduce their consumption of this gas. The results of this assessment will reveal whether these gases still constitute a relevant taxable base that can generate sufficient returns.

Finally, **tax assistance has been introduced for businesses replacing their HFC-based equipment with non-HFC-based equipment.** Businesses subject to business or income tax under an effective tax rate can deduct from their taxable income a sum equalling 40% of the original value of HFC-free refrigeration and air treatment equipment goods acquired as new from 1 January 2019, until 31 December 2022.

Measures to reduce industrial N_2O emissions

N_2O emissions from the chemicals sector have been subject to the European emissions trading system since 2013.

Table 3.3: Policies and measures in the industry sector

Name	Objective and/or activity affected	Greenhouse gases involved	Instrument	Status	Entity responsible	Estimated emissions reduction for a given year ($ktCO_{2eq}$)			
						2020	2025	2030	2035
European emissions trading scheme *	Capping emissions from industrial installations	CO_2, PFC, N_2O	Economic	Implemented	MTES	ne	ne	ne	ne
Energy Eco-loan *	Help VSEs and SMEs to fund equipment that brings about energy savings	CO_2	Economic	Implemented	Bpifrance	ne	ne	ne	ne
Decision-making aids*	Improve energy efficiency in industry by subsidizing energy efficiency studies	CO_2	Economic, Information	Implemented	Ademe	ne	ne	ne	ne
PROREFEI training programme *	Improving energy efficiency in industry by training energy users	CO_2	Education & Training	Implemented	MTES, ADEME, private actors (ATEE, EDF, Total Marketing France)	ne	ne	ne	ne
INVEEST programme*	Train financial actors to accelerate the funding of energy efficiency projects in industry	CO_2	Education & Training	Implemented	MTES, ADEME, private actors (GreenFlex, Total Marketing France, SIPLEC)	ne	ne	ne	ne
Mandatory cost-benefit analysis of waste heat recovery*	Make use of industrial waste heat	CO_2	Regulatory	Implemented	MTES	ne	ne	ne	ne
Preferential pricing of electricity supply for power-intensive sites implementing an energy performance policy*	Increasing energy efficiency at power-intensive sites	CO_2	Economic	Implemented	MTES	ne	ne	ne	ne
Taxing HFCs	Reducing emissions resulting from the use of fluorinated gas	HFC	Fiscal	Planned	MTES	ne	ne	ne	ne
Tax assistance for businesses to replace their HFC-based equipment with non-HFC-based equipment.*	Reducing emissions resulting from the use of fluorinated gas	HFC	Fiscal	Implemented	MTES	ne	ne	ne	ne

Reinforcement of the regulations relating to the leaking control of refrigeration, climatic and thermodynamic equipment *	Reducing emissions resulting from the use of fluorinated gas	HFC	Regulatory	Implemented	MTES	190	70	40	30
Reinforcement of the regulations relating to the recovery of fluorinated fluids waste and the supervision of HFC preloaded equipment *	Reducing emissions resulting from the use of fluorinated gas	HFC	Regulatory	Implemented	MTES	ne	ne	ne	ne
Support for the agrifood industry in improving its environmental performance	Efficiency improvement in industrial end-use sectors Replacement of fluorinated gases by other substances	HFC, CO_2	Voluntary/negotiated agreements	Adopted	Strategic industry committee, MAA	ne	ne	ne	ne
Prohibition of certain fluorinated gases in the air conditioning systems of motor vehicles (*)	Reduction of fluorinated gas emissions (industrial processes), Substitution of fluorinated gases by other substances (industrial processes)	HFC	Regulatory	Implemented	MTES	940	2320	2830	2180

An asterisk (*) means that the measure is included in the “with existing measures” scenario in the SNBC.
MTES: Ministry for Ecological and Inclusive Transition
ne: not existing

Energy

In this section, a distinction is made between energy production and energy consumption. In the sub-section on energy consumption (B.4.2), we have chosen to report on policies and measures that have a 'cross-cutting' impact on energy consumption (i.e. those which affect several sectors). The policies and measures which impact energy consumption in a single sector are reported in the sections focusing on individual sectors.

Energy production

Energy production accounted for 12% of our national emissions in 2017. The main sources of emissions are electricity production which represents 54% of the sector's emissions, oil refining (18%), energy transformation (12%) and urban heating (8%), followed by the transformation of solid mineral fuels in the steel industry (6%) and the extraction and distribution of gaseous fuels (3%).

Measures to reduce CO_2 emissions from energy production

Reducing CO_2 emissions from the energy production sector involves, in particular, capping emissions from electricity and heating production facilities and refineries via the **European emissions trading scheme,** by reducing energy demand and decarbonising the sector. For this reason, the revised National Low Carbon Strategy aims for complete decarbonisation of the sector by 2050, notably by developing renewable energies.

Furthermore, the hydrocarbon law adopted at the end of 2017 prohibits all new permits to explore or exploit fossil fuels and reiterates the target of ending all existing production by 2040.

The State supports the deployment of renewable electric energies through feed-in or additional compensation tariffs, linked to technology-specific calls for tender where appropriate.

Furthermore, in order to support the practical realisation of REn development projects, the State launched the REn liberation plan at the end of 2017 which aims to adopt measures to simplify the paperwork involved in order to improve timeliness and reduce costs. This plan has already resulted in reduced paperwork for the on-shore wind turbine, photovoltaic solar and biogas sectors, and an increase in the number of solar calls for tender (1.5 to 2.5 GW/yr).

A **tariff reconstruction system for connecting renewable energy production facilities** to gas and electricity networks was introduced in 2017. Under this system, up to 40% of these costs can be covered by network operators. This considerably reduces connection costs for agricultural facilities that are often situated far from the networks and will therefore make it easier to deploy renewable energy.

The **National Biomass Mobilisation Strategy,** created in 2018, defines strategic directions, recommendations and actions regarding the production and commercial sectors for biomass likely to be used in energy production, with the aim of increasing biomass production and mobilisation, while also monitoring its use and contribution to mitigating climate change. The Regional Biomass Mobilisation Schemes adapt the National Biomass Mobilisation Strategy to suit regional particularities.

The **right to inject for biomethane installations**, created in 2019, enables natural gas network managers to carry out the necessary work so that the biomethane produced can be injected into the gas network (under conditions and limits that ensure that the investments are technically and economically appropriate). The aim is to make it easier to undertake biogas projects which are currently limited by the capacity of the local gas network array.

The 2019-2028 Multi-Annual Energy Plan (PPE 2) also provides for the following measures to encourage the deployment of renewable energies and the decarbonisation of the sector:

- to boost **on-shore wind farms**: make it mandatory by 2023 to recycle the constituent materials of the wind turbines when dismantled, encourage reuse of wind farm sites at the end of their life to reinstall better performing machines, launch calls for tender amounting to 2 GW/yr following a timeline defined in the PPE.

- to boost **photovoltaics**: prioritise the development of ground-based photovoltaics, which are cheaper, over urbanised or degraded plots and car parks, ensuring that these projects are not harmful to biodiversity and agricultural land, support innovation in the photovoltaics sector via calls for tender to encourage new solar solutions on the ground (agro-voltaics, floating power stations etc.) and on buildings. The PPE 2 project sets a timeline for calls for tender corresponding to 2 GW per year for ground-based plants and 0.9 GW per year for installations on large roofs, and it retains the objective to install 3050 MW per year for installations on small and mid-sized roofs (under 100 kWc) via an open-access system to guide the projects towards self-consumption.

- to boost **renewable gas** development: increase visibility by adopting a timeline for calls for tender for injected biomethane: two calls for tender, for an annual production objective of 350 GWh HHV/yr each, will be launched each year; consolidate the obligation to purchase biogas at a regulated rate and launch calls for tender that allow us to meet the production objectives while keeping the costs under control through a sharp cost-cutting; introduce an adapted support mechanism for biomethane not injected into the natural gas networks (particularly biomethane used directly in bioNGV vehicles).

- to boost **hydrogen** development: introduce a support system for the development of hydrogen amounting to 100 million euros and launch a call for projects on mobility and hydrogen production using electrolysers; introduce by 2020 a traceability system for carbon-free hydrogen; extend the over-depreciation measure to cover the purchase of hydrogen vehicles under at least the same conditions as for NGV (heavy vehicles>3.5t); mobilise the financial institutions (private and public funding including CDC, BPI) and standardise the co-funding models for projects to develop hydrogen ecosystems in the regions; conduct discussions with all players on simplifying and harmonising the licensing and certification procedures for boats and associated hydrogen fueling solutions.

- to boost **biofuel** development: incentives for biofuel incorporation, for operators releasing the fuels for consumption. Furthermore, beyond the existing ceiling for conventional biofuels, the incorporation of biofuels made from primary materials with a high risk of causing indirect changes in land use (in this case palm oil) will be limited, as stipulated in the new European directive relating to renewables, RED II of 11 December 2018 and especially its delegated act of 13 March 2019.[21]

- to boost decarbonisation of the sector: **halt the last electricity plants running exclusively on coal by 2022** or support changes towards less carbon-rich solutions, but also **no longer authorise any new project to build electricity production plants exclusively fuelled by fossil fuels.** In the light of this, the ecological transition contracts (*contrats de transition écologique*, CTE), signed by the State and the regions, set a timeline of voluntary ecological transformation actions for regional authorities. Their specific aim is to provide support for industrial reconversion in situations where the region is affected by the closure of a coal plant. After an initial trial phase in 2018, the decision was taken to extend the CTE initiative and to conduct a second trial phase in the first semester of 2019. A wider rollout is now being planned.

[21] https://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=CELEX:32019R0807&from=EN

The 2019-2028 Multi-Annual Energy Plan (PPE2) also foresees undertaking, during the first period of the PPE (2019-2023), the process of developing electricity pump stations with a potential of 1.5GW, with a view to commissioning the installations between 2030 and 2035. Moreover, the PPE 2 sets a load management goal of 6.5 GW by 2028 with an interim target of 4.5 GW in 2023.

The PPE notably provides the means to meet the renewable energy production targets set by the 2015 Energy Transition for Green Growth Act and the Energy-Climate law of 2019. In effect, French legislation stipulates that the share of renewables should reach at least 33% of the end-use gross energy consumption by 2030. This target is broken down by energy vector: 40% of electricity generation should be renewable by 2030, 38% of end-use heating consumption; 15% of end-use fuel consumption, and 10% of end-use gas consumption. The production of heating and cooling from renewable sources in thermal networks will increase five-fold between 2012 and 2030.

In this context, the PPE sets targets for each renewable sector for 2023 and 2028. The incentive mechanisms put in place are specific to each channel and must be the subject of periodical adjustments to account for technical and economic developments. They are guided by the principle of ensuring the minimum profitability required for the deployment of these technologies.

To achieve its targets regarding renewable energy production, the French government uses two main types of support mechanism: open-access schemes and procedures to increase market competition.

The **open-access** mechanism confers the right to garner support for any eligible installation. This mechanism is adapted for mature sectors for which production costs are relatively known and stable, and for which there are many potential development sites with limited conflicts of use. Since this initiative does not allow renewables to be developed at the best cost; it is only for small-scale installations (up to 1 MW, and by exception up to 18 MW for wind turbines), for accessibility reasons. Two open-access support mechanisms can be identified, depending on the size of the facility: the purchasing obligation and the additional compensation scheme.

The purchasing obligation has only been applied to the smallest installations since 2016 (up to 500 kW). Any kilowatt-hour injected onto the public network is purchased by an obligated buyer at a feed-in tariff exceeding the average market price level, set in advance and enabling the costs of its installation to be covered while ensuring normal project profitability.

The additional compensation scheme, introduced in 2016, applies to installations with greater capacities (mandatory where the installed capacity exceeds 500 kW). Open-access additional compensation is a bonus paid to a renewable energy producer as a supplement to the market sale of the electricity that it has generated. This bonus is proportional to the energy generated and is calculated as the difference between a reference tariff and the market price. It must provide the producer with sufficient remuneration to cover the costs of its installation while ensuring normal project profitability.

In **tendering procedures**, support is only allocated to parties awarded with contracts under these procedures (e.g. calls for tender). These systems are suitable for renewable energy sectors that have one of the following characteristics: need for supervision due to the risk of usage conflicts; lack of suitable areas (e.g. offshore wind power); highly asymmetric cost information; technological demonstration and industrial development issues. Tendering procedures improve competitiveness in renewable energy development by placing projects in competition with one another, and are suitable tools for controlling renewable energy development trajectories in accordance with the targets set by the PPE (multi-year energy programme). When the capacity targets set by the PPE have not been attained, the minister in charge of energy has the option of initiating tendering procedures to develop new production capacities. Winning projects can benefit both from a feed-in tariff and from an additional compensation scheme, depending on the installed capacity of the projects and the procedure's bill of specifications.

Support is provided for renewable energy in the gas sector via the following mechanisms:

- open-access schemes: any biogas producer wishing to inject their product into the natural gas transport and distribution networks is eligible for an open-access purchasing obligation, provided that this has no adverse effect on the proper operation of the networks. In this system, the injected biogas is purchased by a natural gas supplier at a pre-set feed-in tariff covering the biogas production plant investment and operating costs, while ensuring normal project profitability. The purchasing obligation is contracted for a period of 15 years;
- calls for tender: if the capacity for producing biogas for injection into the gas network fails to meet the targets calculated in the Multi-Annual Energy Plan, the Minister for Energy may issue a call for tenders.

In addition, producers who demand energy from these sources may benefit from **guarantees of origin** for electricity generation from renewable energy sources and high-efficiency co-generation, or for injected biogas. These guarantees of origin can be used on the markets, and constitute an additional source of income for producers.

As of 1 January 2015, in accordance with Article 14 of Directive 2012/27/EU on energy efficiency, energy production installations in heating or air-conditioning networks with a total thermal capacity exceeding 20 MW must carry out a **cost-benefit analysis** for new installations and in cases of major renovations. This analysis identifies potential free heat suppliers located near the network and enables implementation of a solution considered to be profitable.

Finally, the heat fund provides financial support to projects to produce heat from renewable energy: biomass (forestry, agricultural, biogas), geothermal energy (direct use or through heat pumps), thermal solar energy and recovered energy as well as the development of heat networks using these forms of energy. The sectors involved are group housing, services, agriculture and industry. The heat fund enables renewable heat to be competitive compared to the heat produced from conventional forms of energy, by guaranteeing a price for heat of renewable origin around 5% lower than that obtained with conventional forms of energy. The heat fund was endowed with a total budget of €2.167 billion in legal commitments for the 2009-2018 period. The 2019-2028 PPE project foresees an increase in the **heat fund** with a budget of €307 million in 2019 then €350 million in 2020 and 2021, and €339 million in 2022. It also foresees simplifying the rules, notably by removing the requirement for repayable advances, which will be replaced by subsidies.

Policies and measures with a cross-cutting impact on energy consumption

Several structural policies and measures have been introduced to limit energy consumption, encourage energy efficiency in several energy consuming sectors. The main sectors concerned are cited below. These measures thus contribute to the reduction of greenhouse gas emissions.

The energy code sets a target to reduce end-use energy consumption by 20% in 2030 and by 50% in 2050 compared to the 2012 level.

The **energy savings certification** scheme, in operation since 2006, is based on an obligation to achieve energy savings imposed by the public authorities on energy vendors (electricity, gas, LPG, heating and air conditioning systems, domestic fuel and automotive fuels). A multi-year target is established and allocated among the obligated parties according to their sales volume. At the end of the period, the obligated parties must prove that they have met their obligations by holding a number of energy savings certificates equivalent to these obligations. To obtain certificates, obligated parties have a choice of action to implement (carrying out energy saving actions themselves, encouraging consumers to reduce energy consumption, purchasing certificates from other stakeholders on the market, etc.), business sectors (residential, services, industrial, agricultural or transport) and types of clients (households, companies, public bodies, etc.). The first three-year period of the scheme ran from mid-2006 to mid-2009, with a total obligation set at 54 cumulative TWh. The second period, which ran from 1 January 2011 to 31 December 2014, comprised a target of 460 cumulative TWh. The third period ran from 1 January 2015 to 31 December 2017 and the overall obligation imposed on energy sellers was set at 700 cumulative TWh. In accordance with the Energy Transition for Green Growth Act (LTECV) of 17 August 2015, a new obligation

to benefit households experiencing fuel poverty has been in place since 1 January 2016, with a target of 150 TWh cumac by the end of 2017. The scheme entered into its 4th obligation period on 1 January 2018 for a duration of 3 years. The obligation imposed on energy sellers in the fourth period is equivalent to 1600 cTWh of conventional shares over the 2018-2020 period, of which 400 cTWh must be achieved for the benefit of households in fuel poverty. By the start of 2020, the 2019-2028 Multi-Annual Energy Plan envisages defining the goal and methods of the next two periods of the Energy Saving Certificates (CEE) scheme based on an analysis of energy saving potentials.

In 2014, a share in proportion to CO_2 emissions from energy products was introduced in the Domestic Consumption Taxes on Energy Products (TICPE). The "**carbon component**" is currently at €44.6/tCO_2.

With the transposition of EU Directive 2012/27/EU on energy efficiency, companies employing more than 250 employees or with an annual turnover in excess of €50 million and a balance sheet total exceeding €43 million must conduct an **energy audit** every 4 years. The energy audit, carried out by an internal or external auditor, consists of a methodical analysis of a site's energy flows and consumption and must enable companies to identify energy saving actions at all levels (buildings, production processes, transport, etc.).

Table 3.4: Policies and measures in the energy sector

Name	Objective and/or activity affected	Greenhouse gases involved	Instrument	Status	Entity responsible	Estimated emissions reduction for a given year (ktCO2eq)			
						2020	2025	2030	2035
European emissions trading scheme *	Capping emissions from electric power generating plants, heat production plants and refineries	CO_2	Economic	Implemented	MTES, MCT	ne	ne	ne	ne
A tariff reconstruction system for connecting renewable energy production facilities to gas and electricity networks.	Supporting the production of renewable energy in rural areas by reducing the costs of connecting renewable energy production plants to gas or electricity networks	CO_2, CH_4	Economic	Implemented	MTES	ne	ne	ne	ne
French national biomass mobilization strategy	Fostering the production and application of biomass	CO_2	Planning, Regulation	Implemented	MTES, Regions	ne	ne	ne	ne
Right to inject for biomethane installations	Encourage the production and use of biomethane	CH_4, CO_2	Regulatory	Implemented	MTES, MCT	ne	ne	ne	ne
Multi-year Energy Programme	Cross-sectoral	CO_2, CH_4	Planning	Planned	MTES	5600	37,000	69,000	ne
Feed in tariffs*	Develop renewable energy sources for electricity through open-access financial support	CO_2	Economic	Implemented	MTES	ne	ne	ne	ne
Calls for tender for biogas	Growing the biogas sector	CO_2, CH_4	Economic	Planned	MTES	ne	ne	ne	ne
Guarantees of origin for renewable electricity and biogas production*	Developing renewable energy sources for electricity and biogas	CO_2, CH_4	Economic	Implemented	MTES	ne	ne	ne	ne
Obligatory cost-benefit analysis of waste heat recovery*	Making energy savings by recovering waste heat from production processes	CO_2	Regulatory	Implemented	MTES	ne	ne	ne	ne
Energy savings certificates*	Making energy savings in various sectors	CO_2	Regulation, Economic	Implemented	MTES	8400	5900	3500	1600
Carbon component in energy taxation*	Reducing fossil fuel energy demand	CO_2	Fiscal	Implemented	MTES	ne	ne	ne	ne

Energy audits*	Improving information provided by companies on their energy consumption, and encouraging them to introduce actions to reduce it	CO_2	Regulatory	Implemented	MTES	ne	ne	ne	ne
Heat fund*	Increasing the use of renewable energy for heat production	CO_2	Economic	Implemented	Ademe	5900	5900	5900	2500
Thermal, acoustic and ventilation regulations in overseas departments *	Efficiency improvements of buildings (Energy consumption); Efficiency improvement of appliances (Energy consumption); Increase in renewable energy (Energy supply)	CO_2	Regulatory	Implemented	MTES	ne	ne	ne	ne
Thermal regulation Guadeloupe & Martinique	Efficiency improvements of buildings (Energy consumption); Efficiency improvement of appliances (Energy consumption); Increase in renewable energy (Energy supply)	CO_2	Regulatory	Implemented	Regional Councils of Guadeloupe & Martinique	ne	ne	ne	ne
Reduced VAT rate for heating and cooling networks containing at least 50% renewable and recovered energy *	Increase in renewable energy (Energy supply)	CO_2	Fiscal	Implemented	ME MTES	ne	ne	ne	ne
Cross-cutting measures to increase the production capacity of renewable electrical energy *	Increase in renewable energy (Energy supply)	CO_2	Regulatory, Economic	Implemented	MTES	ne	ne	ne	ne
Measures for the development of storage and control of electricity demand	Increase in renewable energy (Energy supply)	CO_2	Planning	Planned	MTES	ne	ne	ne	ne
Competitiveness and farm adaptation plan *	Increase in renewable energy (Energy supply); Efficiency improvements of buildings (Energy consumption); Reduction of fertilizer/manure use on cropland (Agriculture); Improved livestock management (Agriculture); Improved	CO_2, CH_4, N_2O	Planning, Economic, Information	Implemented	MAA, Regional Councils	ne	ne	ne	ne

	animal waste management systems (Agriculture)								
Supporting the agrifood industry in improving its environmental performance	Efficiency improvement in industrial end-use sectors (Energy consumption); Replacement of fluorinated gases by other substances (Industrial processes)	HFC, CO_2	Voluntary/negotiated agreements	Adopted	Strategic industry committee, MAA	ne	ne	ne	ne
Energy Eco-loan *	Help VSEs and SMEs to fund equipment that brings about energy savings	CO_2	Economic	Implemented	Bpifrance	ne	ne	ne	ne
PROREFEI training programme	Improving energy efficiency in industry by training energy users	CO_2	Education & Training	Implemented	MTES, ADEME, private actors (ATEE, EDF, Total Marketing France)	ne	ne	ne	ne
Preferential pricing of electricity supply for power-intensive sites implementing an energy performance policy*	Increasing energy efficiency at power-intensive sites	CO_2	Economic	Implemented	MTES	ne	ne	ne	ne

An asterisk (*) means that the measure is included in the “with existing measures” scenario in the SNBC.
MTES: Ministry for Ecological and Inclusive Transition
ne: not existing

Agriculture

Agriculture accounted for 19% of emissions in France in 2017. The agricultural emissions are divided between livestock farming (45% of emissions in 2017), crop farming (41%) and energy consumption by tractors, machines and agricultural boilers (13%). CH_4 emissions from livestock digestion, mainly cattle, and animal manure, and N_2O emissions, mainly from agricultural soils, are predominant, accounting for 45% and 41% respectively of agricultural emissions. CO_2 accounts for 13% of emissions from this sector and mainly originates from energy consumption.
In general, the Law on the future of agriculture, food and forestry (LAAAF), enacted on 13 October 2014, establishes the need to give the population access to foodstuffs produced in conditions contributing to the mitigation of, and adaptation to, climate change as one of the primary purposes of the country's agriculture and food policy.

Reducing CH_4 emissions from livestock effluent management

Agricultural biogas production reduces methane emissions by processing livestock effluent. France has introduced measures to support the development of agricultural biogas production:

- in 2009 and 2010, the Energy Efficiency for Farms Plan (*Plan de Performance Énergétique des Exploitations agricoles*, PPE) helped start up 132 agricultural biogas production projects, notably through the 28 million euros of credit from the Ministry responsible for agriculture, and through ADEME grants;
- the **feed-in tariff** for electricity generated by methane biodigesters was created in 2006 and re-valued in 2016 for small and medium-sized installations (less than 500 kWe) and a call for tenders was set up for larger installations (500 kW to 1 MW) in the form of a "biogas" category included in the calls for tender for the production of electricity from biomass;
- a feed-in tariff for biomethane produced by agricultural methane biodigesters, and injected into the natural gas network, was established in 2011. It was completed with several measures aiming to make it easier to connect such installations to the natural gas networks and to inject the renewable gas produced in this way;
- the main aims of the **"biogas energy for nitrogen self-sufficiency" plan** (*Énergie méthanisation autonomie azote*, EMAA)**,** which came into effect in 2013, is to simplify the administrative procedures involved in developing biogas projects, and improve support for project developers and efforts to organise the sector.
- since 2015, the **plan for competitive and adapted farming** (*plan pour la compétitivité et l'adaptation des exploitations agricoles*, PCAE) offers financial help to modernize livestock buildings and improve effluent management, particularly for cesspit covers and adapted spreading machines using the "drop hose" system, as well as for investments related to methane biodigesters such as for pre- and post-treatments;
- In 2019, the Ministry of agriculture set up a guarantee fund, amounting to €25 million, thus allowing BPI France to provide loans of up to €100 million without guarantee, for agricultural anaerobic degradation projects, with the purpose of promoting financial round-table talks (assuming responsibility for up to 20% of the investment amount in the form of loans).

Measures to reduce agricultural N_2O emissions

Nitrous oxide (N_2O) is an intermediate gas resulting from denitrification, which occurs in all of the reactions (carried out primarily by microorganisms) that lead to a reduction in nitrates through conversion to nitrogen. N_2O emissions during denitrification are influenced by environmental conditions, which are difficult to control. Reducing nitrous oxide (N_2O) emissions through improved control of nitrogen fertilization and preventing surplus organic nitrogen, is a priority for the agricultural sector (despite the fact that fertilizer deliveries have been falling

in France for the last 20 years - at an average rate of 0.5% per year, i.e. more than 10% in total) along with the addition of organic animal fertilizers to the soil (-9%).

Nitrates Action Programmes are obligatory in susceptible areas. Their purpose is to ensure balanced nitrogen fertilization and proper control of livestock farming effluent. They aim to ensure the correct dose of nitrogen is provided at the right time, in order for the crop to take it up quickly, and to restrict environmental leakages. Intermediate nitrate trap crops should be introduced in every plot in susceptible zones where long-term intercropping is practised. This can help to fix nitrogen temporarily, in such a way that it is available at the time the primary crop requires it.

The **Biogas Energy for Nitrogen Self-Sufficiency plan** is compatible with an agricultural approach based on balanced fertilization and an overall reduction in the use of agricultural additives. This plan includes a set of instruments to improve nitrogen management, particularly calls for projects, promoting and disseminating knowledge and simplifying administrative regulations.

The **Organic Ambition 2022** programme was presented in June 2018. Its objective was to ensure that 15% of viable agricultural land would be engaged in organic farming between now and 2022. It was funded with €1.1 billion and revolves around several courses of action: financial, technical and environmental support for producers, industry structuring, the development of organic consumerism, the reinforcement of research, education for actors, regulatory adaptations, and the development of organic production in overseas territories.

The **seed and sustainable agriculture plan** contributes to limiting N_2O emissions by supporting the selection of low-nitrogen plant cultivars and improving resources in terms of leguminous seed varieties.

The **farm competitiveness and adaptation plan** offers investment assistance to reduce the use of mineral fertilizers and to develop leguminous crops, among other things.

There are also various **assistive measures under the CAP** that contribute to the implementation of agricultural practices to reduce nitrogen levels, such as:

- Decoupling agricultural assistance to optimize crop practices;
- Placing conditions on assistance (such as maintaining the ground according to the good agricultural and environmental conditions (French: BCAE), and compliance with nitrate action programme measures);
- Support for organic agriculture, with a declared target of 20% of viable farmland by 2020.

Finally, the **Agr'Air call for proposals** (2017-2022) was announced at the start of 2017. The purpose of this call for proposals was to support pilot projects aiming to disseminate technologies and practices in the agricultural sector that contribute to reducing ammonia and/or fine particle emissions. An additional benefit of these projects is to reduce greenhouse gas emissions by improving the management and recovery of nitrogen contained in livestock effluent, fertilizers and animal feed. Selected projects must promote a collective approach and implement reproducible and sustainable action.

In the speech he gave in Rungis on 11 October 2017, the French President urged cross-sector organizations to draw up **plans to develop and transform the agricultural and agri-foodstuffs industries.** These industry agreements should serve to establish targets for producing more upmarket organic and high-quality products, environmental targets and agricultural research programmes. In December 2017, the cross-industry organizations sent these plans to the Minister of Agriculture and Food.

Reducing CO_2 emissions by controlling energy consumption and developing renewable energy sources in the agricultural sector

As mentioned above, agricultural methanisation produces biogas. This biogas can be used as a source of renewable energy under different forms:

- For simple heat production, which can be utilized near the production site;
- For the joint production of electricity and heat (co-generation) using a combustion engine;
- To be injected into the natural gas grid following a purification phase (biogas is thus converted into biomethane);
- For conversion into fuel in the form of compressed natural gas (CNG).

The **farm competitiveness and adaptation plan** mentioned above also provides subsidies for further activities to reduce energy consumption and to develop renewable energy sources.

Measures affecting the different factors for reducing agricultural emissions

Agri-environment-climate Measures (French: MAEC) provide financial support for farms involved in the development of practices that combine economic and environmental performance, or the maintenance of these practices where they are threatened by extinction. Between 2014 and 2020, the following agri-environment climate measures have been prioritized:

- MAEC adopting a systemic logic, which apply to the entire farm rather than applying only to plots facing one particular environmental issue;
- Preserving practices in favour of extensive grassland systems/limiting intensification and returning organic matter to the soil;
- Maintaining and changing polyculture and livestock farming practices / limiting additives; changing large crop practices / limiting additives;
- Introducing legumes in irrigated systems (particularly in maize monoculture systems);
- Maintaining topographical features such as hedges, copses, shelter belts, etc.

The **Agro-Ecology Project** encourages innovation and engagement in the transition towards new, higher-performance production systems (in economic, environmental and social terms), while also promoting research, education and agro-ecological communication initiatives.

Under the framework of the Big Investment Plan (GPI), presented by the First Minister at the end of 2017, €5 billion has been invested in the **agricultural arm of the GPI** (2018-2022). It aims to speed up the adaptation of agricultural tools and changes in agricultural, fishing, agri-foodstuffs, and forestry and timber practices. The agricultural arm of the GPI expands and improves the range of financial services available for the transformation of beneficiary sectors, offering guarantee funds, loan offers without guarantee, equity capital coupled with grants or repayable advances. It revolves around nine actions, divided into three structural courses of action. Course of action 1, "Transformation of upstream agricultural and forestry operations", consists of four actions: strengthening investment in farming, promoting changes in practice, promoting anaerobic degradation in agriculture, and strengthening investment in forestry. Course of action 2, "Improvement of downstream competitiveness in agricultural and forestry operations", consists of two actions: promoting the upmarket movement of downstream agricultural operations, and promoting the modernization of downstream forestry operations. Course of action 3, "Industry innovation and structuring", consists of three actions: competitive innovation, support for collaborative and territorial innovation projects, and support for structural investment in industry.

The aim of the **Education for Alternative Production plan** is to provide agricultural education to support the transition towards new, more sustainable production systems. Reference materials used in educating future farmers have been revised to include the progress made in the agro-ecological project, especially regarding climate issues.

On 16 November 2018, under the framework of the National Industry Council, the **Strategic Agreement on Agri-Foodstuffs (French: CSF)** was entered into by ministers in charge of the economy and agriculture, the National Association of Foodstuff Industries (ANIA) and the cooperative of agricultural and agri-foodstuff organizations, Coop de France. The agreement includes a project to develop plant-based protein for dietary consumption (the Future Proteins project), in addition to the 2018-2022 protein-rich oil crop industry plan. By supporting R&D initiatives, implementing sensory benchmarking, addressing the general public, monitoring regulation and assisting start-ups, its intention is to provide additional sources of protein other than animal sources, to meet the demand for protein which is expected to grow by 40% by 2030.

The **Biodiversity plan**, published in 2018, aims to fulfil the objective of reducing net biodiversity loss to zero. To achieve this objective of zero net land take, it proposes actions to restrict the use of natural areas, agricultural land and forests. It includes plans to review town and business planning policy, so as to halt the increase in artificial surfaces (buildings, transport infrastructure, car parks, sports pitches, etc.) and to promote planning that is spatially economical.

The **agricultural arm of the Circular Economy Route Map (French: FREC)**, published in 2019, aims to utilize recycled fertilizer matter as a partial substitute for non-renewable mineral fertilizers, and to contribute to the replenishment of soils with organic matter and, therefore, carbon.

In 2019, as part of the large-scale consultation with stakeholders, the **National Strategy on Plant-Based Protein** was drawn up. The purpose of this strategy is to reduce France's dependence on imported plant-based protein by closing nutrient cycles, and to make France a leader in plant-based protein for human consumption. Another objective is to develop spaces for growing legumes. To achieve this, it will endeavour to encourage crop diversification, the self-sufficiency of livestock foodstuffs, and synergies between crops and livestock. It will devote specific courses of action regarding human foodstuffs, research and the European context.

By reducing dependence on non-renewable mineral fertilizers, the agricultural arm of the FRECand the national strategy on plant-based protein expects to reduce CO_2 and N_2O emissions associated with the industrial production and use of nitrogen-based fertilizers.

Table 3.5: Agriculture

Name	Objective and/or activity affected	Greenhouse gases involved	Instrument	Status	Entity responsible	Estimated emissions reduction for a given year (ktCO2eq)			
						2020	2025	2030	2035
Farm Competitiveness and Adaptation Plan*	To encourage investment with the intention of promoting: as regards livestock farming, the covering of slurry pits; as regards the arable sector, a reduction in mineral-based fertilizer use; as regards energy sources, support the acquisition of materials that would enable energy savings or renewable energy production; as regards agroecology, investment in legume crop farming and fodder self-sufficiency.	CO_2, CH_4, N_2O	Planning, Economic, Information	Implemented	MAA	ne	ne	ne	ne
Feed-in tariff for electricity produced by small and medium-sized biogas installations, call for tenders for larger installations*	Development of agricultural biogas to process livestock farming effluent and produce renewable biogas.	CH_4, CO_2	Economic	Implemented	MTES	ne	ne	ne	ne
Right to biomethane injection	To develop anaerobic digestion capabilities, by enabling the injection of biomethane into the natural gas grid.	CO_2, CH_4	Regulatory	Adopted	MTES	ne	ne	ne	ne
Biogas Energy for Nitrogen Autonomy Plan*	Improved nitrogen management, development of agricultural biogas in which livestock farming effluent is processed and renewable biogas is produced.	CO_2, CH_4, N_2O	Planning, Economic, Information, Regulation	Implemented	MAA	ne	ne	ne	ne
Nitrates action programs*	Improved control of nitrogen fertilization	N_2O	Regulations	Implemented	MAA	ne	ne	ne	ne
Ambition Bio programme	To promote the development of organic farming.	N_2O	Economic, Regulation, Research, Education, Tax Incentives, Information, Planning	Implemented	MAA	ne	ne	ne	ne
National strategy on plant-based protein	Encouraging the development of leguminous crops that require less nitrogen fertilizers	N_2O	Planning, Economic, Regulation, Research, Information	Implemented	MAA	ne	ne	ne	ne
Seed Planning and Sustainable Agriculture*	To support the selection of low-nitrogen plant cultivars and improving leguminous seed resources that use less nitrogen fertilizer.	N_2O	Economic, Information, Research	Implemented	MAA	ne	ne	ne	ne

Future Protein project	To provide additional sources of animal protein as a way of meeting the growing demand for protein, expected to increase by 40% by 2030	CO_2, CH_4	MAA, Strategic industry committee	Adopted	MAA	ne	ne	ne	ne
Common Agricultural Policy assistance schemes*	Encouraging agricultural practices that reduce nitrogen inputs	N_2O	Economic	Implemented	MAA	ne	ne	ne	ne
Agr'Air call for proposals	Supporting pilot projects aiming to disseminate technologies and practices in the agricultural sector that contribute to reducing ammonia and/or fine particle emissions.	N_2O	Economic, Information	Implemented	MAA	ne	ne	ne	ne
A tariff reconstruction system for connecting renewable energy production facilities to gas and electricity networks.	Supporting the production of renewable energy in rural areas by reducing the costs of connecting renewable energy production plants to gas or electricity networks	CO_2, CH_4	Economic	Implemented	MTES	ne	ne	ne	ne
Plan for the development and transformation of the agricultural and agri-foodstuff industries	To promote the development of organic farming.	CO_2, CH_4, N_2O	Voluntary or negotiated agreements	Implemented	MAA, cross-sector agricultural and agri-foodstuff organizations	ne	ne	ne	ne
Agri-Environment and Climate Measures	Encouraging the development of agricultural practices that combine economic and environmental performance	CO_2, CH_4, N_2O	Economic	Implemented	MAA	ne	ne	ne	ne
Agro-ecological Project	Encouraging a transition to new, high-production systems in economic, environmental and social terms This project aims to encourage farmers to adopt agro-ecological practices.	CO_2, CH_4, N_2O	Information, Research, Education	Implemented	MAA	ne	ne	ne	ne
Economic and environmental interest groups for farms *	Other activities improving cropland management (Agriculture); Improved livestock management (Agriculture); Improved management of organic soils (Agriculture); Restoration of degraded lands (LULUCF)	CO_2, CH_4, N_2O	Economic	Implemented	MAA	ne	ne	ne	ne
Education for Alternative Production plan*	To provide agricultural education in order to support a transition to new, more sustainable production systems. Version 2 is in the process of being launched. More than reviewing certificates, the plan hopes to mobilize farming and the educational community.	CO_2, CH_4, N_2O	Education & Training	Implemented	MAA	ne	ne	ne	ne

Biodiversity Plan	To reaffirm the ambition for a transition towards agri-ecology, by contributing to the reduction of the net loss of biodiversity.	CO_2	Planning, Regulation	Implemented	MTES	ne	ne	ne	ne
Agricultural arm of the Circular Economy Route Map	To reduce the use of mineral fertilizers, by utilizing recycled fertilizer matter.	CO_2, CH_4, N_2O	Regulation, Economic, Fiscal	Adopted	MAA	ne	ne	ne	ne
Agricultural and forestry arm of the Big Investment Plan	To speed up the adaptation of agricultural tools and practices (including anaerobic digestion)	CO_2, CH_4, N_2O	Economic	Implemented	MAA	ne	ne	ne	ne
Agro-forestry Development Plan*	Carbon stored in the ground and in biomass.	CO_2	Planning, Information, Economic, Regulation, Research, Education	Implemented	MAA	ne	ne	ne	ne

An asterisk (*) means that the measure is included in the “with existing measures” scenario in the SNBC.
MTES: Ministry for Ecological and Inclusive Transition
MAA: Ministry for Agriculture and Food
ne: not existing

- **Land Use, Land Use Change and Forestry (LULUCF)**

In comparison with other sectors, the Land Use, Land Use Change and Forestry (LULUCF) sector is unique in that it constitutes a net carbon sink: in 2017, overall absorption from the sector was approximately -32 $MtCO_{2eq}$, corresponding to approximately 7% of national emissions outside the LULUCF sector. Forests alone represent a carbon sink of -54 $MtCO_{2eq}$ (i.e. 12% of emissions).
The main effect of the measures set out in this section is to reduce CO_2 emissions or to contribute to carbon storage through CO_2 absorption. In general, the future agriculture, food and forestry act (LAAAF) described in section B.5 is now the reference text for guiding climate action in the forest and timber sector. In particular, Article 67 recognizes the overall benefit of "CO_2 capture by woodlands and forests and carbon storage in woodlands and forests, timber and products manufactured from timber, thus contributing to action against climate change". Other land categories, in particular cultivated land and grasslands, are also subject to several LAAAF agriculture provisions (see section B.5).

Provisions encouraging carbon storage in soils and biomass

The Common Agricultural Policy (CAP) includes various measures to promote carbon storage in soils and biomass:

- **Greening**, which contributes towards maintaining the proportion of permanent meadows, crop diversification, and the target to transform 5% of arable land surfaces used for farming into areas of ecological value;
- The **Compensatory payments for natural handicaps (French: ICHN)** scheme, which contributes extensively to the maintenance of extensive grassland areas, is a major factor in keeping and storing carbon in the soils of farmland and grassland;
- Its conditional nature relies on a number of **good agricultural and environmental conditions (French: BCAE)** and **statutory management requirements (French: ERMG)** that encourage a more substantial return of organic matter to the soil, grasslands or environments conducive to plant and animal diversity (e.g. those that maintain hedges, ponds and copses) and to improved adaptation;
- **Coupled support under the first pillar of the CAP**, which aims to support legume production, may contribute to the storage of organic matter and maintaining soil fertility. The three components of greening promote organic matter inputs and grassland or woodland cover, which are conducive to carbon storage as well as diversity, thereby improving adaptation;
- The **Agri-environment-climate Measures (French: MAEC)** also contribute to climate action concerning agricultural soils. One of these, conversion to direct covered seeding (SOL_01), is now applied to agricultural soils for the explicit purpose of reducing tillage, introducing cover and diversifying crop rotations. Several Operation Types (OTs) and agri-environment-climate measures (MAEC) referred to as "systems" were already helping to increase or lock organic matter in soils by providing for the maintenance and extensive management of grasslands and range lands, trees and hedges, legumes and noteworthy environments, or the maintenance of meadow orchards;
- Under the second pillar of the CAP, the section on **technical support of the National Risk Management and Technical Support Programme (French: PNGRAT)** aims to improve knowledge of soils (regional soil repositories), while several measures under the **Regional Rural Development Programmes (French: PDRR)** contribute to improvements in the carbon content of agricultural soils.

Improving the carbon content of agricultural soils is also aided by investment under certain schemes of the **Farm Competitiveness and Adaptation Plan (French: PCAE)**, dedicated to combating erosion and optimizing organic fertilization. This results in higher amounts of organic matter returning to soils, perennial crop plantations and more extensive plant cover of agricultural soils.

Measures to encourage agroforestry are also major factors in encouraging carbon storage, both in the soil and in plant biomass. The **Agroforestry Development Plan**, launched in 2016, consists of five courses of action: i) to

improve knowledge and monitoring of and research into agroforestry; ii) to improve the regulatory and legal framework and to strengthen financial support; iii) to develop advice and education, to promote agroforestry, and to add value to agroforestry production; iv) to add economic value to agroforestry production and to develop this in soils and territories; iv) to promote European and international approaches.

Organic agriculture also deserves a mention due to its almost-exclusive use of organic fertilizers, its practices which most often involve crop diversification and intermediate plant cover, and its prioritized use of grass in livestock farming and/or its strong inclination towards agroforestry.

In certain cases (when biodiversity protection involves more extensive plant cover or plant cover around water abstraction points), the **Natura 2000 network and the water framework directive** promote soils that are richer in organic matter and plant biomass richer in carbon stock.

In addition, by implementing **biofuel sustainability** criteria, the production of raw materials intended for biofuel production is avoided in certain carbon-rich soils and in certain biodiversity-rich areas in the European Union or in countries exporting to the European Union.

The **Biodiversity plan**, published in 2018, aims to fulfil the objective of reducing net biodiversity loss to zero. To achieve this objective of zero net land take, it proposes actions to restrict the use of natural areas, agricultural land and forests. It includes plans to review town and business planning policy, so as to halt the increase in artificial surfaces (buildings, transport infrastructure, car parks, sports pitches, etc.) and to promote planning that is spatially economical.

The **Heart of the City action plan**, launched in 2018, has invested €5 billion to revitalized town centres. This plan necessarily involves restricting urban sprawl and reducing land take.

Forest carbon storage

Overall, French forests currently make a positive net contribution to climate change mitigation, with emissions (particularly those originating from dead wood oxidation and forestry extraction operations) remaining lower than sequestration. Taking into account managed forest sequestration minus extracted amounts, the forest sink accounted for 53 $MtCO_2$ in 2017.
Some of the different policies and measures that help promote forest carbon sinks include:

- The **forest investment tax incentive scheme (French: DEFI)**, which encourages forest owners to adopt a sustainable approach to managing their forests, including joining producer organizations or economic interest and environmental forestry groups (EIEFGs). It does so by means of a higher tax credit rate and it has been extended until 31 December 2020. Its purpose is to improve forest management, leading to multiple benefits, including reducing the over-capitalization of certain forests, improving resistance to wind-throw and increasing the use of timber;
- The **forestry and insurance investment account (French: CIFA)**, which encourages forest owners to take out insurance against wind-throw and to save money to finance preventive measures and, if applicable, to clear and re-stock damaged forest stands. The purpose is to improve resistance to climate change and hence maintain forest sequestration.
- The **forest firefighting scheme**, which is implemented every year to protect forest populations and forest stands. Combating forest fires begins via the preventative mobilization of firefighting resources and accurate assessment of the fire risk on a daily basis.

In addition, a number of cross-sector schemes aim both to improve forest management and to increase timber use.

- These include the **National Forest and Timber Programme (French: PNFB)**, under the LAAAF, approved by the decree of 8 February 2017, which establishes the national forestry policy priorities for the

decade 2016-2026. One of its objectives is to optimize forestry factors in order to adapt French forests to climate change, and contribute to mitigation by taking into consideration the complete carbon balance of the forestry and timber sector (carbon storage in above-ground and below-ground living biomass, dead biomass, forest soils, timber products, and using wood to replace fossil fuel energy or competing materials). In particular, it sets the objective of an additional 12 Mm^3 of commercial timber use by 2026 compared to 2015 levels. The **Regional forest and timber programmes (French: PRFB)**, are a regional adaptation of the national forest and timber programme, and are currently being developed by regional authorities. RFTPs will be based on the structure of the multi-year regional forest development plans;

- The **Inter-Ministry Action Plan for Forest and Timber Industry Revival (French: PAIFB)**, presented by the government on 16 November 2018. It identifies priority action plans, divided along three courses of action, which relate to the use and sustainable renewal of forests, the development of end markets, support via innovation and investment, and improvements in the industry's environmental performance and the development of this performance in the territories.
- The **Strategic Timber Industry Agreement (CSF 2018-2022)**, signed by industry professionals and the government, which aims to promote the use of timber and to strengthen the industry's competitiveness. The STIA outlines a new circular economy model, based on sustainable production, by limiting the waste of raw materials and ensuring recycling and the re-use of forest waste. It also promotes the use of timber in construction, thus ensuring the long-term storage of carbon.
- Timber industry companies also have access to a **sawmill financing fund**, managed by Bpifrance, as well as a **crowdfunding-based loan for the timber industry** with which to finance the modernization of sawmills and forestry operations for collecting timber.
- the **National Bioeconomy Strategy** (adopted in 2017) and its 2018-2020 action plan, which brings together all public policies concerned with biomass, in order to place the renewable carbon and living economies at the centre of our economy, by replacing fossil and mining products with bio-based products. The action plan arranges the bioeconomy strategy into operational actions along five lines: improving knowledge; promoting the bioeconomy and its products among the public; creating the conditions for a supply and demand meeting; sustainably producing, utilizing and converting bioresources; releasing the brakes and mobilising financing.
- The **low-carbon certification**, launched in 2019, which is a voluntary carbon-offsetting scheme to promote local greenhouse gas-reducing projects, including forestry projects.
- The **National climate change adjustment plan**, which addresses forest-related measures. Adapting to climate change is essential in order to ensure the availability and function of forest carbon sinks.
- The **2025 Forest and Timber Research and Innovation Plan**, which describes the sector's main priorities in terms of research and development: increasing the use of high value-added timber, in particular, hardwood; increasing the sector's performance; providing for its adaptation etc.

Developing timber as a material

Timber produced and used sustainably requires little energy for its production and constitutes a temporary source of carbon storage. In France sustainable timber already accounts for the storage of around 2 $MtCO_{2eq}$ of carbon annually, with the opportunity for this figure to increase as sustainable timber use grows. In addition, it can replace materials that generate greenhouse gases when manufactured (such as concrete, steel and aluminium for example).

Several schemes have been devised to encourage the development of timber as a material, particularly in the building industry. **Timber plans I and II** (**timber plan III** was launched on 28 September 2017) were instrumental in releasing the regulatory and technical brakes on the use of timber in medium and high-rise construction. The purpose of the **High-Rise Timber Buildings new French industry plan** is to demonstrate, in very specific terms, through the construction of buildings, the feasibility of high-rise timber construction and, subsequently, to promote widespread use of the most suitable technical solutions. Finally, the **energy-positive, carbon-reduced building certification (E+C-)** (see section B.2) takes into account all emissions from a new building across its

entire life cycle (including material manufacturing). This promotes the use of bio-sourced products and will be extended in future environmental regulations (RE2020).

The **Bio-Based Buildings certification,** which has been in operation since 2013, serves to increase the visibility of new buildings attempting to make significant use of plant- and animal-based materials (timber, hemp, straw, wool, feathers, etc.).

Energy biomass development

Wood for energy can be harvested as a co-product of timber, in line with the hierarchy of uses. Using byproducts from timber harvesting, sawmills and certain types of wood waste as a heat source can be financially and environmentally beneficial. More generally, the development of biomass recovery for energy reduces greenhouse gas emissions in different business sectors when it replaces energy from fossil fuels. A choice has been made to report energy biomass development measures in this section on forestry (rather than in the energy section), as these measures complement measures designed to ensure sustainable forest management. Public policy on forestry and timber aims to take upstream and downstream forestry activities into account in a complementary manner.

The **National Biomass Deployment Strategy (French: SNMB)** and the **Regional Biomass Deployment Schemes (French: SRB)** were established under the Energy Transition for Green Growth act of August 2015. The SNMB sets priorities, recommendations and actions regarding biomass production and recovery lines for use in energy production, with the aim of increasing biomass production and deployment while also monitoring its use and contribution to climate change reduction. The RBDSs adapt the NBDS according to particular regional circumstances.

With regard to heat production, the **heat fund**, managed by the Environment and Energy Exploitation Agency (ADEME) since 2009 (see the section on Energy), supports a number of biomass boiler projects. Between 2009 and 2017, 1093 projects (including 825 boilers) were supported by a total of €770 million in assistance, providing annual heat production of 1.4 Mtoe. Moreover, two calls for expression of interest, entitled **DYNAMIC wood**, were initiated by ADEME in 2015 and 2016 to support innovative operational actions for the use of surplus timber to fuel biomass heating systems, financed under the heat fund, and to improve forest stands.
Electricity production from solid biomass is supported by **calls for tenders** (see the section on Energy).

In addition, tax credit schemes for the energy transition (see the section on Residential/tertiary buildings), energy-saving certificates (see the section on Energy) and zero-interest eco-loans (see the section on Residential/tertiary buildings) support the development of timber-based energy among private entities.

Table 3.6: Land sector

Name	Objective and/or activity affected	Greenhouse gases involved	Instrument	Status	Entity responsible	Estimated emissions reduction for a given year (ktCO2eq)			
						2020	2025	2030	2035
Common Agricultural Policy measures promoting carbon storage*	Carbon stored in the ground and in biomass.	CO_2	Economic	Information	MAA	ne	ne	ne	ne
Farm Competitiveness and Adaptation Plan*	Carbon stored in the ground and in biomass.	CO_2, CH_4, N_2O	Planning, Economic, Information	Implemented	MAA, Regional Councils	ne	ne	ne	ne
Agro-forestry Development Plan*	Carbon stored in the ground and in biomass.	CO_2	Planning, Information, Economic, Regulation, Research, Education	Implemented	MAA	ne	ne	ne	ne
Agri-Environmental and Climate Measures (MAEC)*	Carbon storage in soils	CO_2, CH_4, N_2O	Economic	Implemented	MAA	ne	ne	ne	ne
Biodiversity Plan	To reduce net biodiversity loss	CO_2	Planning, Regulation	Implemented	MTES	ne	ne	ne	ne
Heart of the City action plan	To reduce land take by minimizing urban sprawl	CO_2	Planning, Economic	Implemented	MCT, Municipalities and Inter-municipality groupings	ne	ne	ne	ne
Tax incentive scheme for forestry investments*	To improve forest management	CO_2	Fiscal	Implemented	MAA, ME	ne	ne	ne	ne
Forestry and Insurance Investment Account*	Improving the resistance of forests to climate change and maintaining forest sequestration.	CO_2	Economic, Fiscal	Implemented	ME, MAA	ne	ne	ne	ne
National Forest and Timber Program and regional Forest and Timber Programs	Improving forest management and fostering timber applications	CO_2	Planning, Regulation	Implemented	MAA, Regions	ne	ne	ne	ne
Multi-year regional forestry development plans*	Improving forest management and fostering timber applications	CO_2	Planning	Implemented	MAA	ne	ne	ne	ne
Timber sector strategic contract*	Supporting the timber sector upstream and downstream	CO_2	Planning, Economic, Information, Volunteering, Negotiated Agreements	Implemented	MAA, MTES, MCT, ME, Regions, Strategic Timber Industry Committee	ne	ne	ne	ne
Sawmill financing fund	Supporting the timber sector	CO_2	Economic	Implemented	Bpifrance	ne	ne	ne	ne

Crowdfunding-based loan for the timber sector*	Supporting the timber sector	CO_2	Economic	Implemented	Bpifrance	ne	ne	ne	ne
The Bio-based Building certification*	To incorporate animal- or plant-based materials in new construction	CO_2	Information	Implemented	MCT	ne	ne	ne	ne
Support schemes for timber use in the construction industry*	Fostering the use of timber in the construction industry	CO_2	Information, Regulation	Implemented	MTES, MCT	ne	ne	ne	ne
Inter-ministry plan for revising the forestry and timber industry	To support the growth of the timber sector	CO_2	Planning, Economic, Research	Implemented	MAA, MTES, MCT, ME	ne	ne	ne	ne
National Biomass Deployment Strategy (SNMB) and Regional Biomass Deployment Schemes	Fostering the production and application of biomass	CO_2	Planning, Regulation	Implemented	MTES, Regions	ne	ne	ne	ne
National Bioeconomy Strategy	To replace high-emission materials with timber materials (LULUCF)	CO_2	Planning, Economic, Research	Implemented	MAA	ne	ne	ne	ne
Agricultural and forestry arm of the Big Investment Plan	To support investment in forestry	CO_2, CH_4, N_2O	Economic	Implemented	MAA	ne	ne	ne	ne
Recognition of the general interest of carbon storage in biomass and wood products *	Substitution of GHG-intensive feedstocks and materials with harvested wood products (LULUCF); Conservation of carbon in existing forests (LULUCF)	CO_2	Other	Implemented	MAA	ne	ne	ne	ne
Strategic forest and timber fund *	Support for investment in forests	CO_2	Eonomic	Implemented	MAA	ne	ne	ne	ne
Tax incentive scheme for forests investment*	Support for investment in forests	CO_2	Fiscal	Implemented		ne	ne	ne	ne
Patrimonial fiscal measures in favor of sustainable forest management *	Promote sustainable forest management.	CO_2	Fiscal	Implemented	ME, MAA	ne	ne	ne	ne
National Observatory of Biomass Resources *	Ensure the identification and estimation of biomass resources for energy purposes.	CO_2	Information	Implemented	MAA	ne	ne	ne	ne

An asterisk (*) means that the measure is included in the “with existing measures” scenario in the SNBC.
MTES: Ministry for Ecological and Inclusive Transition
MAA: Ministry for Agriculture and Food
ne: not existing

Waste treatment

In 2017, this sector accounted for 3% greenhouse gas emissions in France. Waste disposal (landfilling) accounts for 84% of emissions in the sector, while incineration without energy production represents 9%, other solid waste treatments (tricycling and recycling, compost and biogas production) 4% and waste water treatment 2% of emissions from this sector. Methane from landfill and the treatment of solid waste and waste water was the main greenhouse gas emitted by this sector in 2017, representing 87% of emissions, followed by CO_2 from waste incineration (9%) and N_2O primarily from the treatment of solid waste and waste water (4%).

Measures aimed at lowering CH_4 and CO_2 emissions produced by the waste sector

The prevention of waste production is included in the Environmental Code as the waste management priority. Preventing waste production not only avoids the environmental impacts related to waste treatment, but it also avoids the environmental impacts of upstream phases of products' life cycle, such as the extraction of natural resources, the production of goods and services, distribution and usage.

Several measures have been introduced to reduce waste production:

- **Single-use plastic bags have been prohibited** since the 1 January 2016;
- **Combating food waste** has been set as a national priority, with the objective of reducing losses and waste by half by 2025. The following measures have been taken: major food retailers now have an obligation to offer agreements to authorised charitable associations to gift unsold food products. Retailers are prohibited from deliberately making unsold food products unfit for consumption. The State, public bodies and local authorities are obliged to set up a system to combat food waste in the canteens and catering services they manage.
- In the Energy Transition for Green Growth Act of 17 August 2015, planned obsolescence is defined as "all techniques through which a marketer deliberately aims to reduce the life cycle of a product in order to increase its rate of replacement." The law recognizes **planned obsolescence as an offense,** punishable by two years of imprisonment and a fine of €300,000; the amount of the fine may be extended to 5% of the retailer's average annual turnover.

After waste prevention, the waste treatment hierarchy in French law (in accordance with European waste directive 2008/98/EC) is as follows: re-using, recycling and other forms of recovering the material, energy recovery and disposal (incineration without energy recovery and landfill).

Extended producer responsibility (French: REP) strategies are schemes for organizing the prevention and management of waste from certain types of product. These schemes are based on the principle of extended producer responsibility, according to which producers, i.e. the parties responsible for marketing certain products, are made responsible for financing or organising the management of waste arising from these products at the end of their life. France currently has around 20 sectors which are subject to this principle, which was introduced gradually from 1992. This kind of scheme allows producers to include waste management costs in the price of the product, and encourages product eco-design to reduce waste. The **anti-waste law for a circular economy** of 2019 serves to strengthen these schemes.

Immediately after waste reduction and prevention procedures, sorting waste at the source is a highly important step in routing the waste to an appropriate processing sector, and increasing the amounts of recovered waste. The Energy Transition for Green Growth Act contains a number of provisions related to waste sorting:

- **There is an obligation to sort waste from the economic activities of business and administrations**, including paper, cardboard, plastic, metals, wood, and glass, with a view to recovering the material or energy;
- **Universal sorting of household biowaste at the source,** by 2025;

- Introduction of **tariff incentives for the collection of household and similar waste**, that is to say, the introduction of a variable element to the household waste collection tax, as a way of rewarding good sorters;
- **Expanding the instructions for sorting household packaging, to include all plastic packaging** by 2022, including plastic films and trays (to date, only plastic bottles and jars had to be sorted);
- **Gradual harmonization of sorting instructions and bin colouring** in France;
- The introduction of a **network of waste sorting units for building and public works**, as of 1 January 2017, imposing a responsibility on the distributors of building material for pre-sorted waste from their clients.

The **waste component of the general tax on polluting activities (French: TGAP)** is a tax incentive payable by all landfill (storage facility) operators or incinerator (thermal treatment facilities for waste) operators, subject to authorization. The chargeable event is payable on receipt of the waste by the facility operator and aims to reduce the upstream production of waste and to promote recycling. TGAP waste rates are regularly raised, in order to keep incentives attractive. In addition, the TGAP non-hazardous waste charge is modulated according to environmental and energy landfill and incinerator criteria, in order to encourage the operation of facilities with a higher level of environmental and recovery performance.

The purpose of the **ADEME waste fund** is to support all operations that adhere to waste policy and promote a circular economy. The waste fund is financed from receipts from the TGAP waste charge. The size of this fund enables ADEME to offer support for most operations adhering to this policy, according to procedures dependent on the nature of the operations (research, coordination, awareness-raising, investments, etc.) and their objective (waste prevention, recycling, recovery, etc.). The main actions supported are the at-source sorting of biowaste from households and business, the prevention of waste production from economic activities and the sorting of waste from this source, and tax incentives for public services for waste management.

The objectives of the **Circular Economy Route Map**, published in April 2018, are to ensure more efficient production (eco-design, use of recycled materials), consumption (promoting reuse and repair, improving product life spans), and management (optimizing waste sorting, developing recycling and repurposing) of waste, and the engagement of all stakeholders.

Following on from the 2018 Circular Economy Route Map, the **anti-waste law for a circular economy**, enacted in July 2019, aims to enforce a number of measures focusing on four broad priorities: putting an end to waste in order to conserve natural resources, urging industries to transform their production methods, facilitating consumer information, improving the collection of waste and combating illegal waste dumping:

- In order to prevent waste, the law will prohibit the destruction of unsold products, require consumers to be informed of the availability of replaceable parts in order to promote repair, and reinforce waste identification among work supervisors upstream of building sites, to promote better management of construction waste;

- In order to transform production methods, a bonus system will be introduced regarding the way in which manufacturers manage and treat products at the end of their lives, as a reward for ecologically-designed products, and REP (extended producer responsibility) schemes will be expanded to include new products (e.g. toys, cigarettes and sport equipment).

- In order to encourage more responsible consumption, consumers will be informed of a repairability score placed on a number of mass-consumption electrical and electronic products, and sorting will be streamlined by means of individual labelling and the standardization of sorting bin colours.

- Waste collection will be improved by providing French citizens with deposit points, requiring distributors to accept returns of old devices free of charge, and structuring the sector in such a way so as to facilitate the management of construction waste.

These measures will have a positive effect on the reduction of greenhouse gases thanks to the evolution of new production methods and new modes of consumption.

Under the terms of the National Deal on Waste, signed in February 2019, **signatory businesses are committed to reducing their plastic use** (and, therefore, to reducing the amount of waste produced) and to investing in the vision of the circular economy, shared with NGOs.

Table 3.7: Waste

Name	Objective and/or activity affected	Greenhouse gases involved	Instrument	Status	Entity responsible	Estimated emissions reduction for a given year (ktCO2eq)			
						2020	2025	2030	2035
Prohibition of single use plastic bags*	Preventing Waste	CO_2, CH_4	Regulatory	Implemented	MTES	ne	ne	ne	ne
The fight against food waste*	Preventing Waste	CO_2, CH_4	Regulatory	Implemented	MTES	ne	ne	ne	ne
Penalizing planned obsolescence*	Preventing Waste	CO_2, CH_4	Regulatory	Implemented	MTES	ne	ne	ne	ne
Sectors with extended producer responsibility*	Waste prevention and management (recycling)	CO_2, CH_4	Regulatory	Implemented	MTES	ne	ne	ne	ne
Requirement to sort waste from the economic activities of companies and administrations	To encourage recycling	CO_2, CH_4	Regulatory	Implemented	MTES	1800	3600	4000	4200
Obligation on major producers to sort organic waste*	To encourage recycling	CO_2, CH_4	Regulatory	Implemented	MTES, Local Authorities	ne	ne	ne	ne
Universal sorting of household biowaste at the source by 2025	To encourage recycling	CO_2, CH_4	Regulatory	Implemented	MTES, Local Authorities	ne	ne	ne	ne
Tariff incentives for the collection of household waste	Encouraging sorting to increase the quantities of waste that is recycled.	CO_2, CH_4	Economic	Implemented	MTES	ne	ne	ne	ne
Extending the system for sorting household packaging to all plastic packaging by 2022.	To encourage recycling	CO_2, CH_4	Regulatory	Implemented	MTES	ne	ne	ne	ne
Gradual harmonisation of sorting rules and bin colouring by 2025	Encouraging sorting to increase the quantities of waste that is recycled.	CO_2, CH_4	Regulatory	Adopted	MTES	ne	ne	ne	ne
Set up of a building industry network of professional waste collection points*	To encourage recycling	CO_2, CH_4	Regulatory	Implemented	MTES, Companies distributing construction materials	ne	ne	ne	ne
Circular economy road map	Waste prevention and management (recycling)	CO_2, CH_4	Planning, Regulation, Economic	Implemented	MTES	ne	ne	ne	ne
Anti-waste law for a circular economy	Waste prevention and management (recycling)	CO_2, CH_4	Planning, Regulation, Economic	Adopted	MTES	ne	ne	ne	ne

Waste component of the nationwide tax on polluting activities*	Limiting waste disposal, encouraging waste prevention and recycling, improving the performance of landfill sites and incinerators	CO_2, CH_4	Fiscal	Implemented	MTES, ME	ne	ne	ne	ne
Waste fund*	Supporting waste prevention, recycling and recovery	CO_2, CH_4	Economic	Implemented	Ademe	ne	ne	ne	ne

An asterisk (*) means that the measure is included in the “with existing measures” scenario in the SNBC.
MTES: Ministry for Ecological and Inclusive Transition
ne: not existing

Cross-cutting policies and measures

Policies and measures affecting all sectors

Policies and measures affecting all sectors are those which apply to both companies and local authorities. They also affect all greenhouse gases.

Since 2012, it has been obligatory for companies with over 500 employees, local authorities with over 50,000 inhabitants, public bodies employing over 250 staff and government departments to **compile a greenhouse gas emissions report and an action plan to reduce them.** The report and action plan must be compiled every three years for local authorities and public bodies, and every four years for companies. A greenhouse gas emissions report provides a detailed account of the emissions produced by an organisation (public or private). These reports are produced to identify and implement the measures required to reduce emissions. Regulations require direct and indirect energy-related (scopes 1 and 2) emissions to be calculated, and encourage calculation of other indirect emissions (scope 3). Regulations are in the process of being updated in order to expand the scope of obligatory emissions calculations, incorporating significant indirect emissions resulting from entities' operations and activities. Methodological guidelines for producing the report are available to organisations free of charge. An online platform for publishing reports was also set up in 2015 to facilitate the publication and dissemination of this information among the public.

The requirements of companies to meet social, environmental and corporate responsibility criteria have been re-emphasized by the Energy Transition for Green Growth act of August 2015, concerning **climate change reporting obligations**. Large companies are required to include in their non-financial reporting information on any entries showing significant greenhouse gas emissions resulting from their activity, including the use of goods and services they produce, for the fiscal year that ended on December 31, 2016. The concept of areas that generate significant emissions was chosen to make companies take stock of the impacts of their activities on climate change, irrespective of whether the emissions are direct or indirect, particularly those generated by the use of the goods and services the company produces.

The same law also supplemented the regulatory system with regard to information provided by portfolio management companies about the environmental, social and governance (ESG) criteria applied in their investment policies. **Institutional investors must also publish information on their progress towards their climate objectives and on the financial risks associated with the transition to green energy**, for the fiscal year that ended on December 31, 2016.

The climate-related activities of local authorities are structured around regional planning schemes: **Regional Planning, Sustainable Development and Territorial Equality Schemes (French: SRADDET)** on a regional level and **Climate, Air and Energy Plans (French: PCAET)** for inter-municipality groupings of more than 20,000 inhabitants (see section A.1. on Institutional Foundations).

Cross-cutting policies and measures regarding fluorinated gases

European Regulation No. 517/2014 (so-called "F-Gas II") outlines a number of provisions aiming to reduce fluorinated gas emissions from the refrigeration and air conditioning appliances used in buildings, industry and cold chain transport. Taking effect on 1 January 2015, it repeals and supersedes Regulation No. 842/2006 (so-called "F-Gas"). The regulation is based on the following measures:

- The intensification of obligations related to appliance isolation (leaktightness testing, obligations to repair), the certification of staff handling HFCs, and the recovery of appliances for maintenance and dismantling;

- The introduction of a mechanism to gradually reduce the amount of HFCs on the market between 2015 and 2030, by means of a quota system. In 2030, the total amount of HFCs on the market, in terms of CO_2 equivalent, should amount to 21% of the average levels between 2009 and 2012;
- Sector-wide bans on the marketing of products or appliances containing fluorinated greenhouse gases above a particular GWP;
- Bans on the possession of refrigeration appliances containing new fluids with a GWP of more than 2500, after 1 January 2020.

On 29 March 2018, France ratified the Kigali Amendment to the Montreal Protocol. Although the Kigali Amendment works to the same overall ends as the F-Gas II European regulation, it encompasses a longer commitment period, lasting until 2036 (the F-Gas regulation period lasted until 2030).

Table 3.8: Cross-cutting policies and measures

Name	Objective and/or activity affected	Greenhouse gases involved	Instrument	Status	Entity responsible	Estimated emissions reduction for a given year (ktCO2eq)			
						2020	2025	2030	2035
Greenhouse gas emissions report and reduction action plan for businesses, local authorities, government departments and public institutions*	Improving information from companies on their greenhouse gas emissions and encouraging them to introduce actions to reduce them	CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3	Regulatory, Information	Implemented	MTES, ADEME	ne	ne	ne	ne
Mandatory climate change reporting by large companies*	To improve communication with businesses regarding their greenhouse gas emissions (direct and indirect) and to encourage them to put in place reduction actions	CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3	Regulatory, Information	Implemented	ME, MTES	ne	ne	ne	ne
Mandatory climate change reporting for investors*	Improving investor information on the carbon footprint of heir investments and inviting them to decarbonise their portfolio	CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3	Regulatory, Information	Implemented	ME, MTES	ne	ne	ne	ne
Regional Planning, Sustainable Development and Territorial Equality Schemes*	Setting strategic priorities and medium and long-term objectives in the region, particularly in terms of climate change mitigation, managing energy consumption and developing renewable energy sources	CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3	Planning	Implemented	MTES, Regions	ne	ne	ne	ne
Climate, Air and Energy Plans*	Improving information from regional authorities and municipalities about their greenhouse gas emissions, establishing a strategy and calculated objectives; an emissions reduction action programme; and a monitoring and evaluation system	CO_2, CH_4, N_2O, HFC, PFC, SF_6, NF_3	Information, Planning	Implemented	Local authorities	ne	ne	ne	ne
European Regulation No. 517/2014 (F-Gas II)*	Limiting chlorinated gas emissions from refrigeration and air conditioning equipment	HFC, PFC, SF_6	Regulatory	Implemented	MTES	1180	3890	5750	7300
Ratification of the Kigali Amendment to the Montreal Protocol	Reducing emissions resulting from the use of fluorinated gas	HFC, PFC, SF_6	Regulatory	Implemented	MTES	ne	ne	ne	ne
Regional climate planning *	Define at regional level the objectives and priorities in terms of reducing energy consumption and greenhouse gas emissions, improv-	CO2, CH4, N2O, HFCs, PFCs, SF6	Planning	Implemented	Regions, MTES	ne	ne	ne	ne

	ing air quality, developing renewable energies and adapting to effects of climate change.								
Low-carbon certification	Promote the emergence of projects to reduce greenhouse gas emissions, by setting up a framework for monitoring, reporting and verifying GHG emissions, allowing the valuation of reductions in additional emissions, carried out voluntarily by natural or legal persons in various sectors of activity.	CO2, CH4, N2O, HFCs, PFCs, SF6	Information, Economic	Implemented	MTES	ne	ne	ne	ne
"Energy and ecological transition for the climate" label *	Guarantee the transparency and environmental commitment of financial products, and increase investments for the benefit of the energy and ecological transition, and the fight against climate change	CO2, CH4, N2O, HFCs, PFCs, SF6	Information	Implemented	MTES	ne	ne	ne	ne
"Crowdfunding for green growth" label	Enhance the crowdfunding of projects working for the energy and ecological transition.	CO2, CH4, N2O, HFCs, PFCs, SF6	Information	Implemented	MTES	ne	ne	ne	ne
Sovereign green bond*	Fund projects contributiong to the ecological transition.	CO2, CH4, N2O, HFCs, PFCs, SF6	Information, Economic	Implemented	France trésor agency (government)	ne	ne	ne	ne
Hydrogen develoment support	Developing renewable energies.	CO2	Economic, Fiscal, Regulatory, Information	Planned	MTES	ne	ne	ne	ne

An asterisk (*) means that the measure is included in the "with existing measures" scenario in the SNBC.
MTES: Ministry for Ecological and Inclusive Transition
ne: not existing

III.3 – Long-term impact on policy and the measures introduced

Impact on emissions reduction

Greenhouse gas emissions in France dropped by 15% between 1990 and 2017 (within the scope of the Kyoto Protocol, excluding LULUCF). During the same period, the population simultaneously grew by 15% and the GDP by 52%. Today, regional emissions per capita in France are among the lowest in the world, among developed countries. This reflects the efforts to reduce the carbon intensity of the economy already undertaken in France, which will be further extended by 2030 and 2050. However, this is also reflects the growth of the service sector in the French economy, which correlates with a drop in industrial activity in the country.
The policies and measures applied have already led to:

- The exploitation of considerable potential energy savings, thus making it possible to counteract the upward trend of consumption;
- The development of renewable strategies;
- The introduction of a carbon price signal in energy taxation;
- The introduction of public policy, in all activity sectors, targeting the various drivers of mitigation;
- Awareness-raising among the public on the importance of mitigating climate change.

In addition, most of France's budget expenditure on combating climate is earmarked for long-term objectives. This expenditure concerns research and transport infrastructures in modes with the lowest greenhouse gas emissions. This is also the case for tax expenditure, most of which is to be used for supporting housing renovation. Likewise, the same applies to regulatory action, which restricts investment to generating large energy savings for its entire life span. In the longer term, financing for research and development is likely to exert the greatest impact. Support for the emergence of green sectors and the development of renewable energy sources (support for onshore and offshore wind farms, solar panels, renewable gases and biomass) is an essential factor in responding to the challenge of energy transition. It is the only factor that can respond to the scale of the challenge posed by climate change, in terms of managing energy consumption and, more generally, lower-emission energy-saving lifestyles and modes of production.
As indicated above, France set itself the long-term objective of becoming carbon-neutral by 2050 and has introduced climate- and energy-friendly pilot schemes in its policy, consisting in a long-term energy plan and, in particular, its national low-carbon strategy. To ensure overall consistency, this strategy sets out the steps to be taken to implement the greenhouse gas emissions mitigation policy in the medium and long term. It puts forward a structured and ongoing approach to reduce the carbon intensity of various sectors by 2050. In this way, the strategy helps to ensure that long-term effects are taken into account when prioritising measures to be implemented.

The main policies and measures in place to combat climate change constitute an evaluation of greenhouse gas emissions. Greenhouse gas emissions evaluations are outlined, where available, in the following tables. Only the primary measures are evaluated. However, there are several measures that cannot be evaluated, especially if they are based on schemes consisting of information sharing, support provision or obligatory auditing, for which it is difficult to isolate the triggering impact, or on measures aimed at changing practices or behaviours, for which it is often difficult to isolate their impact.

Social and economic impact

A macro-economic evaluation has been carried out of the social and economic impacts of the National Low-Carbon Strategy (SNBC) and the Long-Term Energy Plan (PPE). The macro-economic evaluation is expected to have a mildly positive effect on GDP and employment (of around 1 to 2 points in 2030 and 3 points in 2050, compared with a business-as-usual scenario) and a positive impact on employment (creating approximately 300,000-400,000 jobs by 2030 and 700,000-800,000 jobs by 2050). These results are based largely on the premise

that other countries will commit to the low-carbon transition plan, in accordance with the Paris Agreement. Finally, the damages associated with climate change were not taken into account.

- **Minimizing the adverse effects on developing countries**

In addition to technology and expertise transfers, France helps developing countries to strengthen and expand their climate change observation systems via its climate observation network and also though its research and cooperation projects (see chapter 5).

As regards the policies and measures put in place within the context of European policy, France, as a member of the European Union, is required to incorporate European law into its own legislative system. In the process of adopting European measures, Europe has put a system in place to enable estimates to be made of the positive and negative impact of the latter, including effects on other countries in the context of impact studies. Taking account of those impact studies is a key element in the final decision for defining policies and measures. It enables ensuring that the negative impact of European policies on developing countries are minimised and this ensuring that French legal provisons arising under European law comply with the commitments made under the Kyoto protocol, consistent with Section 3.14. The table below lists the estimated direct and indirect effects of certain national climate-related policies and measures in France (with positive effects in green and negative effects in orange).

Table 3.9: Direct and indirect effects on developing countries of France's main climate policies and measures

	Direct Effects			Indirect Effects		
Measure	**Social**	**Environmental**	**Economic**	**Social**	**Environmental**	**Economic**
European emissions trading scheme			Potentially positive economic effect on countries outside the European Union in the case of competitiveness differences brought about by introducing a carbon price signal on European economic activity		Incentives for international firms subject to quotas to develop more efficient processes from an environmental viewpoint that are potentially transferable to developing countries	
Developing biofuels	Positive impact of maintaining or potentially creating jobs in biofuel exporting developing countries	Positive effect, provided that sustainability criteria are put in place, especially as regards the issue of land use change. Biofuel sustainability criteria were reinforced in 2019, particularly in relation to the gradual ban on palm oil	Positive effect on biofuel imports sourced from developing countries		Negative impact on deforestation and food resources. Setting up sustainability criteria for biofuels by means of agreements between the European Commission and developing countries	Effect of decreasing demand on fossil energies and potentially reduced price sensitivity
Promoting energy efficiency	Positive impact of maintaining or potentially creating jobs in developing countries that export energy efficiency generating equipment		Positive effect on imports from developing countries for energy efficiency generating equipment		Improving air quality in developing countries Developing more energy efficient equipment that is potentially transferable to developing countries	Effect of decreasing demand on fossil energies and potentially reduced price sensitivity
Promoting renewable energies	Positive impact of maintaining or potentially creating jobs in developing countries that export renewable energy generating equipment		Positive effect on imports from developing countries for renewable energy generating equipment		Improving air quality in developing countries Developing renewable energy generating equipment that is potentially transferable to developing countries	Effect of decreasing demand on fossil energies and potentially reduced price sensitivity

Measures to foster low greenhouse gas emitting vehicles	Positive impact of maintaining or potentially creating jobs in developing countries that export low-emissions vehicles		Fostering imports of low greenhouse gas emitting vehicles from developing countries		Improving air quality in developing countries	Increasing demand for raw materials and potentially increased price sensitivity
					Developing low emissions vehicles that are potentially transferable to developing countries	Effect of decreasing demand on fossil energies and potentially reduced price sensitivity

France’s carbon footprint has attracted an increasing amount of attention. This footprint represents emissions associated with French consumption, i.e. national emissions minus export-related emissions, plus import-related emissions. This indicator is one of ten pioneering indicators of sustainable development which France adheres to. The SNBC outlines several approaches to lowering France’s carbon footprint, in order to ensure that national emissions reductions do not have the effect of increasing emissions elsewhere in the world. Indeed, the 2019 energy and climate law stipulates that, as of the next SNBC, indicative carbon budgets must be defined not only for national emissions, but also for the carbon footprint.

Chapter IV. Greenhouse gas emissions projections

IV.1 – Definition of scenarios

Between April 2017 and March 2018, France carried out a scenario-based forecasting exercise for the period up to 2050. The previous forecasting exercise only considered the period up to 2035.

A "with existing measures" or WEM scenario, taking into account all policies and measures adopted and implemented before 1 July 2017, was constructed. This scenario updates the 2016 WEM scenario, by bringing together all policies and measures adopted and implemented between 1 July 2016 and 1 July 2017.

All of the policies and measures presented in table CTF3 marked with an asterisk (*) were included in the WEM scenario.

A "with additional measures" or WAM scenario was also constructed. For France, this scenario represents a way of achieving its long-term objectives, in particular carbon neutrality in the national territory by 2050. Measures additional to those of the WEM scenario are included in the scenario. The WAM scenario effectively takes into account the additional measures adopted since 1 July 2017, the strengthening and expansion of existing measures, and approaches adopted in the National Low-Carbon Strategy and the Long-Term Energy Plan. This scenario was defined as part of the consultation activities of the National Low-Carbon Strategy. The hypotheses were developed in technical exchange groups with stakeholders and presented to the Information and Orientation Committee. The WAM scenario is the baseline scenario of the French energy and climate strategy. Both national planning and strategy documents, namely the Long-Term Energy Plan (PPE) and the National Low-Carbon Strategy (SNBC), are based on this scenario, as is the National Integrated Energy and Climate Plan (PNIEC) which France submitted to the European Union.

■ Primary hypotheses of the WEM scenario

This sub-section describes the primary modelling hypotheses underpinning the WEM scenario, as well as the main amendments made since the last WEM scenario, dated 2016.

- Carbon tax (cross-sectoral):

The hypotheses on carbon taxation have not been altered. For non-ETS sectors, the previous WEM scenario includes the same carbon component on domestic energy consumption taxes with a value of €14.50/tCO_2 in 2015, €22/tCO_2 in 2016, €30.50/tCO_2 in 2017, €39/tCO_2 in 2018, €47.50/tCO_2 in 2019, €56/tCO_2 in 2020, and then linear growth until €100/tCO_2.

- Energy saving certificates (cross-sectoral):

The energy saving certificate (ESC) scheme was extended until 2020, with a target of 1,600 cumulative and discounted TWh during the period 2018-2020. The value of the ESC is set at €3 cumulative and discounted MWh for this period.

- Renewable energy sources:

The heat fund has been extended until 2020, beyond which it will be discontinued. Biofuels are included at a rate of up to 7.5% for petrol and diesel in 2015, with the rate rising up to 9.3% by 2023 and subsequently stabilizing. Renewable electrical energy sources are expected to grow at the current rate.

- Transport:

Projections of the future value of traffic have been calculated, particularly in view of the new energy price framework (see 4.2.2.).

The WEM scenario takes into account the reinforcement of measures in favour of the roll-out of electric vehicles, in accordance with the 2015 law on energy transition and green growth (namely, the development of a network of electric vehicle charging points, including incentive schemes, the obligation to purchase low-emission vehicles when renewing public-sector vehicle fleets and a bonus-penalty scheme). The proportion of electric vehicles among registered vehicles increased from 0.9% in 2015 to 4.2% in 2020, and is expected to reach 17.3% by 2030. The share of plug-in hybrid vehicles rose from 0.3% in 2015 to 1.1% in 2020, and is expected to rise to 4.5% by 2030.

With regard to ICE vehicles, the WEM scenario forecasts a significant improvement in the performance of passenger cars and light commercial vehicles by 2020 thanks to European regulations on CO_2 emissions from new vehicles within this period (EU Regulation No. 333/2014 and 510/2011) and the continuation of the national bonus-penalty scheme. The energy performance of new cars and light commercial vehicles is expected to remain stable until 2030, since the 2019 European regulations were not included in the WEM. The discrepancy between actual emissions and emissions measured in the laboratory has been taken into account. Thus, the consumption per unit for new passenger vehicles dropped from 6.2 l/100 km to 5.7 l/100 km for petrol, and from 5.4 l/100 kn to 5.0 l/100 km for diesel, between 2015 and 2020. Beyond 2020, the average emissions of new passenger cars should remain virtually stable (the average consumption in 2030 is expected to be 5.6 l/100 km for petrol vehicles and 4.8 l/100 km for diesel vehicles). These hypotheses are slightly more conservative than those used in the previous WEM scenario, since the expected gains of the 2016 WEM scenario were not taken into account. The WEM scenario takes into account the obligations to purchase low-emission vehicles when renewing bus and coach fleets as part of the public transport network. The WEM scenario also takes into account a business-as-usual hypothesis of the energy efficiency gains of heavy goods vehicles (HGVs).

- Buildings:

As regards the construction of new buildings, the WEM scenario takes into account the most recent regulation in force, namely RT2012. The relief for environmentally-friendly and energy-efficient developments was taken into account from 2017.

Regarding the energy efficient renovation of housing, the tax credit and grants for the energy efficient renovation of disadvantaged households were extended until the end of 2017. The Eco-PTZ (a subsidized loans for individuals) scheme was extended until the end of 2018. It is expected that the Eco-PLS (a subsidized loan for the renovation of social housing) scheme will be accessed at current rates until 2020.

Measures to make energy efficiency renovations mandatory during significant residential works, such as the tertiary sector, to make energy auditing mandatory for jointly owned properties, to strengthen energy regulations instrument by instrument, and to individualize heating payments (this was taken into consideration in the previous WEM scenario) were taken into account.

- Agriculture and forestry:

The share of large-scale agricultural land dedicated to organic farming is expected to increase between 2015 and 2030, rising from 2.3% in 2015 to an expected 10% in 2030 and 15% by 2050. The consumption of mineral fertilizers is expected to drop by 3.4% between 2015 and 2030 and by 9.6% between 2015 and 2050.

- Waste management and processing:

The scenario takes into account the same measures as the previous WEM scenario. The rate of capture of biomethane is expected to remain stable, at 50%, between 2015 and 2030. The portion of captured biomethane that is recovered is expected to remain stable at 66%.

■ Primary hypotheses of the WAM scenario

The WAM scenario takes into account the additional measures adopted since 1 July 2017, the strengthening and expansion of existing measures, and approaches and objectives adopted in the National Low-Carbon Strategy and the Long-Term Energy Plan. Unlike the WEM scenario, which essentially only takes into account measures precisely defined in legislation (public policy instruments), the WAM scenario also takes into account objectives for each sector, such as the renovation of the entire energy-inefficient housing pool, even if associated legislation (e.g. regarding grants, taxes, obligations, sanctions, etc.) is not necessarily being explicitly defined. This scenario was defined as part of the consultation activities of the National Low-Carbon Strategy. The hypotheses were developed in technical exchange groups with stakeholders and presented to the Information and Orientation Committee. A summary of this scenario has been drawn up in French and can be found on the Ministry of Ecological Transition and Solidarity website[22].

- Carbon tax (cross-sectoral):

Unlike the WEM scenario, which takes into account the measures taken up to 1 July 2017, the WAM scenario takes into account the decision to freeze the rise in carbon taxation, taken at the end of 2018. The carbon tax is therefore expected to remain stable from 2018, at €44.60/tCO_2.

- Energy saving certificates (cross-sectoral):

The energy saving certificates scheme has been extended until 2050. The value of the energy saving certificate is expected to rise from €3/MWh cumulative at the start of the period to €20/cumulative and discounted MWh by 2050.

- Renewable energy sources:

The heat fund has been extended until 2050. Biofuels are included at a rate of up to 7.5% for petrol and diesel in 2015, with the rate rising up to 10.6% by 2030 and 100% by 2050. Renewable electrical energy sources are expected to grow faster than in the WAM scenario.

- Transport:

The WAM scenario takes into account the objective of ending the sale of new greenhouse gas-emitting cars and light commercial vehicles by 2040. The scenario therefore forecasts the eventual transition of all passenger vehicles to electric (with cars sales being 35% battery electric and 10% plug-in hybrid electric vehicles by 2030), a surge in electric light commercial vehicles, and HGVs powered by a wider range of energy sources, including the growth of NGVs and bio-NGVs, electrical HGVs and hydrogen fuel cell HGVs. The scenario also takes into

[22]https://www.ecologique-solidaire.gouv.fr/scenarios-prospectifs-energie-climat-air#e2

account strong energy efficiency gains, with an actual consumption of 4 l/100 km by new vehicles by 2030. The growth in low-emission vehicle sales is largely fuelled by the reinforcement of European directives on new vehicle emissions, the intensification of obligations on new public transport fleet vehicle purchases, and tax incentives. The percentage of biofuels incorporated in liquid and gaseous fuels increases and rises up to 100% by 2050.

The scenario encompasses measures on transport demand. The modal share of cycling is expected to increase by a factor of 4 by 2030, while the scenario considers a modal shift towards public transport by 3 points by 2030 and by 7 points by 2050. In the WAM scenario mobility is lower than in the WEM scenario (due to remote working and restrictions on urban sprawl) and the growth of vehicle occupancy rates. Road traffic in vehicle-kilometres is expected to drop by 2% between now and 2030 under the WAM scenario, compared to a 7% rise in the WEM scenario, before remaining stable. Heavy goods traffic, measured in heavy goods vehicle-kilometres, is expected to grow by 8% between now and 2030 under the WAM scenario, compared with a 21% growth under the WEM scenario.

- Buildings:

With regard to the construction of new buildings, the WAM scenario takes into account the most recent regulations in force, namely RT2012, and then devises hypotheses that favour increasingly ambitious regulations on energy consumption, the decarbonisation of the energy mix, and the use of less greenhouse gas-emitting materials, in particular bio-based materials.

With regard to the energy efficient renovation of housing, tax credits, grants for the energy-efficient renovation of disadvantaged households, Eco-PTZ scheme (subsidized loans for individuals) and Eco-PLS schemes (subsidized loans for the renovation of social housing) have been extended until 2050. The scenario also takes into consideration the measures requiring energy efficient renovations in the case of significant works (already incorporated in the WEM scenario) as well as the objective to phase out energy-inefficient housing (those that consume the most) by 2030, which are enshrined in the 2019 climate and energy law.

- Agriculture and forestry:

The share of large-scale agricultural land dedicated to organic farming is expected to increase between 2015 and 2030, rising from 2.3% in 2015 to an expected 28% in 2030 and 44% by 2050. The consumption of mineral-source energy is expected to drop by 21% between 2015 and 2030 and by 45% between 2015 and 2050.

The change in national diet towards a lower-meat, higher-quality diet has caused changes in the structure of agricultural production. Farmers can increase their income by improving quality or diversifying their source of income (increasing the production of biomass produced by agriculture via the repurposing of crop and other waste, including intermediate crops; the development of ecosystem services, including carbon storage). This change in production structure is associated with an expected drop in cattle farming of 11% between 2015 and 2030 and of 30% between 2015 and 2050.

- Waste management and processing:

The scenario takes into account a more circular economy and a huge shift towards waste reutilization, recycling, recovery or waste-to-energy processes. The amount of waste going to landfill is expected to drop by 86% between 2015 and 2050. The rate of capture of biomethane increases from 50% to 60% between 2015 and 2030 and to 85% by 2050. The portion of captured biomethane that is recovered is expected to remain stable at 75% from 2030 onwards.

IV.2 - Presentation of the results

The WEM and WAM scenarios presented here take 2015 to be the reference year. Emissions from before this date are the ones from the inventory submitted in April 2019. Projected emissions require certain contingent elements, such as the harshness of winter, to be corrected. Indeed, given that 2015 was warmer than previous years on average, actual emissions were lower than if previous years had seen harsh winters on average. Corrective amounts have also been introduced for upwards-trending emissions in the short term. The adopted scenario takes into account an hypotheses of a global warming of 2ºC by 2050.

Within the scope of the Kyoto Protocol, 2015 emissions recorded in the last inventory (excluding the LULUCF sector) amounted to 460 $MtCO_{2eq}$ in 2015, i.e. 16% lower than in 1990, and 464 $MtCO_{2eq}$ with the corrective amounts incorporated in the projections.

Under the WEM scenario, emissions drop, reaching:

- 416 $MtCO_{2eq}$ by 2030, i.e. a 24% reduction compared to 1990
- 375 $MtCO_{2eq}$ by 2050, i.e. a 31% reduction compared to 1990

In previous years, the actual emissions reported by France have generally been higher than the results of the WEM scenarios. Thus, the 2019 WEM scenario presented here is more conservative than previous scenarios, despite naturally incorporating more measures. This can be explained by different methodological choices. The models used are different or have been updated. Corrections have been made in order to better take circumstantial phenomena into account (e.g. temperature, energy costs, the unavailability of nuclear power plants, etc.) and delays in reaching certain national targets (such as carbon budgets). Forecasts for the LULUCF sector are also more conservative, so as to take into account more accurately uncertainties surrounding the growth of the forestry sector within changing climate context.

Although the WEM scenario is more conservative than before, actual emissions in France should decrease more rapidly than in this scenario. In 2018, a preliminary estimation showed that emissions would reach 445 $MtCO_{2eq}$ (excluding LULUCF), whereas they would reach 463 $MtCO_{2eq}$ (excluding LULUCF) under the WEM scenario. Circumstantial effects (temperature, energy costs, etc.) explain part of this discrepancy.

Under the WAM scenario, emissions are expected to drop to:

- 307 $MtCO_{2eq}$ by 2030, i.e. a 43% reduction compared to 1990
- 80 $MtCO_{2eq}$ by 2050, i.e. a 85% reduction compared to 1990

This reduction in emissions is much higher under the WAM scenario than under the WEM scenario.

In this chapter, the detailed results are presented within the scope of the Kyoto Protocol. Results to the scope of the Convention are not available for the projections part.

- **General developments**

Within the scope of the Kyoto Protocol and under the WEM scenario, excluding LULUCF, emissions decrease by 16% between 1990 and 2020 and by 24% between 1990 and 2030. Including LULUCF, emissions decrease by 20% between 1990 and 2020 and by 26% between 1990 and 2030.

Within the scope of the Kyoto Protocol and under the WAM scenario, excluding LULUCF, emissions decrease by 20% between 1990 and 2020 and by 43% between 1990 and 2030. Including LULUCF, emissions decrease by 24% between 1990 and 2020 and by 49% between 1990 and 2030.

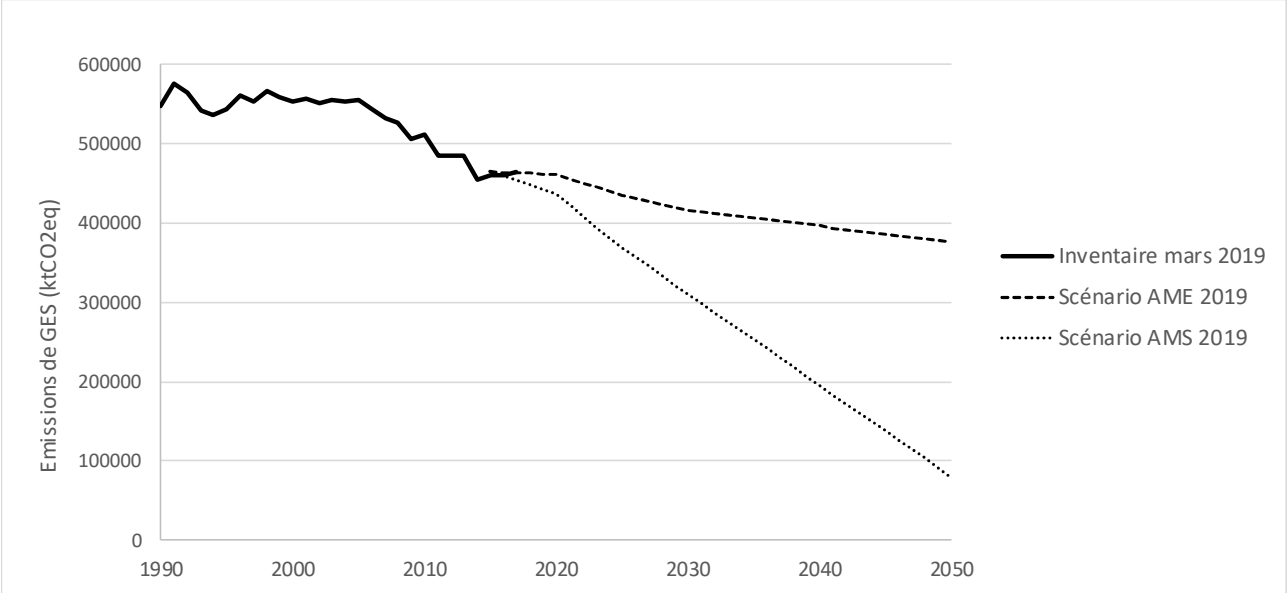

Figure 4.1. $ktCO_{2eq}$ projections, excluding LULUCF, within the scope of the Kyoto Protocol; WEM (AME) and WAM (AMS) scenarios. Source: UNFCCC Inventory, Citepa/MTES, 2019 Submission and MTES Emissions Projections, 2019

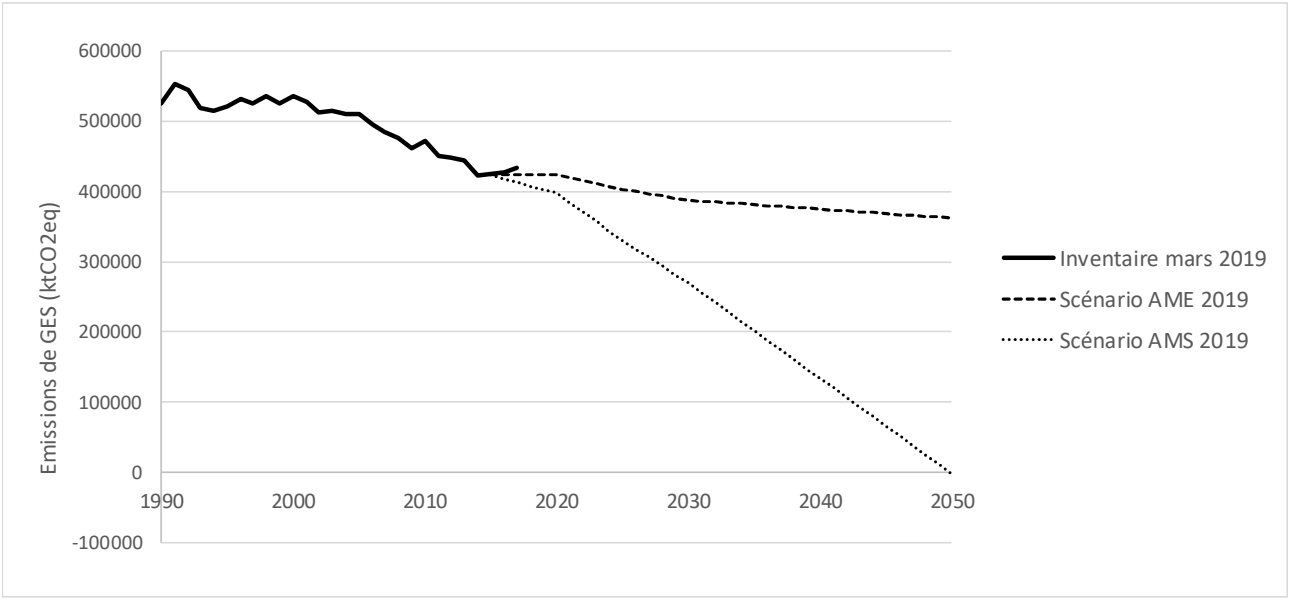

Figure 4.2. $ktCO_{2eq}$ projections, including LULUCF, within the scope of the Kyoto Protocol ; WEM (AME) and WAM (AMS) scenarios. Source: UNFCCC Inventory, Citepa/MTES, 2017 Submission and MTES Emissions Projections, 2017

Projections per sector and gas

The projections per sector and gas under the WEM scenario are presented in the table below (table CTF 6a)).

Table CTF 6a): Observed emissions and emissions projections under a WEM scenario (within the scope of the Kyoto Protocol). Source: UNFCCC Inventory, Citepa/MTES, 2019 Submission and MTES Emissions Projections, 2019

WEM										
	GHG emissions and sinks						GHG emissions projections			
	($ktCO_{2eq}$)						($ktCO_{2eq}$)			
	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
Sector										
Energy	381,294	379,040	394,050	402,790	368,007	321,985	327,831	308,674	295,078	288,288
Transport (1)	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
Industry/industrial processes	67,200	63,870	53,869	53,148	46,987	43,753	42,740	36,305	33,005	31,561
Agriculture	82,312	79,737	82,687	77,308	76,462	76,838	75,295	74,430	73,348	72,610
LULUCF	-22,159	-21,879	-16,781	-44,698	-39,592	-35,813	-38,509	-31,598	-29,039	-25,184
Waste	17,263	20,478	21,862	21,629	20,384	17,292	15,478	15,033	15,020	13,748
Other (specify)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Gas										
CO_2 emissions excluding LULUCF	400,766	397,466	415,971	426,947	389,758	341,030	349,140	329,809	316,243	308,922
CO_2 emissions including LULUCF	374,401	368,647	394,275	377,922	345,842	300,982	306,636	294,160	283,622	280,219
CH_4 emissions excluding LULUCF	69,263	70,843	69,371	63,789	61,270	57,071	55,342	54,023	53,185	51,486
CH_4 emissions including LULUCF	70,263	74,602	71,126	65,061	62,466	58,230	56,455	55,131	54,270	52,577
N_2O emissions excluding LULUCF	66,203	67,264	55,124	47,638	41,991	41,599	40,182	39,948	39,420	39,075
N_2O emissions including LULUCF	69,410	70,445	58,283	50,693	45,118	44,674	43,064	42,891	41,917	41,503
HFCs	4402	1890	6612	13,354	17,297	19,127	15,732	9,788	6,778	5,923
PFCs	5202	3065	2997	1760	617	537	484	409	359	334
SF_6	2215	2592	2374	1355	875	498	458	459	460	460
Other (NF_3)	16	6	20	31	32	6	6	6	6	6
Total (excluding LULUCF)	**548,069**	**543,126**	**552,469**	**554,875**	**511,841**	**459,868**	**461,344**	**434,442**	**416,451**	**406,206**
Total (with LULUCF)	**525,910**	**521,247**	**535,688**	**510,178**	**472,248**	**424,055**	**422,836**	**402,834**	**387,413**	**381,022**
Memo items:										
Aviation Bunkers	8539	10,692	14,484	15,875	16,122	17,418	17,005	19,084	21,396	23,877
Marine bunkers	8034	7191	9553	8865	7996	5618	7796	7957	8024	8049

(1) Transport is included in "Energy".

The projections per sector and gas under the WAM scenario are presented in the table below (table CTF 6c).

Table CTF 6c): Observed emissions and forecasts under an additional-measures scenario (within the scope of the Kyoto Protocol). Source: UNFCCC Inventory, Citepa/MTES, 2019 Submission and MTES Emissions Projections, 2019

WAM										
	GHG emissions and sinks						GHG emission projections			
	($ktCO_{2eq}$)						($ktCO_{2eq}$)			
	1990	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Sector										
Energy	381,294	379,040	394,050	402,790	368,007	321,985	305,017	253,350	203,515	151,385
Transport (1)	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
Industry/industrial processes	67,200	63,870	53,869	53,148	46,987	43,753	41,371	32,979	27,368	24,409
Agriculture	82,312	79,737	82,687	77,308	76,462	76,838	73,646	69,007	65,227	62,117
LULUCF	-22,159	-21,879	-16,781	-44,698	-39,592	-35,813	-38,995	-37,671	-40,160	-45,205
Waste	17,263	20,478	21,862	21,629	20,384	17,292	14,344	12,325	10,983	9785
Other (specify)	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Gas										
CO_2 emissions excluding LULUCF	400,766	397,466	415,971	426,947	389,758	341,030	325,904	273,167	220,992	167,257
CO_2 emissions including LULUCF	374,401	368,647	394,275	377,922	345,842	300,982	282,686	231,263	176,617	117,863
CH_4 emissions excluding LULUCF	69,263	70,843	69,371	63,789	61,270	57,071	52,531	47,947	44,506	41,496
CH_4 emissions including LULUCF	70,263	74,602	71,126	65,061	62,466	58,230	53,671	49,093	45,641	42,610
N_2O emissions excluding LULUCF	66,203	67,264	55,124	47,638	41,991	41,599	40,268	37,693	35,559	33,721
N_2O emissions including LULUCF	69,410	70,445	58,283	50,693	45,118	44,674	43,352	40,778	38,641	36,797
HFCs	4402	1890	6612	13,354	17,297	19,127	14,731	7994	5241	4458
PFCs	5202	3065	2997	1760	617	537	479	395	330	299
SF_6	2215	2592	2374	1355	875	498	456	459	460	460
Other (NF_3)	16	6	20	31	32	6	6	6	6	6
Total (excluding LULUCF)	**548,069**	**543,126**	**552,469**	**554,875**	**511,841**	**459,868**	**434,378**	**367,661**	**307,093**	**247,697**
Total (with LULUCF)	**525,910**	**521,247**	**535,688**	**510,178**	**472,248**	**424,055**	**395,383**	**329,989**	**266,934**	**202,492**
Memo items:										
Aviation Bunkers	8539	10,692	14,484	15,875	16,122	17,418	17,005	19,084	21,396	18,692
Marine bunkers	8034	7191	9553	8865	7996	5618	7778	7911	7903	7,595

(1) Transport is included in "Energy".

Reaching France's objectives

Reaching the 2020 targets under the Kyoto protocol

Under the WEM scenario, projected emissions in 2020, excluding LULUCF, amount to 461 $MtCO_{2eq}$, 16% lower than in 1990. Projected emissions from the sectors covered by the ETS are 28% lower than their 2005 level, while projected emissions from non-ETS sectors are 12% lower than their 2005 level. Under the WAM scenario, emissions not covered by the ETS are 16% lower than their 2005 level.

In 2010, the EU committed to reducing its greenhouse gas emissions by 20% by 2020 compared to 1990 levels. This objective was submitted by the EU-28 within the framework of the Convention, and there are no specific objectives for each Member State. Within the framework of the Energy-Climate Package, the EU has established internal rules that underpin the implementation of this objective. This is divided into two sub-objectives compared to 2005, one for the ETS sectors for the entire EU (target of -21% in 2020 compared to 2005 emissions) and the other for non-ETS sectors shared by each Member State (target of -14% in 2020 compared to 2005 emissions for France). Under the WAM scenario, projected emissions in 2020 in sectors not covered by the ETS is 16% lower than 2005 emissions. Moreover, the non-ETS objective is one to be reached over a period of time as opposed to by a given year. Given that emissions in France are lower than those resulting from the decision to share this effort in previous years, France is in possession of surplus allowances. Therefore, it will reach its 2020 objective.

Reaching the objectives set by France for 2030

Under the Paris Agreement, the EU has undertaken to reduce its greenhouse gas emissions by 40% from now by 2030. Like the 2020 objective, these reduction efforts will be shared among ETS and non-ETS sectors and among Member States. France's reduction target for non-ETS sectors is -37% from 2005.

In addition, France has set itself a national reduction target for all its emissions of 40% by 2030 compared to 1990.

By 2030, according to the WEM scenario, projected emissions are expected to amount to 416 $MtCO_{2eq}$, i.e. a 24% reduction compared to 1990. Projected emissions from sectors covered by the ETS are down 30% from 2005 levels, while projected emissions from non-ETS sectors are 23% lower than 2005 levels. Under the WAM scenario, emissions not covered by the ETS decrease by 40% compared to 2005. Moreover, overall emissions decrease by 43% compared to 1990, thus exceeding the national objective.

By 2030, the existing measures taken into account in the WEM scenario will reduce emissions but not sufficiently. Additional efforts must be implemented beyond the measures already adopted. The climate plan of July 2017 and the energy and climate law of 2019 have served to reinforce the reduction objectives. The purpose of regularly revising the National Low-Carbon Strategy is to make the adjustments required to reach the targets.

IV.3 – Changes to the models and methodologies

Models used

The models and methodologies used to design these scenarios are similar to those used to design the 2016 WEM scenario; no significant changes were made since the last exercise.

The task of revising projections was coordinated by the Directorate-General for Energy and Climate of the Ministry for the Ecological and Inclusive Transition.

Several modelling teams contributed to this task:

- The General Sustainable Development Commission (French: CGDD) for the transport and tertiary sectors;
- The French Agency for the Environment and Energy Management (French: ADEME) for the residential buildings sector;
- The Ministry of Agriculture for the agriculture and forestry sector;
- Enerdata consultants for the modelling of the energy scenarios with the MedPro model;
- The French Institute for Oil and New Energy (French: IFP Energies nouvelles) for the modelling of oil supplies;
- The CITEPA (Interprofessional Technical Study Centre for Air Pollution) which also prepares the GHG emissions and pollutants inventories in France and performed the modelling of greenhouse gas and air pollutant emissions, in accordance with the national inventory methodology.

The hypotheses used to design the scenarios were discussed in sectoral technical groups as part of the process of drafting the National Low Carbon Strategy.

The energy scenarios were modelled using the long-term energy demand simulation model (MedPro), fed by outputs from the sectoral models for transport, residential and thertiary buildings and agriculture. Greenhouse gas emissions were modelled downstream by CITEPA using the outcomes from energy scenarios and data from activity scenarios and supplementary models (including fluorinated gas modelling), in accordance with the inventory methodologies.

a) The Sectoral Models

- Modelling of the transport sector

Traffic projections were made based on the Modev model from the General Commission for Sustainable Development. Modev models the changes in passenger and goods traffic according to demographic variables and economic growth (GDP, end consumption of households, sectoral added values), changes in infrastructure and transport services, and the price of different modes of transport. Modev models the change in the overall transport demand (passengers and goods) as well as the change in the modal split between the different modes of transport and the traffic on the network.

Traffic modelling is supplemented by fleet models that include modelling changes in the share of electric vehicles and changes in the distribution of diesel/petrol vehicles, based on hypotheses about the changing cost of vehicles and batteries and changes in unit consumption of different types of vehicles.

- Modelling of the buildings sector

The residential sector is modelled using the Menfis model from the French Environment and Energy Management Agency. The Menfis model models the change in the energy performance of the residential building stock over a set time frame, from 2008 to 2035. Energy performance improvements are achieved through renovations, the destruction of buildings and the construction of new buildings. The renovation process is a central part of Menfis. Using technical-economic calculations, Menfis annually determines which parts of the building can be renovated and at what level of energy performance. By modelling the rebound effect, it forecasts changes in energy consumption and greenhouse gas emissions.

The tertiary sector was modelled using the tertiary sector model by the CGDD. This model simulates renovation improvements and changes in the market share of heating systems within different branches of the tertiary sector pool, based on an exogenous scenario of energy prices, system and renovation activity costs, and modelled public policies. It generates output on changes in consumption for each type of energy use (heating, other thermal uses, specific electricity, etc.) and for each domain represented in the arsenal of buildings (offices, hospitality and catering, business, education, health, sports, transport and community housing).

- Modelling of the agriculture and forestry sector

The agriculture and forestry sector was modelled using the ClimAgri® model, which was first developed in 2009 by Solagro and Bio Intelligence Service on behalf of ADEME. ClimAgri® models energy consumption and greenhouse gases in the agricultural sector, based on hypotheses about the characteristics of crop production (description of productions, inputs, technical practices and routes, yields) and bioconversion, i.e. the transformation of fodder and concentrates in egg, milk and meat production, describing herds, inputs and breeding practices.

- Modelling of the industrial sector

This sector was modelled based on the hypotheses discussed in technical groups.

- Modelling of fluorinated gases

As regards the fluorinated gas sector, HFC emissions were evaluated by the CITEPA.

b) Modelling energy scenarios

Enerdata's Medpro model is a technical, economic model to simulate the long-term end energy demand, based on a detailed representation of energy consumption according to sector, use and energy. Medpro models all sectors (industry, transport, construction and energy in agriculture) by integrating the outputs of the sectoral models for transport, construction and agriculture described above, as well as the hypotheses relating to the industrial sector.

c) Modelling greenhouse gas emissions

Based on the activity scenarios described above, CITEPA has developed emission projection scenarios for 2020. Emissions projections are consistent with the national greenhouse gas emissions inventory submitted to the UNFCCC. The methods applied to convert activity data into emissions are therefore consistent with the inventory report.

Strengths and weaknesses of the model approach

The strength of the model approach is that it uses detailed models produced by expert teams. The sectorial models are constantly refined and improved. The Medpro model computes all the data from the sectorial models in a coherent and integrated way to produce the energy balance. Then GHG emissions from energy and non energy sources are calculated by Citepa with the same methods used for the NIR, which guarantees that projections are coherent with the latest inventory.

The weaknesses are that, as with any model calibrated on observed data, there are some uncertainties in some calibration parameters; also there might be changes in some elasticities to GDP or prices over a long projection period. Furthermore, the use of different sectorial models implies that the modelling process is rather complex and doesn’t allow for too many sensitivity analysis or variant scenarios if not scheduled at an early stage.

How the approach accounts for any overlap or synergies that may exist between different policies and measures :

The models are integrated models. Therefore all interactions between measures at the level of a sector are taken into account, synergies as well as overlaps.

Scenarios :

The scenarios taken into account are a WEM (with existing measures scenario) and a WAM (with additional measures scenario. The "with existing measures" or WEM scenario, taking into account all policies and measures adopted and implemented before 1 July 2017, was constructed. This scenario updates the 2016 WEM scenario, by bringing together all policies and measures adopted and implemented between 1 July 2016 and 1 July 2017. A "with additional measures" or WAM scenario was also constructed in support of the long term strategy. No WOM scenario was constructed. The objective was to focus on the WEM scenario to estimate the decrease in GHG emissions if no more measures were adopted to estimate the way to go to reach the goals and on the WAM scenario with additional measures to reach the objectives. The construction of a without measures scenario would also raise the problem of the starting point since a number of climate mitigation measures were implemented many years ago.

Indirect GHG

Apart from the projections done on GHG (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 et NF_3), projections have been done on indirect GHG (nitrogen oxides, non-methane volatil organic compounds, sulphur oxides) under the Convention on long range transboundary air pollution (CLRTAP), available at :
https://www.ceip.at/ms/ceip_home1/ceip_home/status_reporting/2019_submissions/
(France submission ; NFR tables ; table : "Annex_IV_Projections_reporting_France_d.xlsx"

- **Baseline scenario assumptions**

Table CTF5 presents the changes in the key variables of the economic framework (population, GDP, international price of energy and price of carbon under the ETS).

Population growth assumptions come from INSEE (the French National Institute of Statistics and Economic Studies), which produces the reference demographic projections for France.

The hypotheses on economic growth are those recommended for France by the European Commission. These assumptions are also consistent with the assumptions used by the French Ministry of the Economy for long-term economic frameworks.

The hypotheses adopted for the price of fossil fuel-based energy are taken from the economic framework proposed by the European Commission for all countries of the European Union.

Hypotheses on the change in the price of carbon for facilities included in the ETS are taken from the economic framework proposed by the European Commission for all countries of the European Union.

Table CTF5: Summary of the key variables and hypotheses used in the projections

Key variables	Unit	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035
Population (1)	thousands of inhabitants	57,996	59,281	60,508	62,731	64,613	66,391	67,820	69,093	70,281	71,417
GDP (2)	Billion euros constant 2010	1440	1535	1772	1923	1998	2095	2268	2419	2594	2822
International price of oil (3)	2013 €/boe	NE	NE	NE	NE	NE	48.2	75.0	85.2	93.8	97.9
International price of gas (4)	2013 €/boe	NE	NE	NE	NE	NE	38.8	48.3	52.2	56.8	60.6
International price of coal (5)	2013 €/boe	NE	NE	NE	NE	NE	11.5	14.3	17.1	20.5	21.7
Price of carbon under ETS (6)	€2013/tCO_2	NE	NE	NE	NE	NE	7.5	15	22.5	33.5	42

(1) Source: Institut national de la statistique et des études économiques/French National Institute of Statistics and Economic Studies

(2) Source: Economic framework of the EU for France

(3) Source: Common economic framework of the EU

(4) Source: Common economic framework of the EU

(5) Source: Common economic framework of the EU

(6) Source: Common economic framework of the EU

Sensitivity tests were done and are available at :

http://cdr.eionet.europa.eu/fr/eu/mmr/art04-13-14_lcds_pams_projections/projections/en-vxmxdtg/FR_MMR_art._14_Tests_de_sensibilitA_2019.pdf

Chapter V. Assistance given to developing countries in the form of financial, technological and capacity enhancement resources

General Matters

In accordance with the commitments made in the context of the United Nations Framework Convention on Climate Change, France has outlined in this report the new and additional financial resources, for the years 2017 and 2018, and provided to developing countries in order to reduce their greenhouse gas emissions and to adapt to the effects of climate change. It has also supported technology transfers and capacity reinforcement in those countries in the context of its bilateral and multilateral initiatives.

During the United Nations General Assembly in September 2015, France announced an increase in its annual climate funding, from €3 billion in 2015 to €5 billion in 2020. As part of this objective, the French President announced, during the One Planet Summit in December 2017, increased financial support dedicated to adaptation, amounting to €1.5 billion per year between now and 2020 (compared with €1 billion previously). On 8 February 2018, the Inter-Ministry Committee for International Cooperation and Development (French: CICID) reaffirmed that the fight against climate change is one of the president's priorities in terms of policy development, on par with education, gender, health and susceptibility. He also underlined that Africa, the least developed countries (LDCs) and the most vulnerable countries should also be prioritized.

In 2018, France provided more than €5 billion[23] of public money for climate change mitigation and adaptation in developing countries through bilateral and multilateral sources. This level of commitment has shown a significant increase compared with 2017 (+15% with a level of commitment of €4.4 bn in 2017) and brings the total funding committed to climate change since 2005 to €33 billion, mainly through the activity of the French Development Agency group. All of the financial support presented in this report is deemed to be new and additional, consisting of funding authorizations for the year in question (for bilateral funding) and payouts made for the reporting year in question (for multilateral commitments). The total commitment for multilateral funding is therefore not reported but only the proportion that was paid out in 2017 and 2018.

France also provides technical cooperation and supports capacity-building in developing countries through numerous channels, which are also described in this report.

V.1 – Use of financial resources from bilateral sources

France is a major player in bilateral development aid in the climate sector with a very large field of intervention, a recognised level of expertise and a substantial financial commitment. It relies mainly on the French Development Agency group (French: AFD, and its private-sector subsidiary, PROPARCO), and on bilateral instruments dedicated, in part, to the climate stakes in developing countries, namely the French Facility for Global Environment (French: FFEM), The Fund for Private Sector Studies and Aid (French: FASEP) and subsidized and unsubsidized Treasury loans.

[23] 5 088 762 euros or 6 007 983 dollars. The conversion rates used are the ones from OCDE (https://data.oecd.org/conversion/exchange-rates.htm) that is for year 2017 : 1USD=0,885 euros and for year 2018 : 1USD=0,847 euros.

Financial support provided by the French Development Agency

The AFD group - the primary French provider of bilateral public aid for development - has developed an ambitious climate strategy for the period 2017-2022, with a pioneering objective of bringing coherence to all funding provided by the AFD, with a climate-resilient and low-carbon development. The "100% Paris Agreement" objective is now a cornerstone of the Strategic Direction Plan, adopted in 2018 for the AFD. Consequently, the AFD group (including Proparco) has set itself the objective of allocating 50% of its financial commitments in foreign States to climate change co-benefit projects. The plan also entails ensuring that the 50% of the AFD group funding not allocated to climate change co-benefit projects do not put in jeopardy the Paris Agreement objectives.

In 2017, the AFD group committed €4 bn of funding to climate co-benefit projects. This level of commitment saw a modest change (of +11%) compared to 2016. In line with its climate strategy, the AFD (excluding Proparco) committed 50% of aid to climate-related co-benefits in 2017 and 55% in 2018, while Proparco committed 47% in 2017 and 32% in 2018. In 2018, the AFD group's climate commitments amounted to €4.8 bn, consisting of funding for 158 development projects and representing 51% of total commitments. The AFD group's climate commitments therefore increased significantly between 2015 and 2018 (+65%).

In order to ensure that the finance provided meets the climate change mitigation and adaptation needs of recipient countries, local agencies of the French Development Agency identify the projects and needs of recipient countries jointly with the partners and project developers provided by these countries. It also relies on the signature of funding contracts with national and local authorities in the countries where there is intervention. Following the COP21, the AFD also put in place a number of specific instruments to support its climate commitments in developing countries.

Financial support provided by the French Facility for Global Environment

The French Facility for Global Environment (FFEM) is a bilateral public fund set up in 1994 and is one of the major instruments serving French policy on cooperation and development in relation to the environment. It provides financial support to innovative projects in the form of grants and its purpose is to provide economic and social development and to have a significant, lasting impact on one or more major global environmental component (such as the fight against climate change, the protection of biodiversity, the fights against soil degradation and desertification, and the fight against land-based water and marine pollution). The Facility was re-established at the end of 2014 and endowed with €90m for the period 2015-2018 and €120m for the period 2019-2022. The Facility has already supported 333 projects in more than 120 countries, two thirds of which are in Africa.

Between 2015 and 2018, the FFEM made total commitments of €72 m, of which €32 m (i.e. 45% of its total financial commitments) was devoted to combating climate change. During this period, 60 projects were supported, including 38 in Africa. 70% of all of the projects for this period were supported by NGOs or local public bodies.

Financial support provided in the form of grants (FASEP) and loans from the French treasury.

Furthermore, the Ministry of Economy and Finance has contributed, in the form of grants, to funding feasibility studies, technical assistance innovative technology demonstrators devoted to the environment and to sustainable development, in the context of study funds and assistance to the private sector (FASEP). This instrument funds services provided by French and foreign consulting engineers and benefits public bodies in countries eligible for Public Development Aid and for sustainable development economic projects that meet the needs of those countries (better access to water, to renewable energies, and improved transport offerings, etc.).

The Ministry of Economy and Finance also supports, by means of loans from the French Treasury, infrastructure projects supported by public bodies in emerging countries eligible for public development aid[24]. The sectors involved mainly concern sustainable development and the topic of climate change (mass transport, water and the environment, renewable energy, etc.).

In 2018, €44 m were committed in the form of a non-concessional loan to address climate change (one project) and €2.4 m in the form of donations from the FASEP (six projects)[25].

V. 2 Use of financial resources from multilateral sources

With a contribution of $12.5 billion in 2018, France is the third-largest donor among G7 countries in terms of its public aid contribution in relation to its gross national income. France thinks that the multilateral system should be exemplary and drive the fight against climate change, with in particular, the purpose of supporting the implementation of nationally determined contributions in developing countries that are signatories to the Paris agreement. France is one of the main contributors to financial institutions and multilateral funds devoted to the climate.

A significant portion of France's action is devoted to its involvement in development banks and multilateral development funds, such as the International Development Association (IDA), the soft lending window of the World Bank, the African Development Fund (ADF), the soft lending window of the African Development Bank and the International Fund for Agricultural Development (IFAD). These banks and funds dedicate part of their resources to tackling the effects of climate change. France's "climate" entry is attributable to its contribution to these soft-lending funds. **In 2018, the "climate" portion of its payouts within the context of these institutions were thought to amount to €372 m.**

During the period 2019-2023, France will have made contributions to the tune of €1.5 bn ($1.7 bn) in order to replenish the Green Climate Fund. This strong commitment, which accounts for a significant portion of the budget, makes France the third largest contributor (of grant elements[26]) to replenishment after the United Kingdom and Germany, and the fourth largest contributor in history after these two countries and Japan. This contribution will be made primarily in grant aid (80%), with the remaining

[24]Where non-concessional loans are offered, these are not recorded as entries of 'French public aid for development', but as 'Other contributions made by the public sector' (French: AASP).

[25]Belarus, Turkey and Ukraine - countries which, although eligible for Public Development Aid (APD) and, therefore, for concessional loans from the French Treasury and FASEP support, are considered to be developed countries, according to the UNFCCC (Appendix I) - are not considered within the context of reporting to the UNFCCC.

[26]If the total contribution is taken into consideration and not only the grant element, France ranks higher than Germany.

20% consisting of substantially concessional loans (zero tax rate, 25-year maturity period). This contribution, France's second following the first contribution made during the initial mobilization of resources, amounts to €774 m and was made in 2018.

The Green Climate Fund aims to strike a balance between funding devoted to climate change mitigation and funding devoted to adaptation. By the end of 2018, 57% of funding commitments had targeted mitigation projects, compared with 43% for adaptation.

Additionally, **during the period 2015-2018, France made contributions to the global environment fund amounting to $300 m** (of which almost 40% was devoted specifically to funding actions associated with climate change). In addition to the reduction of greenhouse gas emissions, this fund invests in fields associated with protecting biodiversity, protecting international waters, and combating the depletion of the ozone layer, soil degradation and persistent organic pollutants. France makes the fifth largest contribution in terms of value to this fund.

Lastly, France contributed **€10 m in 2017 and €7.5 m in 2018 to the Least Developed Countries Fund,** which supports climate change adaptation projects in LDCs (70% of which benefited Africa). I**n 2018, France also contributed to adaptation funds to the tune of €15 m** (announced at COP24).

Tables of funding, related to sections 1 and 2, are presented in the appendices.

The methodology used to report the financial support has not been modified since the previous one used in BR3 and is described in annex III in BR3.

Assistance in the form of financial resources are presented in the tables in Annex II. Exchange rates used are the ones from OCDE (https://data.oecd.org/conversion/exchange-rates.htm); for year 2018, 1USD = 0,847 Euros ; for year 2017, 1USD = 0,885 Euros

V.3 - Technological Cooperation

In addition to bilateral and multilateral channels for public aid for development, France is also committed to various projects and international forums that generate large scale international cooperation with a host of actors. This cooperation is to be understood as a transfer in the widest sense of know-how, methods, and tools that are necessary to implement the transfer to low-carbon technologies.

In previous years, technology has advanced rapidly. Low-carbon industries have developed and been deployed on a large scale in the renewable energy and energy efficiency sector. In implementing the Paris Agreement, a large proportion of NDCs prepared by the countries mention the importance of climate technologies in achieving the objectives set.

In bilateral projects, cooperation consists of strategic cooperation in the area of renewable energy and energy efficiency.

In this phase of public policy implementation, the private sector and decentralised cooperation play a particularly important role as the operational stakeholders developing the capacity required on the ground to set up low-carbon projects and contributing to this technology transfer. French companies and authorities are especially active in the field and are developing both mature and innovative projects in an increasing number of countries.

At the multilateral level, French technological cooperation is performed through major international energy partnerships, like the International Energy Agency (French: AIE), and especially within the

international AIE platform on low carbon technologies established in October 2010, the CEM (Clean Energy Ministerial) or the IPEEC (International Partnership for Energy Efficiency Cooperation). France also contributes considerably to the International Renewable Energy Agency (IRENA), which is staunchly devoted to supporting countries. It is also important to mention the far-reaching multilateral treaties implemented under the aegis of the United National Framework Convention on Climate Change (UNFCCC). These treaties underline the importance of technology transfers and experience-sharing on climate technologies, in particular under the Paris Agreement on climate change. In 2010, the Technology Facilitation Mechanism was created to sustain technology transfers to strengthen climate change mitigation and adaptation in developing countries. France contributed to the work of the two authorities set up as part of this Mechanism: the Climate Technology Centre & Network (CTCN) and the Technology Executive Committee (TEC). The work of UNEP (United Nations Environment Programme) and that of the FAO (Food and Agriculture Organisation) also foster the sharing of experience and tools useful for a low carbon transition.

Technological cooperation such as that represented in Table CTF 8 must be understood in the widest sense, and in particular incorporates know-how, method and tool transfers that are required for implementing low carbon transition technologies. Table CTF 8 presented here is not intended to be exhaustive, but is rather intended to demonstrate, with a few examples, how the French public and private sectors have addressed the issue at all levels. This enables wide-scale technological cooperation to be generated beyond the classic bilateral and multilateral channels for public development aid.

Table 8. Measures and activities associated with technology transfer

Country or Region	Objective	Measures and Activities Connected to Technology Transfer	Sector	Funding Source	Activities Undertaken by	Status	Additional information
Zambia	Mitigation	Installation of an anaerobic biodigester in Lusaka (Zambia), in the Mutendere district: The objective of the project is to explore the potential of the biogas production industry as part of an organic waste pilot operation in the Mutendere district, involving the installation of anaerobic biodigestion tanks with biogas distribution in the district.	Energy /waste	Ministry of Energy Transition and Solidarity, via the ADEME	The companies Bioéco and its partners in Zambia	In progress (project conducted during the period 2018-2020)	The project involves: - The organization of a collection network; - The installation of an anaerobic biodigestion tank, holding 1000 m^3 of faecal sludge and 2000 t of organic waste, and the sale of biogas to local populations; - Support for Zambian partners (training, follow-up of construction and operation for a minimum of 12 months, in order to ensure the longevity of the project).
Cameroon	Mitigation	Women and sustainable energy - Strengthening the network of women mayors of Cameroon: the project aims to strengthen the network of locally elected women of Cameroon and to set in motion pilot projects for street lighting and an electricity connection in public buildings.	Energy	AIMF, Veolia Foundation, ADEME (funded by the Ministry of Energy Transition and Solidarity) , FEICOM and the municipalities targeted	Secretariat of the Network of Locally Elected Women of Cameroon	In progress (project conducted during the period 2018-2020)	The project was first conducted for the benefit of two towns during phase 1 (Bangangté and Fokoué) and then in five new towns during phase 2 (Mayo Oulo, Mbengwi, Angossas, Afanloum and Mintom). The objective on completion is the sustainable strengthening of public energy systems, ensuring energy autonomy and the management of production technologies and renewable energy distribution for street lighting and public buildings. Total cost of the programme: €1.1 m
Developing countries eligible for public development aid	Mitigation and adaptation	The objective of the Private Sector Climate Innovation Facility (FISP-Climat) is to promote innovation in the climate change sector, supported by private-sector actors.	Energy	FFEM	Private companies of the North and South	Call for proposals in 2013, 2014, 2015, 2016 and 2018	Approximately five projects are selected after each call for proposals. Some of the projects currently in progress or in operation include: electricity production from gas generators using rice husks and timber waste, in Cameroon; the collection of fuel from sugar cane straw for electricity production in a combined coal/biogas plant in Maurice; and the installation of a battery-free solar desalination plant for seawater in Maurice.

Country or Region	Objective	Measures and Activities Connected to Technology Transfer	Sector	Funding Source	Activities Undertaken by	Status	Additional information
Worldwide	Mitigation	France hosts the International Energy Agency (AIE) in Paris and it is a founder member. In particular, this agency enables supporting and accelerating technology transfers, and the sharing of experience in the fields of energy and energy efficiency.	Energy	Public	Public	Installed	Founded by the OECD in 1974 following the first oil crisis, its initial mission was coordinating the measures to be taken at times of crisis in oil supplies. Whilst that remit remains at the heart of its activity, its remit has gradually widened to take energy safety, economic and sustainable development and more recently, climate stakes into consideration. The IEA facilitates the coordination of energy policies between its 29 members, who work to ensure reliable, clean and affordable energy supplies for their citizens. The AIE is the reference organisation in the field of energy, and each year produces the reference report on energy at a global level, the World Energy Outlook (WEO).
Worldwide	Mitigation and Adaptation	Though human and financial support, and constructive cooperation, France works actively within IRENA (International Renewable Energy Agency) to facilitate energy transitioning in developing countries, towards low carbon growth. In addition, France is the sixth largest contributor to the Agency (1.4 M USD in 2012).	Energy	Public	Public	Installed	The agency's rise to power, from its creation in 2009 to now where it includes more than one hundred members, deserves being saluted. This agency's operations involve providing support for countries wishing to implement renewable energy. It enables the development and sharing of tools that foster the deployment of renewable energy at a large scale and in all countries. The support it provides specifically to developing countries, including the least advanced and small islands, is deemed to be a priority by France. Nowadays the Agency incorporates its action in the overall context of the Sustainable Energy for All (SE4All) initiative proposed by the United Nations Secretary General. Promoting three major targets for low carbon development, this large scale initiative has enabled action to be catalysed by offering a shared framework and increased visibility of these challenges. France participates actively in that initiative, directly by providing human support or by mobilising its actors in cooperation on the ground, or indirectly through the action of the European Union and the funding facilities put in place. Access to energy is an important issue for France which it supports through its cooperation initiatives.

Country or Region	Objective	Measures and Activities Connected to Technology Transfer	Sector	Funding Source	Activities Undertaken by	Status	Additional information
Worldwide	Mitigation and Adaptation	France is one of the main financers of the United Nations Environment Programme (UNEP). The latter contributes to the distribution of technologies and know-how to combat climate change via several programmes, such as for example the ten year planning framework on sustainable modes of consumption and production (10FYP). PNUE is also the host of the Climate Technology Centre and Network, which is the military arm of the Technological CCNUCC Mechanism.	Other (Cross-cutting)	Public	Public	Installed	The main aims of the PNUE are: - Promoting international cooperation in the field of the environment and recommending policies oriented in that direction; - Studying the environmental situation in the world in order to ensure that issues at an international scale in this field form the scope of appropriate study on the part of governments; - Handling the resources of the Fund for the Environment, which funds the PNUE action programme. It should be noted that France is the fourth largest contributor to this fund, with an annual contribution of $5.85 m in 2012. At 10YFP level, France was actively involved in preparing that framework and steered one of the seven process working groups in Marrakesh, the one on sustainable tourism. Nowadays, France holds the vice-presidency (2013-2015) of the World Sustainable Tourism Partnership after two years as president. France has also invested in other 10FYP programmes, especially those dealing with consumer information and sustainable buildings.

V.4 – Capacity-building

The thematic breadth of France's capacity building has become wider over the years. The fourth biennial report is an opportunity to bring to the fore the progress made in the sphere of discussions and sharing on the framework and tools for mitigating and adapting to the effects of climate change.

- **Adapting to Climate Change**

France is committed to projects aimed at sharing its own experience in planning adaptation policies with developing countries. In fact, France has put an adaptation strategy in place since 2006. In 2011, it published a national adaptation plan, which was then evaluated in 2015. Then, in 2018, the second National Plan for Adapting to Climate Change (PNACC-2) was released.

Section two of work package 4 (WP4) of the Climate Services convention, signed in 2017, between the Ministry of Ecological Transition and Solidarity and the organizations researching climate science, addresses a climate service demonstrator project for agriculture in West Africa. On a continent that is particularly susceptible to climate variability and change, this consists of having effective climate risk-management tools so as to increase the capital gain of adaptation strategies in real terms.

- **Preparing and Implementing the Intended Nationally Determined Contributions (INDC)**

In January 2015, the French Development Agency (AFD) funded an initial facility with 3.5 million euros of grants in order to assist 26 developing countries, including African countries and Small Island Developing States (SIDS), to prepare their Intended Nationally Determined Contributions (INDC). All the countries that have benefited from that support filed their INDC with the UNFCCC secretariat before COP21.

In order to contribute to the operationalization of the Paris Agreement, to respond to states' requests for development in terms of support to implement their Nationally Determined Contributions (NDCs), in particular as regards the section on adaptation, and to upscale investment in adaptation to the effects of climate change in these countries, the AFD decided to set up the new "Adapt'Action" facility. This facility aims to prepare states to implement their NDC commitments.

Launched in May 2017, Adapt'Action is equipped with a total of €30 million (in grants) to be distributed over four years and is intended to support around fifteen African countries and SIDSs to reach their "climate" objectives, especially as regards climate change adaptation. It does this through capacity-building activities and technical assistance, in accordance with three main themes:

- **Theme 1:** Support for "climate" capacity building and governance to consolidate, implement and monitor the NDC; this component is implemented by Expertise France.
- **Theme 2:** Support for improved NDC commitment integration into sectoral public policies;
- **Theme 3:** Support for structural project/programme preparation in the field of adaptation and renewable energy.

As part of the first stage of Adapt'Action, identification assignments will be performed in the various partner countries in order to determine, with local counterparts, each country's needs in terms of institutional support requiring Adapt'Action funding.

- **Setting up a national reporting system (GHG inventory, projections, mitigation measures and adaptation)**

Since 2014, France has contributed, technically and financially, to the activities of the "French-speaking cluster" which, along with Belgium, Switzerland and Germany, jointly finances capacity-building workshops intended for French-speaking developing countries. The French-speaking cluster is an initiative of the Partnership on Transparency within the Paris Agreement. It was created following the French-speaking workshop for Africa on the principles of Measurement, Reporting and Verification (MRV), taking place in Gammarth, Tunisia, on 17 and 18 December 2013. Its objective is to enable information, expertise and experience sharing between French-speaking partners, developing and developed countries, concerning GHG inventories, the development of mitigation measures, the MRV process and the preparation of nationally determined contributions (NDCs). Several workshops have been organized since 2013 (see http://mitigationpartnership.net/cluster-francophone). A side event to present feedback from those workshops took place during COP21 in Paris. In 2015, two workshops were held (Paris and Rabat); in 2016, two workshops also took place in Abidjian and Casablanca, and a workshop was organized for a week in Rome in 2017. In 2018, a workshop on the Measurement and Evaluation of Adaptation Measures was organized in Cameroon. In 2019, the Saly workshop in Senegal brought together 65 participants from 20 developing countries in French-speaking Africa, in order to understand how to successfully implement the guidelines of the 2006 IPCC in the sectors for "Agriculture, forestry and other land use" (AFOLU) and waste management. The purpose of this is to enable the submission of Biennial Update Reports (BURs) and future Biennial Transparency Reports (BTRs), and to encourage the implementation of NDCs. The public operator CITEPA has a globally-recognized expertise and specializes in French inventories. It is a major actor in the French-speaking cluster and facilitates these workshops. The next workshop is currently being prepared and its purpose is to support countries to update and intensify their NDCs ahead of COP26, which will take place in Glasgow in 2020.

- **French support to implement a national GHG inventory in Algeria**

The French Ministry of Europe and Foreign Affairs, represented by the French Embassy in Algeria, is co-financing a support scheme for Algerian authorities, including the National Climate Change Agency (ANCC) and the Ministry of the Environment. This support scheme, which was launched in 2018, is delivered by the CITEPA as the State Operator and covers the institutionalization of the national GHG inventory system, the training of Algerian experts in GHG inventory methods, based on the guidelines of the 2006 IPCC, and support for these experts in making emissions calculations for all sectors across long time series. These actions may be used in the submissions currently being prepared such as the National Communication and the BUR, as well as in the revised NDCs.

- **Software for the MRV of air pollutant emissions and GHGs: risQ**

Developed by the CITEPA and adapted for implementation in emerging markets and developing countries, this tool exists in three versions: Excel, Access and Web. It promotes transparency, precision, reliability, coverage and consistency in national inventories; the sustainability of capacity-building actions in southern countries; and the scalability of measurement, reporting and verification (from countries to towns and from nations to their neighbours). risQ has been or will be implemented in France, Morocco, Nigeria, Niger, Rwanda, Tunisia, Algeria and Monaco. (Development self-financed by the CITEPA).

- **The Franco-Chinese Centre and the CRAES**

CTIEPA and its Chinese partner CRAES, which comes under the Ministry for pollutant control, met for the first time in Beijing in 2014. On 1 August 2015, they signed a five-year framework agreement to incorporate GHGs and pollutants, thus enabling a synergy between urban air quality and combating

climate change. This collaboration, based on knowledge, quantification, reporting and emissions projections in China, aims to integrate gradually the problems facing the air, the climate and energy. A report was published in 2015 on the fruits of this joint work, which resulted in the creation of the Franco-Chinese Centre of Pollutants, GHG emissions and emissions reduction. The centre promotes good practice in listing, measuring, reporting and verifying GHG emissions at the service of public policy. These initiatives were presented during a specific side event at the 5th international Franco-Chinese conference on the atmospheric environment, held in Xi'an in October 2016. A workshop was also held in Paris in May 2017. In 2019, the partnership was completed by the addition of the NTSC, a division of the Chinese Ministry of the Environment and Water Resources (MEE) and responsible for China's NDC. In 2019-2020, plans were made to demonstrate an integrated approach to reporting and policy on climate measures and air pollution, in two provinces (including Inner Mongolia). In March 2019, this pilot scheme, which utilized two pieces of regional risQ software, was presented to the Asian Development Bank (AsDB) with a request for finance. It is expected that a more complete project will be presented to the AsDB for financing at the start of 2020.

A new presentation of the risQ software, for use in various Asian countries, is expected in the first half of 2020. This project is to be self-financed by the CITEPA.

- **The MobiliseYourCity programme and the Programme for Energy Efficiency in Construction (PEEB)**

Launched at COP21, MobiliseYourCity is a Franco-German initiative of the Global Climate Action Agenda, implemented by the GIZ, the AFD, the CEREMA, the CODATU and ADEME, with the support of the FFEM. It aims to roll out sustainable urban mobility plans in 100 towns across 20 developing countries. It takes the form of a partnership programme, whereby: (i) councils and governments commit to designing sustainable urban mobility plans (SUMPs) and national urban mobility policies (NUMPs), in order to improve mobility and to reduce GHG emissions; and (ii) actions are financed so as to support them in this objective, to provide them with a robust methodological framework and to enable peer exchanges.

Launched at COP22, the Programme for Energy Efficiency in Construction contributes to the Global Alliance for Buildings and Construction (GlobalABC) and is implemented by the GIZ, the AFD and ADEME, with the support of the FFEM. The objective of this programme is to encourage and to finance projects to improve the energy efficiency of buildings in developing countries. Five pilot countries are targeted in the initial phase of the PEEB project: Mexico, Morocco, Tunisia, Senegal and Vietnam. Priority is given to new buildings, to the extent that a large proportion of the buildings in developing countries that will exist in 2035 are yet to be built. The programme consists in setting up a technical cooperation facility to encourage the emergence, at an international level, of innovative finance solutions; strengthening national public policy; providing assistance in the organization and support of projects. This facility thus aims to promote and support the financing, by international and local financial institutions, of investments in energy efficient buildings.

Table CTF9 describes some capacity-building initiatives.

Table CTF9: Capacity-building projects and programme

Beneficiary country/region	Field	Programme or project title	Description of the programme or project
Africa	Multiple Areas	AMMA-CATCH	In connection with the Global Climate Observing System (GCOS) in Africa, AMMA-CATCH is a system for observing the long-term impacts of the monsoon on West Africa. It was set up by the Ministry of Higher Education and Research (MESR) and receives support from the Institute for Research and Development (IRD) and the National Institute of Universal Sciences (INSU). http://www.amma-catch.org/
Mediterranean Basin	Multiple Areas	MISTRALS	Launched in 2008 and expected to run until 2020, MISTRALS is an international meta-programme consisting of basic research and systematic, interdisciplinary observation, devoted to understanding how the environment behaves and changes in the Mediterranean Basin under the pressure of global anthropogenic change, in order to predict future change. Beyond its academic scope, MISTRALS also has the aim of transforming the goals and results of research into concepts and data that are accessible to decision makers, and to territorial actors and managers, in order to identify national and trans-national needs and to meet the societal, environmental and economic stakes involved in sustainable development of the countries and populations that share the Mediterranean area. http://www.mistrals-home.org/spip/spip.php?rubrique39
Africa	Adaptation	Climate Service	Demonstrator project 2 under the Climate Services conference, signed in 2017 between the MTES and specialist climate laboratories: IPSL/LSCE; CNRM; CECI. It is a climate service demonstrator project for agriculture in West Africa.
Africa, SIDS	Mitigation, adaptation	French INDC Preparation Facility	Preparing INDCs for some thirty countries
Africa	Mitigation	French-speaking Cluster	Training on GHG inventories and mitigation measures.
Africa (Ethiopia, Zambia)	Mitigation	AFD	Analysis of the shortcomings of the MRV system in terms of GHG inventories and emissions mitigation.

Beneficiary country/region	Field	Programme or project title	Description of the programme or project
Africa (Comoros)	Mitigation (capacity-building)	Adapt'Action	Intensifying an NDC
Global	Mitigation (MRV, transparency)	risQ	Developed by the CITEPA and personalized for implementation in emerging markets and developing countries, this tools exists in three versions: Excel, Access and Web. It promotes transparency, precision, reliability, coverage and consistency in national inventories; the sustainability of capacity-building actions in southern countries; and the scalability of measurement, reporting and verification (from countries to towns and from nations to their neighbours). risQ has been or will be implemented in France, Morocco, Nigeria, Niger, Rwanda, Tunisia, Algeria and Monaco. (Development self-financed by the CITEPA)
China	Mitigation (with air pollution co-benefits)	Franco-Chinese Centre	Creation of a Franco-Chinese centre devoted to integrating GHG emissions inventory systems with air pollutants, by combining French expertise (CITEPA) with Chinese ones (Chinese Research Academy in Environmental Sciences in Beijing - CRAES), following contacts made in 2014. The centre promotes good practice in listing, measuring, reporting and verifying GHG emissions at the service of public policy. These initiatives were presented during a specific side event at the 5th international Franco-Chinese international conference on the atmospheric environment which was held in Xi'an in October 2016. A workshop was also held in Paris in May 2017.

Beneficiary country/region	Field	Programme or project title	Description of the programme or project
Southern Europe, Mediterranean Basin, Europe, Vietnam	Adaptation	Bilateral and Multilateral Cooperation	The National Observatory of the Effects of Global warming (ONERC) participated in different tasks: - Working group 6, set up by the European Commission to monitor adaptation and climate change actions, and currently working to revise the EU's strategy on climate change adaptation; - In the context of the work of the European Environment Agency: - Evaluating and updating the Climate-Adapt platform, as part of revisions to the European strategy; - Contribution to and editing of thematic reports from the European Environment Agency; - Multilateral meetings between European countries for experience-sharing on the evaluation of public policy on adaptation; - Hosting foreign delegations, including delegations of members of the National Observatory of Climate Change in Cameroon (ONACC); - Multilateral dialogues with countries neighbouring the Alpine arc, under the Alpine Convention (Climate Advisory Council); Météo-France and the relevant ministries are working to set up the global framework for climate services, under the aegis of the WMO and under the framework convention signed with the MTES in 2017.
Multi-country	Mitigation	Mobilise Your City	Launched at COP21, MobiliseYourCity is a Franco-German initiative of the Global Climate Action Agenda, implemented by the GIZ, the AFD, the CEREMA, the CODATU and ADEME, with the support of the FFEM. It aims to roll out sustainable urban mobility plans in 100 towns across 20 developing countries. It takes the form of a partnership programme, whereby: (i) councils and governments commit to designing sustainable urban mobility plans (SUMPs) and national urban mobility policies (NUMPs), in order to improve mobility and to reduce GHG emissions; and (ii) actions are financed so as to support them in this objective, to provide them with a robust methodological framework and to enable peer exchanges.

Beneficiary country/region	Field	Programme or project title	Description of the programme or project
Mediterranean, Asia, sub-Saharan Africa, Latin America	Mitigation	Programme for Energy Efficiency in Construction (PEEB)	Launched at COP22, the Programme for Energy Efficiency in Construction contributes to the Global Alliance for Buildings and Construction (GlobalABC) and is implemented by the GIZ, the AFD and ADEME, with the support of the FFEM. The objective of this programme is to encourage and to finance projects to improve the energy efficiency of buildings in developing countries. Five pilot countries are targeted in the initial phase of the PEEB project: Mexico, Morocco, Tunisia, Senegal and Vietnam. Priority is given to new buildings, to the extent that the majority of the buildings in developing countries that will exist in 2035 are yet to be built. The programme consists in setting up a technical cooperation facility to encourage the emergence, at an international level, of innovative finance solutions; strengthening national public policy; providing assistance in the organization and support of projects. This facility thus aims to promote and support the financing, by international and local financial institutions, of investments in energy efficient buildings.
Latin America and the Caribbean Morocco, Algeria, Tunisia and Lebanon		Support for the set-up of an energy efficiency monitoring system (energy efficiency indicators and energy efficiency assessment)	Continuing the European Odyssee Mure project that has been running for more than 20 years and which has enabled the development and implementation in the European Union of a methodology for evaluating energy savings, based on energy efficiency indicators, ADEME has supported the adaptation of this methodology: In Morocco, Algeria, Tunisia and the Lebanon from 2012 to 2014 in the context of MEDENER (Mediterranean Association of National Energy Control Agencies); Since 2014, in some twenty or so Latin American and Caribbean countries with CEPAL-UN (United Nations Economics Commission for Latin America and the Caribbean) in the context of IPEEC (International Partnership for Energy Efficiency Cooperation); Since 2016, more detailed work has been performed with Mexico in the context of cooperation with CONUEE (Comisión Nacional para el Uso Eficiente de la Energía) supported by AFD.
Morocco	Strengthening the energy sector	Pairing of the MTES and the MEMDD	France (the MTES), along with Germany (the BMWi), was selected as a partner to implement a matching programme with Morocco, financed by the EU and entitled: “Support for strengthening the energy sector” (2017-2019). The overall objective of the project is to facilitate the attainment of the objectives of the national energy strategy (security of supply and of the availability of energy, universal access to energy, managing demand, and environmental conservation).

Beneficiary country/region	Field	Programme or project title	Description of the programme or project
Africa	Cities, Mitigation and Adaptation	CICLIA	The project was conceived in 2016 and financed partly by the AFD and by the funds allocated to the AFD by the European union and the SECO. It consists of activities that provide technical support for urban climate planning, preparing climate co-benefit projects, and assistance and capacity-building for local project managers.
French-speaking Africa	Negotiation	Workshop for Francophone African women climate leaders, organized in the context of the Franco-Canadian partnership on the climate and the environment.	This purpose of this workshop, organized in the context of the Franco-Canadian partnership on the climate and the environment, is to build the skills of French-speaking African women climate leaders in terms of both climate-related knowledge (history of climate negotiations, the Paris Agreement, climate financing, etc.) and negotiation-related skills. The first workshop took place in Dakar in 2018 and brought together 20 women climate leaders from 15 sub-Saharan countries. Another will take place in October 2019.

Annex I. Annex to chapter I – Emissions per sector

Table : Emissions per sector in 2017 within the Convention scope – Source : 2019 submission, CRF format within the scope of the Convention, CITEPA / MTES

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2(1)	CH4	N2O	HFCs	PFCs	SF6	Unspecified mix of HFCs and PFCs	NF3	Total
	CO2 equivalent (kt)								
Total (net emissions)(1)	316 366,05	57 874,46	45 223,84	18 779,39	707,68	461,35	NO,NA	7,64	439 420,41
1.Energy	326 036,01	2 821,82	3849,00						332 706,83
A. Fuel combustion (sectoral approach)	323 135,08	1 687,58	3836,05						328 658,71
1. Energy industries	49 892,75	41,35	308,74						50 242,84
2. Manufacturing industries and construction	54 066,36	150,21	584,69						54 801,26
3. Transport	134 333,43	145,38	1587,94						136 066,75
4. Other sectors	84 842,54	1 350,65	1354,69						87 547,87
5. Other	NO	NO	NO						NO
B. Fugitive emissions from fuels	2 900,93	1 134,23	12,95						4 048,11
1. Solid fuels	NO,NA	16,73	NO,NE						16,73
2. Oil and natural gas	2 900,93	1 117,51	12,95						4 031,39
C. CO2 transport and storage	NO,IE								NO,IE
2. Industrial processes and product use	22 734,05	52,42	1 659,96	18 779,39	707,68	461,35	NO,NA	7,64	44 402,49
A. Mineral industry	9328,02								9 328,02
B. Chemical industry	6794,21	43,54	1523,10	300,36	3,10	NO,NA	NO,NA	NO,NA	8 664,31
C. Metal industry	4950,71	8,69	NA	NO,NA	41,16	53,77	NO,NA	NA	5 054,33
D. Non-energy products from fuels and solvent use	1186,19	0,19	2,64						1 189,03
E. Electronic Industry				7,59	111,85	3,88	NO,NA	7,64	130,95
F. Product uses as ODS substitutes				18470,76					1 8470,76
G. Other product manufacture and use	474,87	NA	134,22	0,69	551,56	403,70	NA	NA	1 565,04
H. Other	0,05	NA	NA						0,05
3. Agriculture	1 943,20	38 708,80	35 817,83						76469,82
A. Enteric fermentation		34 846,10							3 4846,10
B. Manure management		3 732,72	2 525,87						6 258,59
C. Rice cultivation		81,43							81,43
D. Agricultural soils		NO	3 3276,96						3 3276,96
E. Prescribed burning of savannas		NO	NO						NO
F. Field burning of agricultural residues		48,55	15,00						63,55
G. Liming	645,06								645,06
H. Urea application	1 298,14								1 298,14
I. Other carbon-containing fertilizers	NO								NO
J. Other	NO	NO	NO						NO
4. Land use, land-use change and forestry(1)	-35 918,73	1 215,72	3 095,23						-31 607,78
A. Forest land	-53 857,15	639,70	359,30						-52 858,15
B. Cropland	16 053,49	1 16,96	1 561,02						17 731,47
C. Grassland	-8 536,52	169,22	100,94						-8 266,36
D. Wetlands	518,85	9,45	0,77						529,07
E. Settlements	11 037,51	61,19	624,70						11 723,39
F. Other land	0,16	NO	NO,NE						0,16
G. Harvested wood products	-1 195,10								-11 95,10
H. Other	60,03	219,20	NA						279,23
5. Waste	1 571,52	15 075,71	801,82						17 449,05
A. Solid waste disposal	NA	12 524,01							12 524,01
B. Biological treatment of solid waste		237,95	343,08						581,03
C. Incineration and open burning of waste	1 571,52	23,59	48,24						1 643,35
D. Waste water treatment and discharge		2 290,16	410,50						2 700,66
E. Other	NO	NO	NO						NO
6. Other (as specified in summary 1.A)									
Memo items :(2)									
International bunkers	23 186,49	15,77	189,10						23 391,36
Aviation	17 456,72	2,00	145,33						17 604,06
Navigation	5 729,76	13,77	43,77						5787,30
Multilateral operations	1,35	NE	NE						1,35
CO2 emissions from biomass	64 447,47								64 447,47
CO2 captured	NO,NE,NA								NO,NE,NA
Long-term storage of C in waste disposal sites	NE								NE
Indirect N2O			NO,NE						
Indirect CO2 (3)	IE,NA								
Total CO2 equivalent emissions without land use, land-use change and forestry									47 1028,19
Total CO2 equivalent emissions with land use, land-use change and forestry									43 9420,41
Total CO2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry									NA
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (CO2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO2, the national totals shall be provided with and without indirect CO.

Table : Emissions per sector in 2017 within the Kyoto scope – Source : 2019 submission, CRF format within the Kyoto scope, CITEPA / MTES

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2(1)	CH4	N2O	HFCs	PFCs	SF6	Unspecified mix of HFCs and PFCs	NF3	Total
	CO2 equivalent (kt)								
Total (net emissions)(1)	310 247,76	57 453,62	45 073,30	18 711,33	707,68	460,21	NO,NA	7,64	432 661,53
1.Energy	320 619,04	2 812,60	3 819,81						327 251,45
A. Fuel combustion (sectoral approach)	317 718,11	1 678,37	3806,86						323 203,33
1. Energy industries	49 239,93	40,49	304,78						49 585,20
2. Manufacturing industries and construction	5 0715,62	144,22	573,06						5 1432,89
3. Transport	13 3017,32	143,24	1575,57						134 736,13
4. Other sectors	8 4745,23	1 350,42	1353,45						87449,11
5. Other	NO	NO	NO						NO
B. Fugitive emissions from fuels	2 900,93	1 134,23	12,95						4 048,11
1. Solid fuels	NO,NA	16,73	NO,NE						16,73
2. Oil and natural gas	2 900,93	1 117,51	12,95						4 031,39
C. CO2 transport and storage	NO,IE								NO,IE
2. Industrial processes and product use	22 326,68	52,42	1 658,79	1 8711,33	707,68	460,21	NO,NA	7,64	43 924,74
A. Mineral industry	9 328,02								9 328,02
B. Chemical industry	6 794,21	43,54	1 523,10	300,36	3,10	NO,NA	NO,NA	NO,NA	8 664,31
C. Metal industry	4 549,03	8,69	NA	NO,NA	41,16	53,77	NO,NA	NA	4 652,66
D. Non-energy products from fuels and solvent use	1 182,96	0,19	2,62						1 185,77
E. Electronic Industry				7,59	111,85	3,88	NO,NA	7,64	130,95
F. Product uses as ODS substitutes				18402,70					18 402,70
G. Other product manufacture and use	472,42	NA	133,07	0,69	551,56	402,56	NA	NA	1 560,29
H. Other	0,05	NA	NA						0,05
3. Agriculture	1943,20	38 543,95	35 721,38						76 208,53
A. Enteric fermentation		34 727,83							34 727,83
B. Manure management		3 686,15	2512,30						6 198,44
C. Rice cultivation		81,43							81,43
D. Agricultural soils		NO	33194,08						33 194,08
E. Prescribed burning of savannas		NO	NO						NO
F. Field burning of agricultural residues		48,55	15,00						63,55
G. Liming	645,06								645,06
H. Urea application	1 298,14								1 298,14
I. Other carbon-containing fertilizers	NO								NO
J. Other	NO	NO	NO						NO
4. Land use, land-use change and forestry(1)	-36 212,68	1 198,10	3 083,60						-31 930,98
A. Forest land	-54 151,11	622,08	347,68						-53 181,35
B. Cropland	16 053,49	116,96	1561,02						17 731,47
C. Grassland	-8 536,52	169,22	100,94						-8 266,36
D. Wetlands	518,85	9,45	0,77						529,07
E. Settlements	1 1037,51	61,19	624,70						11 723,39
F. Other land	0,16	NO	NO,NE						0,16
G. Harvested wood products	-1 195,10								-1195,10
H. Other	60,03	219,20	NA						279,23
5. Waste	1 571,52	14 846,56	789,71						17 207,79
A. Solid waste disposal	NA	12 333,01							12 333,01
B. Biological treatment of solid waste		237,95	343,08						581,03
C. Incineration and open burning of waste	1 571,52	23,59	48,24						1 643,35
D. Waste water treatment and discharge		2 252,01	398,39						2 650,40
E. Other	NO	NO	NO						NO
6. Other (as specified in summary 1.A)									
Memo items :(2)									
International bunkers									
Aviation	22 826,91	15,37	186,21						23 028,50
Navigation	17 246,69	1,96	143,58						17 392,23
Multilateral operations	5580,22	13,41	42,63						5 636,26
CO2 emissions from biomass	1,35	NE	NE						1,35
CO2 captured	64 439,31								64 439,31
Long-term storage of C in waste disposal sites	NO,NE,NA								NO,NE,NA
Indirect N2O	NE								NE
Indirect CO2 (3)			NO,NE						
Total CO2 equivalent emissions without land use, land-use change and forestry									464 592,51
Total CO2 equivalent emissions with land use, land-use change and forestry									432 661,53
Total CO2 equivalent emissions, including indirect CO2, without land use, land-use change and forestry									NA
Total CO2 equivalent emissions, including indirect CO2, with land use, land-use change and forestry									NA

(1) For carbon dioxide (CO2) from land use, land-use change and forestry the net emissions/removals are to be reported. For the purposes of reporting, the signs for removals are always negative (-) and for emissions positive (+).

(3) In accordance with the UNFCCC Annex I inventory reporting guidelines, for Parties that decide to report indirect CO2, the national totals shall be provided with and without indirect CO.

Annex II. Annex to Chapter V – Assistance given to developing countries in the form of financial, technological and capacity enhancement resources

The methodology used for the financial reporting to developing countries has not been modified since the previous biennial report. The methodology used is described in Annex III of BR3.

The tables are presented in euros and dollars.

Conversion rates used are the ones from OCDE (https://data.oecd.org/conversion/exchange-rates.htm).

2018 : 1USD = 0.847 Euros

2017 : 1USD = 0.885 Euros

Table 7 : Provision of public financial support to developing countries : summary information in 2018

Euros

Allocation channels	Climate-specific in euros		
	Mitigation	Adaptation	Cross-cutting
Total contributions through multilateral channels	***335 816 697***	***268 111 586***	***1 996 440***
Multilateral climate change Funds	135 043 080	96 659 220	1 996 440
Multilateral financial institutions, including regional development banks	200 773 617	171 452 366	-
Total contributions through bilateral, regional and other channels	***2 404 257 642***	***997 524 100***	***1 081 085 539***
TOTAL climate specific by funding type	***2 740 074 339***	***1 265 635 686***	***1 083 051 979***
TOTAL climate specific finance	***5 088 762 004***		

Total climate specific by funding source - 2018	Euros	Total climate specific by financial instru-ment	Euros
ODA	*4 095 321 060*	**Grant**	*536 347 967*
OOF	*993 440 945*	**Concessional loan**	*3 558 973 093*
		Non concessional loan	*580 331 336*
		Other	*413 109 609*

Table 7 : Provision of public financial support to developing countries : summary information in 2018

USD

Allocation channels	Climate-specific in USD		
	Mitigation	Adaptation	Cross-cutting
Total contributions through multilateral channels	***396 477 800***	***316 542 604***	***2 357 072***
Multilateral climate change Funds	159 436 930	114 119 504	2 357 072
Multilateral financial institutions, including regional development banks	237 040 870	202 423 100	
Total contributions through bilateral, regional and other channels	***2 838 556 838***	***1 177 714 404***	***1 276 370 176***
TOTAL climate specific by funding type	***3 235 034 639***	***1 494 257 008***	***1 278 691 829***
TOTAL climate specific finance	***6 007 983 476***		

Total climate specific by funding source - 2018	USD	Total climate specific by financial instru-ment	USD
ODA	*4 835 089 799*	**Grant**	*633 232 547*
OOF	*1 172 893 678*	**Concessional loan**	*4 201 857 253*
		Non concessional loan	*685 160 963*
		Other	*487 732 714*

Table 7 : Provision of public financial support to developing countries : summary information in 2017

Euros

Allocation channels	Climate-specific in euros		
	Mitigation	Adaptation	Cross-cutting
Total contributions through multilateral channels	***353 865 121***	***232 895 425***	***4 820 000***
Multilateral climate change Funds	291 620 000	196 370 000	4 820 000
Multilateral financial institutions, including regional development banks	62 245 121	36 525 425	-
Total contributions through bilateral, regional and other channels	***3 088 519 000***	***684 863 000***	**-**
TOTAL climate specific by funding type	***3 442 384 121***	***917 758 425***	***4 820 000***
TOTAL climate specific finance	***4 364 962 546***		

Total climate specific by funding source - 2017	Euros	Total climate specific by financial instru-ment	Euros
ODA	*3 504 636 546*	**Grant**	*364 851 000*
OOF	*860 326 000*	**Concessional loan**	*3 139 795 000*
		Non concessional loan	*755 390 000*
		Other	*104 936 000*

Table 7 : Provision of public financial support to developing countries : summary information in 2017

USD

Allocation channels	Climate-specific in USD		
	Mitigation	Adaptation	Cross-cutting
Total contributions through multilateral channels	***399847594***	***263158672***	***5446328***
Multilateral climate change Funds	*329514124*	*221887006*	*5446328*
Multilateral financial institutions, including regional development banks	*70333470*	*41271667*	*0*
Total contributions through bilateral, regional and other channels	***3489851977***	***773856497***	***0***
TOTAL climate specific by funding type	***3 889 699 572***	***1 037 015 169***	***5 446 328***
TOTAL climate specific finance	***4 932 161 069***		

Total climate specific by funding source - 2017	USD	Total climate specific by financial instrument	USD
ODA	*3 960 041 295*	**Grant**	*412 261 017*
OOF	*972 119 774*	**Concessional loan**	*3 547 790 960*
		Non concessional loan	*853 548 023*
		Other	*118 571 751*

Table 7(a) : Provision of public financial support : contribution through multilateral channels in 2018

Euros

Donor Funding	Core/general (Euros)	Climate-specific (Euros)	Status	Funding source	Financial instruments	Type of support	Sector
Total contribution through multilateral channels							
Multilateral climate change funds	**251 171 660**	**233 668 740**					
Global Environment Facility	50 000 000	32 497 080	provided	ODA	Grant	Mitigation	-
Least Developed Countries Fund	7 500 000	7 500 000	provided	ODA	Grant	Adaptation	-
Green Climate Fund	160 000 000	160 000 000	provided	ODA	Grant	Cross-cutting	-
Other multilateral climate change funds	33 671 660	33 671 660	provided	ODA	Grant	Cross-cutting	-
Multilateral financial institutions, including regional development banks	**1 350 830 560**	**372 225 983**					
African Development Fund	148 771 000	26 555 623	provided	ODA	Grant	Cross-cutting	-
AsDB Special Funds	11 500 000	1 772 840	provided	ODA	Grant	Cross-cutting	-
International Fund for Agricultural Development	11 600 000	5 344 932	provided	ODA	Grant	Adaptation	-
International Fund for Agricultural Development	32 419 560	14 937 961	provided	ODA	Concessional loan	Adaptation	
International Development Association	800 000 000	208 000 000	provided	ODA	Concessional loan	Cross-cutting	-
Total contribution through multilateral channels	***1 602 002 220***	***605 894 723***					

Table 7(a) : Provision of public financial support : contribution through multilateral channels in 2018

USD

Donor Funding	Core/general (USD)	Climate-specific (USD)	Status	Funding source	Financial instru-ments	Type of support	Sector
Total contribution through multilateral channels							
Multilateral climate change funds	**296 542 692**	**275 878 087**					
Global Environment Facility	59 031 877	38 367 273	provided	ODA	Grant	Mitigation	-
Least Developed Countries Fund	8 854 782	8 854 782	provided	ODA	Grant	Adaptation	-
Green Climate Fund	188 902 007	188 902 007	provided	ODA	Grant	Cross-cutting	-
Other multilateral climate change funds	39 754 026	39 754 026	provided	ODA	Grant	Cross-cutting	-
Multilateral financial insti-tutions, including regional development banks	**1 594 841 275**	**439 463 970**					
African Development Fund	175 644 628	31 352 566	provided	ODA	Grant	Cross-cutting	-
AsDB Special Funds	13 577 332	2 093 081	provided	ODA	Grant	Cross-cutting	-
International Fund for Agri-cultural Development	13 695 396	6 310 427	provided	ODA	Grant	Adaptation	-
International Fund for Agri-cultural Development	38 275 750	17 636 318	provided	ODA	Concessional loan	Adaptation	
International Development Association	944 510 035	245 572 609	provided	ODA	Concessional loan	Cross-cutting	-
Total contribution through multilateral channels	***1 891 383 967***	***715 342 058***					

Table 7(a) : Provision of public financial support : contribution through multilateral channels in 2017

Euros

Donor Funding	Core/general (Euros)	Climate-specific (Euros)	Status	Funding source	Financial instruments	Type of support	Sector
Total contribution through multilateral channels							
Multilateral climate change funds	**528 610 000**	**492 810 000**					
Global Environment Facility	50 000 000	14 200 000	provided	ODA	Grant	Mitigation	-
Least Developed Countries Fund	10 000 000	10 000 000	provided	ODA	Grant	Adaptation	-
Green Climate Fund	163 200 000	163 200 000	provided	ODA	Grant	Cross-cutting	-
Green Climate Fund	285 000 000	285 000 000	provided	ODA	Concessional loan	Cross-cutting	-
Other multilateral climate change funds	20 410 000	20 410 000	provided	ODA	Grant	Cross-cutting	-
Multilateral financial institutions, including regional development banks	**492 186 000**	**98 770 546**					
African Development Fund	123 167 000	25 865 070	provided	ODA	Grant	Cross-cutting	-
AsDB Special Funds	11 500 000	1 925 115	provided	ODA	Grant	Cross-cutting	-
International Fund for Agricultural Development	11 600 000	8 145 316	provided	ODA	Grant	Adaptation	-
International Development Association	345 919 000	62 835 045	provided	ODA	Concessional loan	Adaptation	-
Total contribution through multilateral channels	***1 020 796 000***	***591 580 546***					

Table 7(a) : Provision of public financial support : contribution through multilateral channels in 2017

USD

Donor Funding	Core/general (USD)	Climate-specific (USD)	Status	Funding source	Financial instru-ments	Type of support	Sector
Total contribution through multilateral channels							
Multilateral climate change funds	**597 299 435**	**556 847 458**					
Global Environment Facility	56 497 175	16 045 198	provided	ODA	Grant	Mitigation	-
Least Developed Countries Fund	11 299 435	11 299 435	provided	ODA	Grant	Adaptation	-
Green Climate Fund	184 406 780	184 406 780	provided	ODA	Grant	Cross-cut-ting	-
Green Climate Fund	322 033 898	322 033 898	provided	ODA	Conces-sional loan	Cross-cut-ting	-
Other multilateral climate change funds	23 062 147	23 062 147	provided	ODA	Grant	Cross-cut-ting	-
Multilateral financial institutions, including regional de-velopment banks	**556 142 373**	**111 605 137**					
African Development Fund	139 171 751	29 226 068	provided	ODA	Grant	Cross-cut-ting	-
AsDB Special Funds	12 994 350	2 175 271	provided	ODA	Grant	Cross-cut-ting	-
International Fund for Agricultural Development	13 107 345	9 203 747	provided	ODA	Grant	Adaptation	-
International Development Association	390 868 927	71 000 051	provided	ODA	Conces-sional loan	Adaptation	-
Total contribution through multilateral channels	***1 153 441 808***	***668 452 594***					

Table 7(b) : Provision of public financial support : contribution through bilateral, regional and other channels in 2018 (in thousands Euros and in thousands USD)

Recipient country/ region/project/programme	*Project/ Programme title*	*Total amount (climate-specific) in thousands of Euros*	*Total amount (climate-specific) in thousands of USD*	*Status: disbursed, committed*	*Funding source: ODA, OOF, Other*	*Financial instrument: grant, concessional loan, non-concessional loan, equity, other*	*Type of support: Mitigation, Adaptation, cross-cutting*	*Sector*	*Additional information*
Region Africa									
ANGOLA	Supporting the development of commercial agriculture	79 000	93 270	committed	ODA	Concessional loan	Mitigation	Agriculture	AFD
BURKINA FASO	ONEA investment programme	21 440	25 313	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
BURKINA FASO	Creation of an urban incubator in Ouagadougou	182	215	committed	ODA	Grant	Adaptation	Urban development and management	AFD
BURKINA FASO	Rural development	3 100	3 660	committed	ODA	Grant	Adaptation	Agriculture	AFD
BURKINA FASO	Preservation and development of an ecological cliff	326	384	committed	ODA	Grant	Adaptation	Environmental policy and administrative management	AFD
CAMEROON	Hydropower plant	90 000	106 257	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
CAMEROON	Hydropower plant	60 000	70 838	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
COTE D IVOIRE	SUNREF multibank facility	5 000	5 903	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
COTE D IVOIRE	SUNREF multibank facility	7 500	8 855	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
COTE D IVOIRE	SUNREF multibank facility	7 500	8 855	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
COTE D IVOIRE	SUNREF multibank facility	10 000	11 806	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
DJIBOUTI	Large-scale sanitation system	2 680	3 164	committed	ODA	Grant	Adaptation	Water and sanitation	AFD
EGYPT	Upgrading water supply in the Nil delta	34 000	40 142	committed	ODA	Concessional loan	Adaptation	Agriculture	AFD
EGYPT	Railway transport	50 000	59 032	committed	ODA	Concessional loan	Mitigation	Transport and storage	AFD

EGYPT	Upgrading metropolitan railway transport	300	354	committed	ODA	Grant	Mitigation	Transport and storage	AFD
ETHIOPIA	Urban management	1 000	1 181	committed	ODA	Grant	Adaptation	Urban development and management	AFD
GABON	Initiative for forest in Central Africa	13 919	16 433	committed	OOF	Other	Mitigation	Environmental policy and administrative management	AFD
GHANA	Corporate finance for energy	13 000	15 348	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
GHANA	Corporate finance for energy	17 000	20 071	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
GUINEA	Energy distribution	50 000	59 032	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
KENYA	Improvement of access to drinking water	76 000	89 728	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
KENYA	Building of a road in the ASAL area	60 000	70 838	committed	ODA	Concessional loan	Adaptation	Agriculture	AFD
MADAGASCAR	Urban management governance in Antananarivo	510	602	committed	ODA	Grant	Adaptation	Governement and civil society	AFD
MADAGASCAR	Supporting local governments	340	401	committed	ODA	Grant	Adaptation	Governement and civil society	AFD
MADAGASCAR	Rural development	681	804	committed	ODA	Grant	Adaptation	Agriculture	AFD
MADAGASCAR	SUNREF multibank facility	5 000	5 903	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
MADAGASCAR	SUNREF multibank facility	10 000	11 806	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
MADAGASCAR	SUNREF multibank facility	5 000	5 903	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
MADAGASCAR	SUNREF multibank facility	10 000	11 806	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
MADAGASCAR	Talaky project - Environmental policy	3 500	4 132	committed	ODA	Grant	Cross-cutting	Environmental policy and administrative management	AFD
MADAGASCAR	Waste management	325	384	committed	ODA	Grant	Cross-cutting	Waste management	AFD
MOROCCO	Extension and improvement of access to drinking water	40 000	47 226	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
MOROCCO	Improvement of services' performance	800	945	committed	ODA	Grant	Adaptation	Water and sanitation	AFD
MOROCCO	Extension and improvement of access to drinking water	40 000	47 226	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
MOROCCO	Supporting integrated rural development	837	988	committed	ODA	Grant	Adaptation	Governement and civil society	AFD
MOROCCO	Tramway line 3 and 4 in Casablanca	100 000	118 064	committed	ODA	Concessional loan	Mitigation	Transport and storage	AFD

MAURITIUS	Upgrading the electric network	16 391	19 351	committed	ODA	Concessional loan	Mitigation	Environmental policy and administrative management	AFD
MAURITANIA	Rural development	2 158	2 548	committed	ODA	Grant	Adaptation	Agriculture	AFD
MAURITANIA	Rural development	520	614	committed	ODA	Grant	Adaptation	Agriculture	AFD
MAURITANIA	Rural development	182	215	committed	ODA	Grant	Adaptation	Agriculture	AFD
MAURITANIA	Professional training	350	413	committed	ODA	Grant	Cross-cutting	Governement and civil society	AFD
MAURITANIA	Rural eletrification	4 000	4 723	committed	ODA	Grant	Mitigation	Energy generation, distribution and efficiency	AFD
NIGER	Emergency access to drinking water in border area	840	992	committed	ODA	Grant	Adaptation	Water and sanitation	AFD
NIGER	Reinforcing resilience of rural actors	629	743	committed	ODA	Grant	Cross-cutting	Water and sanitation	AFD
NIGER	Rural development	2 000	2 361	committed	ODA	Grant	Adaptation	Agriculture	AFD
NIGER	Food security	5 000	5 903	committed	ODA	Grant	Adaptation	Agriculture	AFD
NIGERIA	Rehabilitation of rural tracks	124 000	146 399	committed	ODA	Concessional loan	Adaptation	Agriculture	AFD
UGANDA	Solar power plant	11 430	13 494	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
SENEGAL	Drinking water plant	7 500	8 855	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
SENEGAL	Support to local governments	1 460	1 724	committed	ODA	Concessional loan	Cross-cutting	Governement and civil society	AFD
SENEGAL	Technical assistance to local governments	140	165	committed	ODA	Concessional loan	Cross-cutting	Governement and civil society	AFD
SENEGAL	Drinking water plant	1 250	1 476	committed	ODA	Concessional loan	Cross-cutting	Governement and civil society	AFD
SENEGAL	Technical assistance - Supporting local governments	275	325	committed	ODA	Grant	Cross-cutting	Governement and civil society	AFD
SENEGAL	Education	225	266	committed	ODA	Grant	Cross-cutting	Governement and civil society	AFD
SENEGAL	Education and administrative management	5	6	committed	OOF	Other	Cross-cutting	Governement and civil society	AFD
SENEGAL	Education and administrative management	4	4	committed	OOF	Other	Cross-cutting	Governement and civil society	AFD
SENEGAL	Education and administrative management	1 569	1 853	committed	OOF	Other	Cross-cutting	Governement and civil society	AFD
SENEGAL	Education and administrative management	275	325	committed	OOF	Other	Cross-cutting	Governement and civil society	AFD
SENEGAL	Education and administrative management	16	19	committed	OOF	Other	Cross-cutting	Governement and civil society	AFD

SENEGAL	Education and administrative management	3	4	committed	OOF	Other	Cross-cutting	Governement and civil society	AFD
SENEGAL	Fighting coastal erosion in St Louis	3 900	4 604	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
SENEGAL	Fighting coastal erosion in St Louis	2 340	2 763	committed	ODA	Grant	Adaptation	Water and sanitation	AFD
SENEGAL	Agroecology	225	266	committed	ODA	Grant	Adaptation	Agriculture	AFD
SENEGAL	Express regional train	100 000	118 064	committed	ODA	Concessional loan	Mitigation	Transport and storage	AFD
TANZANIA	Large-scale sanitation system	27 300	32 231	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
CHAD	Building family toilets	1 350	1 594	committed	ODA	Grant	Adaptation	Water and sanitation	AFD
TOGO	Development of hen breeding	213	251	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
TOGO	Electricians without border' initiative	316	373	committed	ODA	Grant	Adaptation	Energy generation, distribution and efficiency	AFD
TUNISIA	SUNREF multibank facility	40 000	47 226	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD
ZAMBIA	Renewable energy production	40 000	47 226	committed	OOF	Other	Mitigation	Energy generation, distribution and efficiency	AFD
MADAGASCAR	Feasability study for rural electrification of 142 villages	178	210	committed	ODA	Grant	Mitigation	Energy generation, distribution and efficiency	FASEP
CHAD	Feasability study for an energy storage system complementing solar projects in N'Djaména	298	352	committed	ODA	Grant	Mitigation	Energy generation, distribution and efficiency	FASEP
SOUTH AFRICA	Innovative dessalinisation plant powered by solar energy	285	336	committed	ODA	Grant	Cross-cutting	Water and sanitation	FASEP
SENEGAL	Supplying off-grid street light powered by solar energy	16 060	18 961	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	Treasury loan
SENEGAL	Rolling stock for the train line connecting Dakar and Diamniadio	6 000	7 084	committed	OOF	Non-concessional loan	Mitigation	Transport and storage	Treasury loan
BENIN	Reinforcing sustainable management of natural forests in Middle-Ouémé	1 000	1 181	committed	ODA	Grant	Mitigation	Biodiversity	FFEM
CONGO	Providing basic services in rural areas through hydropower generation	131	155	committed	ODA	Grant	Mitigation	Energy generation, distribution and efficiency	FFEM
MOROCCO	Development of an industrial channel for prickly pears	480	567	committed	ODA	Grant	Adaptation	Agriculture	FFEM

MOROCCO	Dynamic agricultural systems including solar power in areas under water stress	1 000	1 181	committed	ODA	Grant	Cross-cutting	Water and sanitation	FFEM
MADAGASCAR	Sustainable agriculture and biodiversity preservation for local communities in Pointe à Larrée	800	945	committed	ODA	Grant	Mitigation	Agriculture	FFEM
SENEGAL	Using solar cooling for adatapting fisheries to climate change	138	163	committed	ODA	Grant	Adaptation	Energy generation, distribution and efficiency	FFEM
KENYA	Developing tools for sustainable agriculture and animal health	0	1	committed	ODA	Grant	Adaptation	Agriculture	Other
MADAGASCAR	Development of rice farming adapted to high altitude	1	1	committed	ODA	Grant	Adaptation	Agriculture	Other
SENEGAL	Supporting food secutiry through sustainable agriculture	1	1	committed	ODA	Grant	Adaptation	Agriculture	Other
MADAGASCAR	International volunteering in NGOs	1	1	committed	ODA	Grant	Adaptation	Governement and civil society	Other
Total Region Africa		*1 241 178*	*1 465 381*						
Region Latin America and Carribean islands									
ARGENTINA	Renewable energy production	19 712	23 273	committed	OOF	Non-concessional loan	Mitigation	Water and sanitation	PROPARCO
ARGENTINA	Renewable energy production	22 097	26 088	committed	OOF	Non-concessional loan	Mitigation	Water and sanitation	PROPARCO
ARGENTINA	Renewable energy production	22 097	26 088	committed	OOF	Non-concessional loan	Mitigation	Water and sanitation	PROPARCO
ARGENTINA	Renewable energy production	15 468	18 262	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
ARGENTINA	Renewable energy production	15 468	18 262	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
ARGENTINA	Renewable energy for small businesses	80 000	94 451	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
ARGENTINA	Railway transport	65 439	77 260	committed	OOF	Non-concessional loan	Mitigation	Transport and storage	AFD
BOLIVIA	Water supply between Misicuni and Sacaba	43 500	51 358	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
BOLIVIA	Rural development	930	1 098	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
BRAZIL	Agriculture production	22 551	26 625	committed	OOF	Non-concessional loan	Mitigation	Agriculture	PROPARCO

BRAZIL	Agriculture production	14 094	16 640	committed	OOF	Non-concessional loan	Mitigation	Agriculture	PROPARCO
COLOMBIA	Public policies related to climate	197 628	233 328	committed	ODA	Concessional loan	Cross-cutting	Environmental policy and administrative management	AFD
COLOMBIA	Developing tourism in mountainous areas	465	549	committed	ODA	Grant	Adaptation	Environmental policy and administrative management	AFD
COSTA RICA	Banco Davivienda	34 288	40 481	committed	OOF	Non-concessional loan	Mitigation	Banking and financial services	PROPARCO
CUBA	Rural development to increase resilience to natural disasters	795	938	committed	ODA	Grant	Adaptation	Agriculture	AFD
CUBA	Sustainable agriculture and rural development	17 500	20 661	committed	ODA	Concessional loan	Cross-cutting	Agriculture	AFD
CUBA	Upgrading health facilities	10 080	11 901	committed	ODA	Concessional loan	Adaptation	Basic sanitation	AFD
CUBA	Reinforcing sanitation services	15 600	18 418	committed	ODA	Concessional loan	Cross-cutting	Environmental policy and administrative management	AFD
DOMINICAN REP	Public policies related to urban mobility	43 500	51 358	committed	ODA	Concessional loan	Mitigation	Urban development and management	AFD
DOMINICAN REP	Public policies related to urban mobility and railway transport	87 000	102 715	committed	ODA	Concessional loan	Mitigation	Transport and storage	AFD
ECUADOR	Sanitation in Guayaquil	70 360	83 070	committed	ODA	Concessional loan	Mitigation	Water and sanitation	AFD
ECUADOR	Banco Pichincha	44 119	52 088	committed	OOF	Other	Mitigation	Banking and financial services	PROPARCO
HAITI	Water supply	209	247	committed	ODA	Grant	Adaptation	Water and sanitation	AFD
HAITI	Rural development	4 000	4 723	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
HAITI	Rural development	20 000	23 613	committed	OOF	Other	Cross-cutting	Agriculture	AFD
HAITI	Rural development - promotion of peasant agriculture	558	659	committed	ODA	Grant	Adaptation	Agriculture	AFD
HAITI	Microfinance	614	725	committed	ODA	Grant	Mitigation	Banking and financial services	AFD
HAITI	Official financial intermediaries	300	354	committed	ODA	Grant	Cross-cutting	Banking and financial services	AFD
HAITI	Developing financial investment in agricultural sector	1 200	1 417	committed	ODA	Grant	Cross-cutting	Banking and financial services	AFD
HONDURAS	Banco financiera	30 400	35 892	committed	ODA	Concessional loan	Mitigation	Banking and financial services	PROPARCO
MEXICO	Renewable energy	12 353	14 585	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO

MEXICO	Renewable energy	8 824	10 418	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
MEXICO	Renewable energy	11 471	13 543	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
MEXICO	Renewable energy	11 471	13 543	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
MEXICO	Renewable energy	12 353	14 585	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
MEXICO	Renewable energy	18 530	21 877	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
MEXICO	Energy efficiency in schools and hospitals	25 000	29 516	committed	ODA	Concessional loan	Mitigation	Environmental policy and administrative management	AFD
MEXICO	Renewable energy and electric network	131 544	155 306	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
PERU	Sanitation services in Lima	23 626	27 894	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
PERU	Fighting social exclusion	250	295	committed	ODA	Grant	Adaptation	Basic sanitation	AFD
SALVADOR	Renewable energy	24 373	28 775	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
JAMAÏCA	Extension of irrigable areas in the 'Pedro Plains'	692	817	committed	ODA	Grant	Adaptation	Water and sanitation	FASEP
BRAZIL	Research in South America to develop an environmentally friendly agriculture	1	1	committed	ODA	Grant	Adaptation	Agriculture	Other
COLOMBIA	Research in South America to develop an environmentally friendly agriculture	0	1	committed	ODA	Grant	Adaptation	Agriculture	Other
COSTA RICA	Research in South America to develop an environmentally friendly agriculture	0	0	committed	ODA	Grant	Adaptation	Agriculture	Other
Total Latin America and Carribean islands		*1 180 460*	*1 393 696*						
Region Asia, Central Europe and Middle east									
AZERBAIDJAN	Railway transport - maintenance of existing lines	90 222	106 519	committed	OOF	Non-concessional loan	Mitigation	Transport and storage	AFD
BANGLADESH	Financing energy efficiency and renewable energy production	90 000	106 257	committed	ODA	Concessional loan	Mitigation	Banking and financial services	AFD

CAMBODIA	Water purification plant	38 650	45 632	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
CAMBODIA	Upgrading the energy network	25 000	29 516	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
CHINA	Infrastructure for water management	23 100	27 273	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
CHINA	Natural park in Hezhou	50 000	59 032	committed	ODA	Concessional loan	Adaptation	Biodiversity	AFD
CHINA	Biodiversity conservation in Maoli natural park	35 000	41 322	committed	ODA	Concessional loan	Cross-cutting	Biodiversity	AFD
CHINA	Investment program for sustainable cities	31 941	37 710	committed	ODA	Concessional loan	Adaptation	Urban development and management	PROPARCO
CHINA	Credit line dedicated to biodiversity protection	100 000	118 064	committed	ODA	Concessional loan	Mitigation	Biodiversity	AFD
CHINA	Urban heating network - energy efficiency	41 000	48 406	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
GEORGIA	Supporting the reform of the electricity market	25 000	29 516	committed	ODA	Concessional loan	Mitigation	Environmental policy and administrative management	AFD
INDIA	Solar power plant	4 628	5 464	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	Solar power plant	4 628	5 464	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	Solar power plant	2 439	2 879	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	Solar power plant	5 300	6 257	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	Solar power plant	4 628	5 464	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	Solar power plant	4 628	5 464	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	Solar power plant	7 543	8 905	committed	ODA	Concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	Solar power plant	147	174	committed	OOF	Non-concessional loan	Mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	Renewable energy	13 029	15 382	committed	OOF	Other	Mitigation	Energy generation, distribution and efficiency	PROPARCO

INDIA	Renewable energy	17 372	20 510	committed	OOF	Other	Mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	Forest conservation and biodiversity protection	50 000	59 032	committed	ODA	Concessional loan	Mitigation	Environmental policy and administrative management	AFD
INDIA	Building a hospital	900	1 063	committed	ODA	Concessional loan	Adaptation	Basic sanitation	AFD
INDIA	Underground railway transport in Pune	180 000	212 515	committed	ODA	Concessional loan	Mitigation	Transport and storage	AFD
INDONESIA	Marine transportation management	18 750	22 137	committed	ODA	Concessional loan	Mitigation	Environmental policy and administrative management	AFD
IRAK	Agricultural recovery	1 500	1 771	committed	ODA	Grant	Adaptation	Agriculture	AFD
JORDAN	Sanitation in North-east of Balqa	60 000	70 838	committed	ODA	Concessional loan	Cross-cutting	Water and sanitation	AFD
LAOS	Rural development	250	295	committed	ODA	Grant	Adaptation	Agriculture	AFD
LAOS	Rural development	372	439	committed	ODA	Grant	Adaptation	Agriculture	AFD
LAOS	Biodiversity conservation	1 500	1 771	committed	ODA	Grant	Cross-cutting	Biodiversity	AFD
LAOS	Trade facilitation	1 500	1 771	committed	ODA	Grant	Adaptation	Governement and civil society	AFD
LAOS	Investment program for sustainable industries	4 257	5 027	committed	ODA	Concessional loan	Mitigation	Banking and financial services	PROPARCO
LAOS	Investment program for sustainable industries	4 257	5 027	committed	ODA	Concessional loan	Mitigation	Banking and financial services	PROPARCO
LEBANON	Urban and economic resilience	8 000	9 445	committed	ODA	Concessional loan	Mitigation	Urban development and management	AFD
PAKISTAN	Drinking water supply	85 500	100 945	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
SRI LANKA	Water management for agricultural purposes	73 500	86 777	committed	ODA	Concessional loan	Adaptation	Agriculture	AFD
PALESTINIAN AUTONOMOUS TERRITORIES	Water management for agricultural purposes	12 350	14 581	committed	ODA	Grant	Adaptation	Agriculture	AFD
PALESTINIAN AUTONOMOUS TERRITORIES	Water management for agricultural purposes	22 800	26 919	committed	OOF	Other	Adaptation	Agriculture	AFD
VIETNAM	Climate-resilient infrastructure	67 650	79 870	committed	ODA	Concessional loan	Adaptation	Water and sanitation	AFD
VIETNAM	Energy efficiency and renewable energy	80 000	94 451	committed	ODA	Concessional loan	Mitigation	Urban development and management	AFD
INDIA	Building a solar charging station for electric vehicles in New Delhi	735	868	committed	ODA	Grant	Mitigation	Transport and storage	FASEP

THAILAND	Feasability study for the production of combustible from biomass	217	256	committed	ODA	Grant	Mitigation	Energy generation, distribution and efficiency	FASEP
INDONESIA	Capacity building of the meteorology and climate services of the national agency (BMKG)	22 000	25 974	committed	OOF	Non-concessional loan	Adaptation	Environmental policy and administrative management	Treasury loan
Total Region Asia, Central Europe and Middle east		*1 310 293*	*1 546 982*						
Global (multi-countries)									
MULTI-COUNTRIES	Supporting reconstruction and rehabilitation	308	364	committed	ODA	Grant	Mitigation	Urban development and management	AFD
MULTI-COUNTRIES	Development of cattle breeding	1 860	2 196	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
MULTI-COUNTRIES	Supporting the development of agricultural cooperatives	2 232	2 635	committed	ODA	Grant	Adaptation	Agriculture	AFD
MULTI-COUNTRIES	Supporting the development of agricultural cooperatives	4 250	5 018	committed	ODA	Grant	Adaptation	Agriculture	AFD
MULTI-COUNTRIES	Transition to peasant agriculture and agroecology	3 348	3 953	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
MULTI-COUNTRIES	Development of small business	1 848	2 182	committed	ODA	Grant	Cross-cutting	Governement and civil society	AFD
MULTI-COUNTRIES	Urban management	300	354	committed	ODA	Grant	Adaptation	Urban development and management	AFD
MULTI-COUNTRIES	Protecting rural land	0	0	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
MULTI-COUNTRIES	Protecting rural land	100	118	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
MULTI-COUNTRIES	Rural development	1 200	1 417	committed	ODA	Grant	Adaptation	Agriculture	AFD
MULTI-COUNTRIES	Rural development	1 500	1 771	committed	ODA	Grant	Adaptation	Agriculture	AFD
MULTI-COUNTRIES	Rural development	1 500	1 771	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
MULTI-COUNTRIES	Protection of biodiversity	2 400	2 834	committed	ODA	Grant	Mitigation	Biodiversity	AFD
MULTI-COUNTRIES	Protection of biodiversity	2 000	2 361	committed	ODA	Grant	Cross-cutting	Biodiversity	AFD
MULTI-COUNTRIES	Protection of biodiversity	2 009	2 372	committed	ODA	Grant	Adaptation	Biodiversity	AFD
MULTI-COUNTRIES	Protection of biodiversity	325	384	committed	ODA	Grant	Adaptation	Biodiversity	AFD
MULTI-COUNTRIES	Energy efficiency from the supply side	977	1 153	committed	ODA	Grant	Mitigation	Urban development and management	AFD
MULTI-COUNTRIES	Education	930	1 098	committed	ODA	Grant	Cross-cutting	Governement and civil society	AFD

MULTI-COUNTRIES	Environmental training	300	354	committed	ODA	Grant	Adaptation	Governement and civil society	AFD
MULTI-COUNTRIES	Trade facilitation	2 000	2 361	committed	ODA	Grant	Adaptation	Governement and civil society	AFD
MULTI-COUNTRIES	Credit line dedicated to climate mitigation and adaptation	209 000	246 753	committed	OOF	Other	Cross-cutting	Banking and financial services	AFD
MULTI-COUNTRIES	Credit line dedicated to climate mitigation and adaptation	31 000	36 600	committed	OOF	Other	Cross-cutting	Banking and financial services	AFD
MULTI-COUNTRIES	Credit line dedicated to climate mitigation and adaptation	413 000	487 603	committed	ODA	Concessional loan	Cross-cutting	Banking and financial services	AFD
MULTI-COUNTRIES	Mobilisation of domestic resources	10 000	11 806	committed	ODA	Grant	Cross-cutting	Governement and civil society	AFD
MULTI-COUNTRIES	Local development	2 744	3 239	committed	ODA	Grant	Adaptation	Governement and civil society	AFD
MULTI-COUNTRIES	Contribution to IFAD	12 500	14 758	committed	ODA	Concessional loan	Cross-cutting	Agriculture	AFD
MULTI-COUNTRIES	Public policies related to agriculture	325	384	committed	ODA	Grant	Cross-cutting	Environmental policy and administrative management	AFD
MULTI-COUNTRIES	NDC facility	12 500	14 758	committed	ODA	Grant	Cross-cutting	Environmental policy and administrative management	AFD
MULTI-COUNTRIES	NDC facility	2 500	2 952	committed	ODA	Grant	Cross-cutting	Environmental policy and administrative management	AFD
MULTI-COUNTRIES	Public policies related to environment and climate	400	472	committed	ODA	Grant	Adaptation	Environmental policy and administrative management	AFD
MULTI-COUNTRIES	Public policies related to environment and climate	400	472	committed	ODA	Grant	Mitigation	Environmental policy and administrative management	AFD
MULTI-COUNTRIES	Technical assistance related to water management policies	650	767	committed	ODA	Grant	Adaptation	Environmental policy and administrative management	AFD
MULTI-COUNTRIES	Technical assistance related to health policies	6 000	7 084	committed	ODA	Grant	Adaptation	Environmental policy and administrative management	AFD
MULTI-COUNTRIES	Sustainable management of forestry	2 000	2 361	committed	ODA	Grant	Mitigation	Environmental policy and administrative management	AFD
MULTI-COUNTRIES	Food security	1 767	2 086	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
MULTI-COUNTRIES	Biodiversity protection	3 000	3 542	committed	ODA	Grant	Mitigation	Biodiversity	AFD

MULTI-COUN-TRIES	Natural parks - biodiversity preservation	225	266	committed	ODA	Grant	Cross-cutting	Biodiversity	AFD
MULTI-COUN-TRIES	Fighting land degradation	7 000	8 264	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
MULTI-COUN-TRIES	Fighting land degradation	3 000	3 542	committed	ODA	Grant	Cross-cutting	Agriculture	AFD
MULTI-COUN-TRIES	Coastal risks and adaptation in West Africa	1 277	1 508	committed	ODA	Grant	Adaptation	Biodiversity	FFEM
MULTI-COUN-TRIES	Increasing ecosystems resilience in the Indian Ocean	1 500	1 771	committed	ODA	Grant	Cross-cutting	Biodiversity	FFEM
MULTI-COUN-TRIES	Mutual action from public and private sectors to develop low-carbon strategies in emerging countries	761	898	committed	ODA	Grant	Mitigation	Environmental policy and administrative management	FFEM
Global (multi-countries)		750 935	886 582						
TOTAL		**4 482 867**	**5 292 641**						

Table 7(b) : Provision of public financial support : contribution through bilateral, regional and other channels in 2017 (in thousands Euros and in thousands USD)

Recipient country/ region/project/programme	*Project/ Programme title*	*Total amount (climate-specific) in thousands of Euros*	*Total amount (climate-specific) in thousands of USD*	*Status: disbursed, committed*	*Funding source: ODA, OOF, Other*	*Financial instrument: grant, concessional loan, non-concessional loan, equity, other*	*Type of support: Mitigation, Adaptation, crosscutting*	*Sector*	*Additional information*
Region Africa									
BURKINA FASO	Contract farming and ecological transition	2 800	3 164	committed	ODA	concessional loan	Adaptation	Agriculture	AFD
BURKINA FASO	Contract farming and ecological transition	1 400	1 582	committed	ODA	grant	Adaptation	Agriculture	AFD
BURKINA FASO	Strengthening the economic development of rural areas located at the Niger border	4 960	5 605	committed	ODA	grant	Adaptation	Agriculture	AFD
BURKINA FASO	Strengthening the economic development of rural areas located at the Niger border	620	701	committed	ODA	grant	Adaptation	Urban development and management, Energy	AFD
BENIN	"Adapting Cities to Climate Change" program	50 000	56 497	committed	ODA	concessional loan	Adaptation	Urban development and management	AFD
BENIN	"Adapting Cities to Climate Change" program	8 000	9 040	committed	ODA	grant	Adaptation	Urban development and management	AFD
BENIN	Agro-ecological Transition of Cotton producing regions of Benin	1 500	1 695	committed	ODA	grant	Adaptation	Agriculture	AFD
DRC	Sustainable forest management	4 000	4 520	committed	ODA	grant	Mitigation	Agriculture	AFD
IVORY COAST	Complement to the C2D for the work of the Bouaké-Ferkessédougou road	120 000	135 593	committed	ODA	concessional loan	Mitigation	Transport and storage, Transport	AFD
CAMEROON	SUNREF line of credit	1 150	1 299	committed	ODA	grant	Mitigation	Banking and financial services	AFD
CAMEROON	SUNREF line of credit	30 000	33 898	committed	ODA	concessional loan	Mitigation	Banking and financial services	AFD
EGYPT	Sectorial Public Policy Loan for renewable energy and energy efficiency in Egypt	101 500	114 689	committed	ODA	concessional loan	mitigation	Environmental Policy and administrative management	AFD
EGYPT	Sectorial Public Policy Loan for renewable energy and energy efficiency in Egypt	870	983	committed	ODA	grant	Mitigation	Environmental Policy and administrative management	AFD

Recipient country/ region/project/programme	*Project/ Programme title*	*Total amount (climate-specific) in thousands of Euros*	*Total amount (climate-specific) in thousands of USD*	*Status: disbursed, committed*	*Funding source: ODA, OOF, Other*	*Financial instrument: grant, concessional loan, non-concessional loan, equity, other*	*Type of support: Mitigation, Adaptation, crosscutting*	*Sector*	*Additional information*
KENYA	Rehabilitation and modernization of the Mombasa port	95 214	107 586	committed	ODA	concessional loan	Mitigation	Transport and storage	AFD
KENYA	Energy Distribution	94 000	106 215	committed	ODA	concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
MOROCCO	LGV 2 - Complementary financing for the high-speed rail line between Tangier and Kenitra	80 000	90 395	committed	ODA	concessional loan	mitigation	Transport and storage	AFD
MOROCCO	MASEN SOLAR PLAN (CSP AND PV)	150 000	169 492	committed	ODA	concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
MOROCCO	MASEN SOLAR PLAN (CSP AND PV)	500	565	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	AFD
MOROCCO	Blue credit line	300	339	committed	ODA	grant	Adaptation	Water and sanitation	AFD
MOROCCO	Blue credit line	10 000	11 299	committed	ODA	concessional loan	Adaptation	Banking and financial services	AFD
MOROCCO	FEC - Financial and technical support on climate and sustainable development	25 000	28 249	committed	ODA	concessional loan	Mitigation	Banking and financial services	AFD
MOROCCO	FEC - Financial and technical support on climate and sustainable development	250	282	committed	ODA	grant	Mitigation	Banking and financial services	AFD
MADAGASCAR	Strengthening the governance of protected areas in relation to central and decentralized administrations to support the implementation of NAPs in the Diana region	2 380	2 689	committed	ODA	grant	Adaptation	Agriculture	AFD
MADAGASCAR	Establishment of a landscape approach for sustainable Agriculture at the national and regional levels	25 000	28 249	committed	ODA	concessional loan	Mitigation	Agriculture	AFD
MADAGASCAR	Improving acces and sanitation in selected neighborhoods in the Antananarivo agglomeration	9 690	10 949	committed	ODA	concessional loan	Adaptation	Disaster prevention and preparedness	AFD

Recipient country/ region/project/programme	*Project/ Programme title*	*Total amount (climate-specific) in thousands of Euros*	*Total amount (climate-specific) in thousands of USD*	*Status: disbursed, committed*	*Funding source: ODA, OOF, Other*	*Financial instrument: grant, concessional loan, non-concessional loan, equity, other*	*Type of support: Mitigation, Adaptation, crosscutting*	*Sector*	*Additional information*
MALI	Regional program to strengthen and extend the OMVS interconnected network, whose purpose is to support the socio-economic development of member countries by improving their energy supply.	80 000	90 395	committed	ODA	concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
MAURITIUS	Financing projects to combat climate change and promote gender inclusiveness	45 000	50 847	committed	ODA	concessional loan	Mitigation	Banking and financial services	AFD
MAURITIUS	Financing projects to combat climate change and promote gender inclusiveness	20 000	22 599	committed	ODA	concessional loan	Mitigation	Banking and financial services	AFD
MAURITIUS	Financing projects to combat climate change and promote gender inclusiveness	10 000	11 299	committed	ODA	concessional loan	Mitigation	Banking and financial services	AFD
MAURITIUS	Water and sanitation project	230	260	committed	ODA	grant	Adaptation	Water and sanitation	AFD
MOZAMBIQUE	Construction of a photovoltaic solar power plant in Mozambique	16 955	19 158	committed	ODA	concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
NIGER	photovoltaic plant in Niger	23 500	26 554	committed	ODA	concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD
NIGERIA	Line of credit to finance energy efficiency / renewable energy projects in Nigeria and technical assistance	29 536	33 374	committed	ODA	concessional loan	Mitigation	Banking and financial services	AFD
NIGERIA	Line of credit to finance energy efficiency / renewable energy projects in Nigeria and technical assistance	29 536	33 374	committed	ODA	concessional loan	Mitigation	Banking and financial services	AFD
NIGERIA	Program to support the implementation of the Lagos State Transport and storage Master Plan	168 521	190 419	committed	ODA	concessional loan	Mitigation	Transport and storage	AFD
NIGERIA	Capacity building program to support the improvement of the governance framework of the urban water sector	46 132	52 127	committed	ODA	concessional loan	Adaptation	Water and sanitation	AFD

Recipient country/ region/project/programme	*Project/ Programme title*	*Total amount (climate-specific) in thousands of Euros*	*Total amount (climate-specific) in thousands of USD*	*Status: disbursed, committed*	*Funding source: ODA, OOF, Other*	*Financial instrument: grant, concessional loan, non-concessional loan, equity, other*	*Type of support: Mitigation, Adaptation, crosscutting*	*Sector*	*Additional information*
SENEGAL	Economic development of the rural territories of the southern third of Senegal	14 000	15 819	committed	ODA	concessional loan	Adaptation	Water and sanitation	AFD
SENEGAL	Economic development of the rural territories of the southern third of Senegal	2 000	2 260	committed	ODA	grant	Mitigation	Water and sanitation	AFD
SENEGAL	Restoration of mangroves	5 000	5 650	committed	ODA	grant	Mitigation	Agriculture	AFD
SENEGAL	Support to family farms in the Matam region - Phase 2	1 040	1 175	committed	ODA	grant	Adaptation	Agriculture	AFD
SENEGAL	Support to family farms in the Matam region - Phase 2	15 600	17 627	committed	ODA	concessional loan	Adaptation	Agriculture	AFD
SENEGAL	Water Development Support Project of the Department of Matam	600	678	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	AFD
SENEGAL	Public Policy Loan for the Governance of the Water and sanitation Sector (2018-2021) and Additional Grant	1 600	1 808	committed	ODA	concessional loan	Adaptation	Water and sanitation	AFD
SENEGAL	Public Policy Loan for the Governance of the Water and sanitation Sector (2018-2021) and Additional Grant	100	113	committed	ODA	grant	Adaptation	Water and sanitation	AFD
TOGO	Drinking Water Supply Project of the City of Lomé - Phase 2	4 200	4 746	committed	ODA	grant	Adaptation	Water and sanitation	AFD
TUNISIA	Second program for the rehabilitation of informal neighborhoods	23 240	26 260	committed	ODA	concessional loan	Mitigation	Banking and financial services	AFD
TUNISIA	Support to the transition of the agricultural sector in the KEF region for a better adaptation to climate change	242	273	committed	ODA	grant	Adaptation	Agriculture	AFD
TANZANIA	Rural electrification	100 000	112 994	committed	ODA	concessional loan	Mitigation	Government and civil society	AFD
UGANDA	Rehabilitation and construction of a hydro-agricultural infrastructure and structuring of the organizations necessary for its management and development	50 000	56 497	committed	ODA	concessional loan	Adaptation	Water and sanitation	AFD

Recipient country/ region/project/programme	*Project/ Programme title*	*Total amount (climate-specific) in thousands of Euros*	*Total amount (climate-specific) in thousands of USD*	*Status: disbursed, committed*	*Funding source: ODA, OOF, Other*	*Financial instrument: grant, concessional loan, non-concessional loan, equity, other*	*Type of support: Mitigation, Adaptation, crosscutting*	*Sector*	*Additional information*
EGYPT	Financing the construction and operation of a solar farm in northern Aswan	25 388	28 687	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
EGYPT	Financing the construction and operation of a solar farm in northern Aswan	591	668	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
EGYPT	Financing the construction and operation of a solar farm in northern Aswan	25 388	28 687	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
EGYPT	Financing the construction and operation of a solar farm in northern Aswan	591	668	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
EGYPT	Financing the construction and operation of a solar farm in northern Aswan	24 122	27 256	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
EGYPT	Financing the construction and operation of a solar farm in northern Aswan	743	840	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
EGYPT	Financing the construction and operation of a solar farm in northern Aswan	24 340	27 503	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
EGYPT	Financing the construction and operation of a solar farm in northern Aswan	2 614	2 954	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
EGYPT	Financing the construction and operation of a 32 MW solar photovoltaic plant	21 547	24 347	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
MOROCCO	Purchase of green bonds	8 016	9 058	committed	OOF	green bonds	mitigation	Banking and financial services	PROPARCO
MOZAMBIQUE	Financing the construction of a 41 MW photovoltaic solar power plant in Metoro (north-eastern Mozambique) and a connection line to the national network	16 956	19 159	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
NAMIBIA	Financing of Namibia's first large-scale solar power station	37 000	41 808	committed	OOF	Garanties	mitigation	Energy generation, distribution and efficiency	PROPARCO

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NIGERIA	Credit line to finance the long-term credit activity and projects with a positive environmental impact	35 962	40 635	committed	OOF	non concessionnal loan	mitigation	Banking and financial services	PROPARCO
UGANDA	Financing the construction and operation of a 15 MW hydroelectric facility in western Uganda	10 727	12 121	committed	OOF	Garanties	mitigation	Energy generation, distribution and efficiency	PROPARCO
UGANDA	Financing the construction and operation of a 6 MW hydroelectric facility in western Uganda	39 787	44 957	committed	OOF	Garanties	mitigation	Energy generation, distribution and efficiency	PROPARCO
UGANDA	Construction and operation of a 255 MW hydroelectric plant	33 704	38 084	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
SENEGAL	PV solar development	400	452	committed	ODA	Grant	Mitigation	Energy generation, distribution and efficiency	FFEM
MAURITIUS	Deslination plant by solar energy	184	208	committed	ODA	Grant	Adaptation	Water and sanitation	FFEM
SENEGAL	SUNNA Design Nannogrid	500	565	committed	ODA	Grant	Mitigation	Energy generation, distribution and efficiency	FFEM
AFRICA	LAGAZEL Box - local producing of green products	369	417	committed	ODA	Grant	Adaptation	Energy generation, distribution and efficiency	FFEM
CAMEROON/DRC	Promoting local and sustainable transformation of forest byproducts	2 000	2 260	committed	ODA	Grant	Adaptation	Forestry	FFEM
COMOROS/MADAGASCAR	Energy efficiency program	574	649	committed	ODA	Grant	Adaptation	Energy generation, distribution and efficiency	FFEM
AFRICA	Increasing the resilience of coastal ecosystems in the Indian Ocean through restoration and conservation	1 500	1 695	committed	ODA	Grant	Adaptation	Disaster prevention and preparedness	FFEM
AFRICA	Coastal risks and adaptation in coastal areas in West Africa	1 274	1 440	committed	ODA	Grant	Adaptation	Disaster prevention and preparedness	FFEM

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AFRICA	Beyond Ratings, rating agency specialized in increased sovereign risk	500	565	committed	ODA	Grant	Adaptation	Banking and financial services	FFEM
BENIN	Strengthening the sustainable management of natural forests in the Middle-East	1 000	1 130	committed	ODA	Grant	Adaptation	Forestry	FFEM
AFRICA	Energy efficiency tool - pilot phase	1 500	1 695	committed	ODA	Grant	Mitigation	Energy generation, distribution and efficiency	FFEM
MOROCCO	Study, optimization and implementation of dynamic agri-voltaic pilot systems in water and thermal stress zones	1 000	1 130	committed	ODA	grant	Adaptation	Agriculture	FFEM
WEST AFRICA	Support for the Agroecological Transition in West Africa	8 000	9 040	committed	ODA	grant	Adaptation	Agriculture	AFD
WEST AFRICA	Support for the Agroecological Transition in West Africa	2 000	2 260	committed	ODA	grant	Adaptation	Agriculture	AFD
KENYA	Establishment of an analysis laboratory for the development of methanation units and the development of the biogas sector	845	955	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FASEP
UGANDA	Establishment of a satellite hydrometric measurement system	498	563	committed	ODA	grant	Adaptation	Water and sanitation	FASEP
IVORY COAST	Manioc project (feasibility study for sustainable agriculture)	310	350	committed	ODA	grant	Adaptation	Agriculture	FASEP
EGYPT	Hydrocarbon recycling micro-refineries	113	128	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FASEP
MOROCCO	Installment of electric locomotives	128 100	144 746	committed	OOF	non concessionnal loan	mitigation	Transport and storage	Treasury loan
SEYCHELLES	Seychelles Port Rehabilitation and Extension Project	9 240	10 441	committed	OOF	non concessionnal loan	Adaptation	Disaster prevention and preparedness	AFD
SEYCHELLES	Heat recovery and thermal recovery for cold production demonstrator	827	934	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FASEP
Total Region Africa		*1 974 376*	*2 230 933*						

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Region Latin America and Carribean islands									
ARGENTINA	Integrated Flood Risk Management Program in Rio Lujan Basin	39 000	44 068	committed	ODA	concessionnal loan	Adaptation	Water and sanitation	AFD
ARGENTINA	Water and sanitation infrastructure under the Belgrano Plan for the Northern Provinces of Argentina	54 199	61 242	committed	ODA	concessionnal loan	Adaptation	Water and sanitation	AFD
BOLIVIA	Financing investments for the Cochabamba sanitation master plan	34 563	39 054	committed	ODA	concessionnal loan	Adaptation	Water and sanitation	AFD
BOLIVIA	public policy loan for improving governance in the water sector	72 420	81 831	committed	ODA	concessionnal loan	Adaptation	Water and sanitation	AFD
BRAZIL	Programmatic credit line to finance energy efficiency, renewable energy, waste management, agricultural cooperatives, businesses, and possibly municipalities	35 000	39 548	committed	ODA	concessionnal loan	mitigation	Banking and financial services	AFD
BRAZIL	Mobility / Drainage-sanitation components of the PROINFRA infrastructure investment program	37 383	42 241	committed	OOF	non concessionnal loan	Adaptation	Water and sanitation	AFD
BRAZIL	Support to the EMBASA program for operational modernization and energy efficiency	46 200	52 203	committed	ODA	concessionnal loan	adaptation	Water and sanitation	AFD
COLOMBIA	Post Conflit Rural Developpement	80 000	90 395	committed	ODA	concessionnal loan	mitigation	Government and civil society	AFD
COLOMBIA	Credit Line (Multi Tranche Finder 2 Facility)	10 111	11 425	committed	OOF	non concessionnal loan	mitigation	Banking and financial services	AFD
ECUADOR	Reforestation credit line and commercial exploitation of the forest	37 234	42 072	committed	OOF	non concessionnal loan	mitigation	Agriculture	AFD
ECUADOR	Financing a metro line in Guayaquil	104 959	118 598	committed	ODA	concessionnal loan	mitigation	Transport and storage	AFD
HAITI	OICC riverbank protection at the Oranger River	375	424	committed	ODA	grant	Adaptation	Disaster prevention and preparedness	AFD
HAITI	Support to land reform and decentralization	235	266	committed	ODA	grant	Adaptation	Urban development and management	AFD

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HAITI	Support to land reform and decentralization	80	90	committed	ODA	grant	Adaptation	Urban development and management	AFD
HAITI	Support to land reform and decentralization	22	25	committed	ODA	grant	Adaptation	Urban development and management	AFD
HAITI	Support to land reform and decentralization	63	71	committed	ODA	grant	Adaptation	Urban development and management	AFD
HAITI	Support to land reform and decentralization	100	113	committed	ODA	grant	Adaptation	Urban development and management	AFD
HAITI	Extension of the Photovoltaic Lamps Park in the Palmes Region	300	339	committed	ODA	grant	Adaptation	Energy generation, distribution and efficiency	AFD
MEXICO	Sectorial budget support for the energy transition policy	80 000	90 395	committed	ODA	concessionnal loan	mitigation	Environmental Policy and administrative management	AFD
BRAZIL	Financing the construction and operation of a 254 MW solar PV plant in Brazil	25 714	29 055	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
BRAZIL	Financing the construction and operation of a 254 MW solar PV plant in Brazil	25 714	29 055	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
BRAZIL	Financing the construction and operation of a 254 MW solar PV plant in Brazil	38 572	43 584	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
COLOMBIA	Financing of a Rapid Transit Bus network project in Cartagena, Colombia	24 000	27 119	committed	OOF	non concessionnal loan	mitigation	Transport and storage	PROPARCO
DOMINICAN REP.	Financing the construction and operation of a 52.5 MW wind farm in Dominican Republic	11 019	12 451	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
DOMINICAN REP.	Financing the construction and operation of a 52.5 MW wind farm in Dominican Republic	3 391	3 832	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
HONDURAS	Financing the extension of a solar farm in Honduras	4 031	4 555	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
JAMAICA	Financing the construction, operation and maintenance of a solar power plant in Jamaica	45 782	51 731	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO

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COSTA RICA	adaptation of mangroves to climate change	1 270	1 435	committed	ODA	Grant	Adaptation	biodiversity	FFEM
COLOMBIA	forest management project	1 200	1 356	committed	ODA	grant	Adaptation	Forestry	FFEM
LATIN AMERICA	setting up long-term climate strategies	762	861	committed	ODA	grant	Adaptation	Government and civil society	FFEM
COLOMBIA	Urban energy efficiency programme in Medellin	556	628	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FASEP
CUBA	Programme of eradication of the invasive plant Marabu	112	127	committed	ODA	grant	Adaptation	biodiversity	FASEP
NICARAGUA	Feasibility study for a geothermic plant in Tipitapa-Santiago	618	698	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FASEP
ECUADOR	Diagnostic and feasibility study for a better management of waste in Guayaquil	570	644	committed	ODA	grant	Adaptation	Waste management	FASEP
REGIONAL (BRAZIL/PERU/COLOMBIA)	Feasibility study for a biogaz development and financial analysis of fundings available	259	293	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FASEP
COLOMBIA	Feasibility study for a low-carbon transportation network in Valle del Cauca	984	1 112	committed	ODA	grant	Mitigation	Transport and storage	FASEP
JAMAICA	Feasibility study to implement a natural air-cooling system for Norman Manley Kingston airport	460	520	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FASEP
Total Latin America and Carribean islands		**817 258**	**923 455**						
Region Asia, Central Europe and Middle east									
CHINA	Restoration and enhancement of heritage; improvement of urban services with infrastructure upgrades	32 200	36 384	committed	ODA	concessional loan	mitigation	Energy generation, distribution and efficiency	AFD
CHINA	Improvement of drinking water, sewage and sludge treatment services in Jiangyuan District, Jilin Province	20 540	23 209	committed	ODA	concessional loan	Adaptation	Water and sanitation	AFD
INDONESIA	Second phase Public policy loan for energy transition in Indonesia	60 000	67 797	committed	ODA	concessional loan	mitigation	Environmental Policy and administrative management	AFD

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INDIA	Financing of the '100 Smart Cities' program supported by the Government of India	40 000	45 198	committed	ODA	concessional loan	mitigation	Government and civil society	AFD
IRAK	Rehabilitation of the Rashidiya pumping station and medium and Long Term Planning and capacity building	4 200	4 746	committed	ODA	grant	Adaptation	Disaster prevention and preparedness	AFD
JORDANIA	Sectoral policy to optimize the financial management of the Jordan Water Authority (WAJ)	115 500	130 508	committed	ODA	concessional loan	mitigation	Water and sanitation	AFD
CAMBODIA	Support to the agricultural sectoral policy stakeholders	1 000	1 130	committed	ODA	concessional loan	Adaptation	Agriculture	AFD
CAMBODIA	Water resources management and agro-ecological transition for irrigated perimeters in Cambodia	55 000	62 147	committed	ODA	concessional loan	Mitigation	Agriculture	AFD
CAMBODIA	Drinking Water and sanitation for secondary cities in Cambodia	14 800	16 723	committed	ODA	concessional loan	Adaptation	Urban development and management	AFD
COMOROS	Establishment of a facility to support high-impact initiatives by civil society actors and NGOs	1 080	1 220	committed	ODA	grant	Adaptation	Agriculture	AFD
LIBAN	Support Project for Social Resilience, Infrastructure, Forestry and Agriculture in Lebanon	4 050	4 576	committed	ODA	grant	Adaptation	Agriculture	AFD
SRI LANKA	Extension of the Ratmalana / Moratuwa wastewater collection networks and household connections.	57 750	65 254	committed	ODA	concessional loan	Adaptation	Disaster prevention and preparedness	AFD
PHILIPPINES	Line 1 of BRT on the Quezon Avenue in Manila	21 000	23 729	committed	ODA	concessional loan	Mitigation	Transport and storage	AFD
PHILIPPINES	2nd tranche of the Local Government Finance and Fiscal Decentralisation programme	6 000	6 780	committed	ODA	concessional loan	Adaptation	Urban development and management	AFD
PAKISTAN	Construction of mini hydropower plants in KPK according to a results-based approach	70 000	79 096	committed	ODA	concessional loan	Mitigation	Energy generation, distribution and efficiency	AFD

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PAKISTAN	Co-financing with ADB (Lead Partner) for the construction of a BRT network in the city of Peshaw	130 000	146 893	committed	ODA	concessionnal loan	Mitigation	Transport and storage	AFD
PALESTINIAN AUTONOMOUS TERRITORIES	Credit line for financing energy efficiency and renewable energy	12 500	14 124	committed	ODA	concessionnal loan	Mitigation	Banking and financial services	AFD
PALESTINIAN AUTONOMOUS TERRITORIES	Credit line for financing energy efficiency and renewable energy	12 500	14 124	committed	ODA	concessionnal loan	Mitigation	Banking and financial services	AFD
PALESTINIAN AUTONOMOUS TERRITORIES	pilot project to support public drinking water operators in two districts of the northern West Bank	4 000	4 520	committed	ODA	grant	Adaptation	Water and sanitation	AFD
VIET-NAM	Expansion of 50% of the capacity of the Ialy hydroelectric plant and financing of the Se San 4 solar power station	65 000	73 446	committed	ODA	concessionnal loan	Mitigation	Energy generation, distribution and efficiency	AFD
VIET-NAM	Expansion of 50% of the capacity of the Ialy hydroelectric plant and financing of the Se San 4 solar power station	35 000	39 548	committed	ODA	concessionnal loan	Mitigation	Energy generation, distribution and efficiency	AFD
BANGLADESH	Credit line dedicated to climate project financing and SME support in Bangladesh	10 662	12 047	committed	OOF	non concessionnal loan	mitigation	Banking and financial services	PROPARCO
INDIA	Support for the development of energy and renewable energy infrastructure projects	27 000	30 508	committed	OOF	non concessionnal loan	mitigation	Banking and financial services	PROPARCO
TONGA	Increasing renewable energy	13	15	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	AFD
VANUATU/INDONESIA	Access to electricty in rural areas - Village infrastructure angels	500	565	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FFEM
GEORGIA	Financing of the construction and operation of two hydroelectric facilities in northwestern Georgia	13 552	15 313	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO

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GEORGIA	Financing of the construction and operation of two hydroelectric facilities in northwestern Georgia	7 179	8 112	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
INDIA	SAE – SIV system demonstrator in Hyderabad	280	316	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FASEP
INDIA	Action plan and demonstrator to improve the performance of the electricity grid in Madhya Prades	850	960	committed	ODA	grant	Mitigation	Energy generation, distribution and efficiency	FASEP
INDIA	Feasibility study for the implementation of domestic waste sorting machines	652	737	committed	ODA	grant	Adaptation	Waste management	FASEP
NEPAL	Extension of the FASEP grant on the economic model study and financial projections of a cable transport line in Kathmandu	40	45	committed	ODA	grant	Mitigation	Transport and storage	FASEP
MACEDONIA	Extension of the FASEP grant for the study on financing, design-building and operation of the wastewater treatment plant in Skopje	198	224	committed	ODA	grant	Adaptation	Waste management	FASEP
PHILIPPINES	Feasibility study for a cable line in Manila	440	497	committed	ODA	grant	Mitigation	Transport and storage	FASEP
Total Region Asia, Central Europe and Middle east		*823 486*	*930 493*						
Global (multi-countries)									
MULTI-COUNTRIES	support the development of ARC in sub-Saharan Africa and support its capacity building program	5 000	5 650	committed	ODA	grant	Adaptation	Agriculture	AFD
MULTI-COUNTRIES	Technical Assistance to CICOS and spatial altimetry	175	198	committed	ODA	grant	Adaptation	Water and sanitation	AFD
MULTI-COUNTRIES	Line of Credit for the financing of "climate" infrastructure projects in Africa	500	565	committed	ODA	grant	Mitigation	Banking and financial services	AFD

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MULTI-COUNTRIES	Establishment of a facility for the implementation of NDCs in African countries, LDCs and SIDS	10 523	11 890	committed	ODA	grant	Adaptation	Environmental Policy and administrative management	AFD
MULTI-COUNTRIES	Establishment of a facility for the implementation of NDCs in African countries, LDCs and SIDS	3 500	3 955	committed	ODA	grant	Adaptation	Environmental Policy and administrative management	AFD
MULTI-COUNTRIES	Establishment of a facility for the implementation of NDCs in African countries, LDCs and SIDS	978	1 105	committed	ODA	grant	Adaptation	Environmental Policy and administrative management	AFD
MULTI-COUNTRIES	Disaster response capacity and health security for the benefit of the Indian Ocean Commission Member State's population	4 320	4 881	committed	ODA	grant	Adaptation	Basic sanitation	AFD
MULTI-COUNTRIES	Financing of the second phase of the RESCCUE project and its extension	4 500	5 085	committed	ODA	grant	Mitigation	Agriculture	AFD
MULTI-COUNTRIES	Contribution to the framework agreement IUCN 2017/2020	400	452	committed	ODA	grant	Mitigation	Agriculture	AFD
MULTI-COUNTRIES	support to the Pacific Public Health Surveillance Network to strengthen surveillance and response to epidemic crises	3 000	3 390	committed	ODA	grant	Adaptation	Basic sanitation	AFD
MULTI-COUNTRIES	Project to support the structuring of the Adaptation of African Agriculture to Climate Change Moroccan government initiative	1 000	1 130	committed	ODA	grant	Adaptation	Agriculture	AFD
MULTI-COUNTRIES	financing of a multi-country investment fund dedicated to supporting sustainable land management projects	30 000	33 898	committed	ODA	concessional loan	Mitigation	Agriculture	AFD
MULTI-COUNTRIES	Multi-Tranche Facility to Strengthen Afreximbank's Trade Finance Capacity	200	226	committed	ODA	grant	Mitigation	Government and civil society	AFD

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MULTI-COUNTRIES	Support the expansion of a South African boiler manufacturer using biomass	9 406	10 628	committed	OOF	other	mitigation	Energy generation, distribution and efficiency	PROPARCO
MULTI-COUNTRIES	Investing in green bonds issued that will finance climate projects in emerging or developing countries	21 190	23 944	committed	OOF	non concessionnal loan	mitigation	Banking and financial services	PROPARCO
MULTI-COUNTRIES	SICAV AMUNDI Senior subscription	63 570	71 831	committed	OOF	non concessionnal loan	mitigation	Energy generation, distribution and efficiency	PROPARCO
Global (multi-countries)		158 262	178 827						
TOTAL		**3 773 382**	**4 263 708**						