

THE FIFTH NATIONAL COMMUNICATION OF FRANCE to the United Nations Framework Convention on Climate Change

NOVEMBER 2009
English abstract



Resources, land, habitats and housing
Energy and climate Sustainable development
Risk prevention Infrastructure, transport and the sea

**Present
for
the future**



Ministry for Ecology, Energy, Sustainable Development and the Sea
In Charge of Green Technologies and Climate Negotiations

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EDITORIAL

In Copenhagen, leaders of 192 countries will meet in an attempt to seek a climate agreement marking the second phase of the Kyoto Protocol. The objective is to limit temperature increase to 2°C maximum, a threshold beyond which the world would enter a period of strong climactic uncertainty.

To achieve this, we must have precise objectives for reducing greenhouse gas emissions over the short, medium and long terms. France is thus campaigning, on the basis of research conducted by scientists at the Intergovernmental Panel on Climate Change, for a reduction in developed countries' emissions of between 25% and 40% by 2020 and a 50% reduction in world emissions by 2050. France, which is already one of the only countries in the world to comply with the Kyoto Protocol, has chosen, in the framework of the Environment Round Table, to set an example by planning a 75% reduction in its carbon dioxide emissions by 2050.

For more than two years and by mobilising all sectors, France is intensively investing in a new green growth model based on restraint in carbon and energy consumption: almost unanimous adoption of the "Grenelle 1 Act", 800 million euros in assistance for building 50 mass transportation projects in 38 metropolitan areas in France, creation of an ecological loan at zero percent with already more than 50,000 energy-efficiency improvements made by private individuals, a request for proposals for building at least one solar power plant per region by 2011, cutting by half within two years the time for connection to the electricity grid for solar energy, introduction of an ecological bonus for automobiles, launch of a clean vehicle plan, etc.

The first results are in! According to commonly accepted projections, the Environment Round Table should reduce greenhouse gas emissions by 22.8% between 1990 and 2020, thus complying with the objectives set in the energy-climate package adopted during the French presidency of the European Union.

Month after month and thanks to the involvement of all stakeholders and all business sectors, we are respecting our commitments while providing our country with the infrastructure it will need over the next decade.

Beyond this, and while some nations still hesitate to commit, the Environment Round Table illustrates an undeniable reality: sustainable development is not only possible on a national scale, but is also a source of well-being, quality of life, growth and jobs. By its example, France demonstrates almost every day that the bet on green growth is a winning bet: winning for workers, businesses, health, regions and our children.

Finally, because it knew to take the first step, France can today propose a new project for the planet in the context of the Copenhagen conference. A project of reconciliation: reconciliation between north and south, between growth and solidarity and between progress and the future.



Jean-Louis Borloo

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A. Country-specific conditions

A.1 Fresh impetus: the Grenelle Environment Forum

Based on the dual observation of the risks linked to the deterioration in the health of our planet and the urgent need to act in combating this deterioration, the President of the Republic has, since 2007, desired the organisation of the Grenelle Environment Forum, uniting around the same table all the players involved with sustainable development on a daily basis: the State, territorial authorities, trade unions, professionals and environmental protection associations. Climate change is therefore at the centre of Grenelle Environment Forum undertakings. Article 2 of the Programme Law of 3 August 2009 on the implementation of the Grenelle Environment Forum conveys this commitment: "Combating climate change is amongst the first priorities. In connection with this, it is confirmed that France is committed to cutting its greenhouse gas emissions by four between 1990 and 2050 by reducing greenhouse gas emissions into the atmosphere by, on average, 3% per year, in order to bring the annual greenhouse gas emissions at that date to a level below 140 million tonnes of carbon dioxide equivalent".

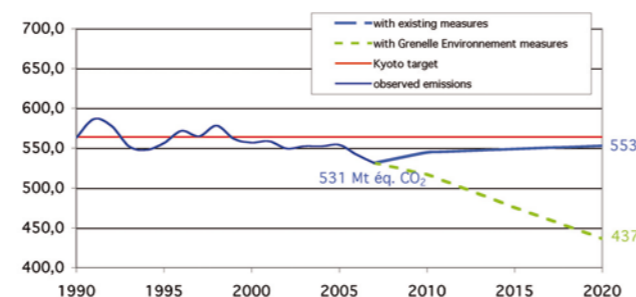
The implementation phase for these commitments is underway via:

- the programme law of 3 August 2009 on implementing the Grenelle Environment Forum;
- Budget Laws 2008 and 2009 and the Budget Proposal 2010 in particular with the creation of a carbon tax;
- the bill on a national environmental undertaking (currently before parliament).

A Grenelle monitoring committee has been set up in order to maintain the dialogue between the government and the players involved in the first stage of the Grenelle Environment Forum. In addition to the State, it groups together representatives of the 4 colleges (trade unions, NGOs, professional bodies and territorial authorities) and meets regularly in order to present the advancement in the implementation stages.

Estimates of the impact of the Grenelle Environment Forum measures show a reduction in GHG emissions of 116 Mt CO₂-eq. compared to a trend scenario without the measures taken during the Grenelle Environment Forum.

Figure 1: Estimate of GHG emissions (in Mt CO₂-eq.) with and without the implementation of the Grenelle Environment Forum objectives



Sources: UNFCCC inventory, CITEPA, 2009 submission and emission projections.

A.2 Recent developments in society

Recent developments in French society and the French economy reveal contrasting situations, some of which are favourable for combating climate change, and others which are not.

Therefore, in terms of the territorial division of the population, which is not without consequence on households turning to means of transport such as the car, and thus on greenhouse gas emissions, the significant demographic growth in large rural areas seen over the last few years could lead to an increase in greenhouse gas emissions. On the other hand, the revival of town centres could lead to a degree of densification that allows the negative effects of urban dispersion to be reduced in terms of transport-related greenhouse gas emissions.

Likewise, the drop in economic growth because of the global crisis automatically leads to a reduction in greenhouse gas emissions. While this could be seen as a plus for meeting the commitments undertaken by France within the framework of the Kyoto protocol, or at Community level, this same crisis may lead to the absence of a countercyclical policy for a lack of investment by companies and households causing an increase in emissions in the medium to long term.

Within the field of demographics, the number of households is tending to grow faster than the population: +1.24% per year on average for the number of households between 1975 and 2005 as against +0.48% for the population. The average number of people per household is in fact tending to drop: equalling 2.9 in 1975, it was only 2.4 in 1999 and 2.3 in 2005. This increase in the number of households is not without a direct influence on the need for housing and

on the energy consumption from housing and transport.

Furthermore, while, according to the last CORINE (coordination of information on the environment) biophysical inventory, Land Cover 2006, mainland France is primarily covered by agricultural land (60%) and forests and other semi-natural spaces (34%), changes between 2000 and 2006 extend those of the 1990s. In other words, agricultural land continues to shrink, mainly to the profit of artificially-created spaces. The part comprising forests, wetlands, other natural environments and extensive agricultural lands, such as meadows, has seen its area diminish in all regions between 2000 and 2006. The resulting artificialisation of land is generally accompanied by its being rendered waterproof. The consequence is an increase in runoff which in turn increases the risk of floods, by increasing water levels and the speed at which they appear after rainfall.

In the energy sphere, the growth of renewable energies combined with a stagnation in final energy and non-energy consumption seen since 2001 seems to herald a new era in energy systems. Nevertheless, due to the ambitious objectives to be met, it is necessary to strengthen actions.

The observation is the same in the area of residential sector heating consumption. Residential sector energy consumption has clearly reduced since 2001, by 4% between 2001 and 2006 due to the 7.5% drop in heating-related energy consumption, and this despite an increase in housing of 6%.

In the transport sphere, greenhouse gas emissions from the transport sector have stabilised over the last two years thanks to the reduction in average speeds and an improvement to the nature of new vehicle stocks. For the time being, these positive impacts counterbalance the growing passion for more polluting vehicles and the increase in the number of vehicles.

Lastly, France is the number one tourist destination in the world with regard to the first indicator adopted by the World Tourism Organization, the number of foreign tourist arrivals, i.e. foreigners spending at least one night in France. In 2007, France therefore held the record with 82 million arrivals. This advantage for France is accompanied by increased transport requirements.

B. Information relating to the GHG inventory, including information on the national inventory system and the national register

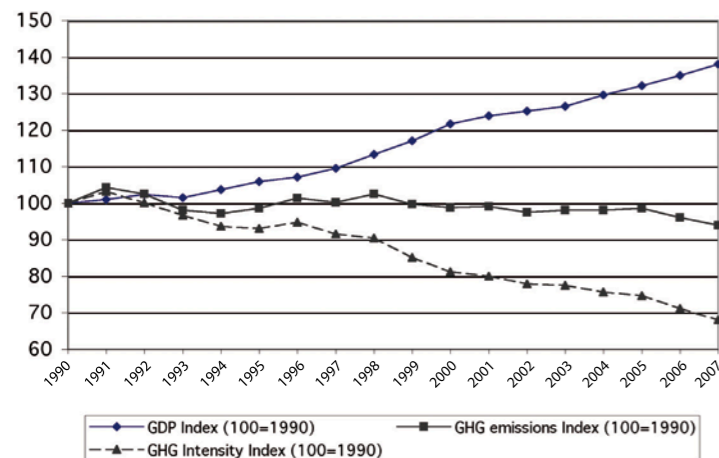
The reference emissions for the French commitments under the Kyoto Protocol (mainland and overseas departments) were set at a level of 563.9 Mt CO₂-eq. Between 1990 and 2007, greenhouse gas emissions reduced by 5.6%, to reach 531 Mt CO₂-eq. in 2007. This reduction is explained in particular by:

- the low use of carbon and gas to produce electricity, in contrast to many other countries that have not developed a nuclear base like that of France;
- the major role played by hydraulic energy in our electricity production, France being the 2nd European producer of renewable energy; and
- one of the smallest car fleets.

Calculated on the basis of the Kyoto perimeter, CO₂ represents 397 Mt, i.e. 75% of national GHG emissions. In 2007, methane emissions rose to 54 Mt CO₂-eq. and represented 10% of French GHG emissions. As for N₂O emissions, these rose to 64 Mt CO₂-eq. and represented 12% of French GHG emissions. F-gases rose to 16 Mt CO₂-eq. and represented 3% of total French GHG emissions. While CO₂ emissions remained stable between 1990 and 2007, N₂O and CH₄ emissions reduced between 1990 and 2007 by 30% and 17% respectively. F-gas emissions increased by 64% between 1990 and 2007 despite the implementation of existing European directives (European Regulation Nos. 2037/2000 and 842/2006, Directive 2006/40/EC). However, the full effect of these measures will only be seen in 2020.

Amongst the activity sectors, transport is the highest emitter of CO₂, with a share equal to 35% of CO₂ emissions. 80% of methane is emitted by the agricultural sector. Agriculture is also the main sector for N₂O emissions with a share of 84% of total French emissions. The emissions are related to the increase in fertilisers and to enteric fermentation from animals.

Figure 2 : Disconnection of growth in the economy and greenhouse gas emissions (development of real GDP, GHG emissions and GHG intensity - 100 = 1990)



Sources: INSEE, emissions inventory, PNLCC format for Kyoto perimeter, CITEPA, 2009 submission, DGEC (General Directorate for Energy and Climate Change - MEEDDM)

The graph in Figure 2 highlights the growing disconnection between GHG emissions and the increase in France's GDP. The French economy is therefore becoming more carbon-friendly.

In accordance with Article 5.1 of the Kyoto Protocol, France has created a national inventory system: SNIEPA (National Inventory System for atmosphere-polluting emissions), defined by an Interministerial Decree of 29 December 2006.

MEEDDM (the Ministry for Ecology, Energy, Sustainable Development and the Sea) oversees its operation. To this end, it defines and divides the responsibilities attributed to the various bodies involved. These are allocated as follows:

- contracting for the creation of inventories and coordination of the entire system is overseen by the MEEDDM General Directorate for Energy and the Climate (DGEC);
 - other ministries and public bodies (the Ministry responsible for Agriculture - MAAAP, the Ministry responsible for the Economy, Industry and Employment - MINEIE, the Office of the Commissioner General for Sustainable Development - MEEDDM) contribute to the emissions inventories by making available the data and statistics used in drawing up these inventories.
- In relation to the creation of emissions inventories, the methods and preparations for their changes, the collection and treatment of data, archiving, the creation of reports and various media, and control and quality management has been entrusted by MEEDDM to CITEPA (Interprofessional Technical Centre for Atmospheric Pollution Studies).
- The Briefing and Consultation Group for Emission Inventories (GCIE),

comprised of the above-mentioned bodies, is charged with:

- giving advice on the results of the estimates produced in the inventories,
- giving advice on the changes brought to estimation methodologies,
- giving advice on the inventory improvement action plan for future dates.

With reference to the French national register, the Loans Fund was designated by Decree No. 2004-1412 to hold the register and to develop and secure the IT systems designed for its use. After all the compulsory tests organised by the United Nations Secretariat (rehearsals, coordinated testing) between May and August 2008, on 08/09/08 the French register received approval to connect to the International Transaction Log production environment.

C. Policies and measures

Expressed in action plans since 1995, then defined in an integrated manner in the National Programme for Combating Climate Change (2000), France's Climate Policy comes within the national strategy for sustainable development published in June 2003 and updated in March 2005. It is based on two pillars: mitigation (reduction of GHG emissions) and adaptation. The Climate Policy is expressed in the "Climate Plan 2004-2012", which is France's action plan for meeting its commitments in relation to the Kyoto Protocol. This plan is updated every two years in application of Article 2 of the Programme Law of 13 July 2005 on fixing the approaches for the energy policy.

The policy for combating climate change was finally strengthened at the end of October 2007 within the framework of the conclusions from round tables on "the Grenelle Environment Forum". The aim of cutting French emissions by four by 2050 (Article 2 of the Law of 3 August 2009, see above) was therefore reconfirmed.

In accordance with UNFCCC guidelines, the policies and measures implemented by France come within two categories:

- "existing" measures, which correspond to measures decided on before 1 January 2008; and
- "additional" measures, which correspond to measures decided on after 1 January 2008 and which are, in the main, a result of the Grenelle Environment Forum.

The MEEDDM has developed a tool in order to assess the impact of the policies and measures. It allows emission variations to be established in relation to a trend scenario by developing the input technical data (e.g. development of road

traffic, housing, building insulation) in accordance with the planned policies and measures. This tool (known as SceGES for Scénarisation des Emissions de GES = GHG Emissions Simulation) was created with the Ecole des Mines de Paris, CITEPA, design offices "Energies Demain" and "Solagro" and the INRA (National Institute for Agricultural Research). Evaluations made using SceGES are based on three principles:

- the emissions calculation methodologies used are compatible with those used to create the French national inventory, and the emissions are similar to those given by France to the United Nations within the framework of its international commitments on climate change;
- the calculation methodologies are updated every year in parallel to those for the national inventory, in order to guarantee consistency in the evaluations over time;
- the emissions calculations are based on the most detailed description possible of the technical stocks for most sectors of activity (description of housing in accordance with year of construction; description of vehicle fleet according to cubic capacity, vehicle age, engine size, road type; description of livestock for agriculture, etc). The evaluations presented below were calculated using this tool.

Following is a list of the only additional measures.

Residential-tertiary

The building sector is the biggest energy-consuming sector in France. It currently consumes approximately 68 million tonnes of oil equivalent, i.e. 42.5% of the total final energy. It generates 86 million tonnes of CO₂, i.e. 16% of national emissions. The annual heating bill represents approximately EUR 900 on average per household, with large differences that tend to increase in line with the rise in energy prices: annual expenditure can thus vary from EUR 250 for a "low consumption" house to more than EUR 1,800 for a poorly insulated house.

Thermal regulation 2010 (RT 2010): a new thermal regulation: from the end of 2012, all new constructions must show a primary energy consumption of less than 50 kWh/m²/year on average. This obligation has been brought forward to the end of 2010 for public and tertiary buildings, and for constructions built within the framework of the national urban renewal programme. From 2020, all new constructions must have a primary energy consumption lower than the amount of renewable energy produced in these constructions (positive energy buildings).

→ Impact: - 2.2 Mt CO₂-eq. in 2020 compared to maintaining the current thermal regulation (RT 2005) for the residential sector only.

"Sustainable development" tax credit: this system, which has been in existence since 2005, has been improved in order to speed up light thermal renovations: the tax credit has been extended to the end of 2012; it has been widened to rental housing, and now includes the labour costs for some works; it is centred on the best performing equipment and materials from an energy and environmental point of view.

→ Impact: - 3.78 Mt CO₂-eq. in 2020 with regard to ceasing the system at the end of 2008 and - 10.34 Mt CO₂-eq. for the system since 2005.

Zero rate eco-loan: the zero rate eco-loan constitutes one of the Grenelle Environment Forum's flagship measures. All private homeowners may benefit for projects in their main residences, including for co-ownerships and housing that is let. With a 10-year duration, which can be extended to 15 years by the bank, it allows the finance of up to EUR 30,000 of works to improve the building's energy efficiency. It can be held concurrently with other support systems, in particular "sustainable development" tax credits (subject to resources), aid from the national agency for habitat and territorial authorities, energy saving certificates and the zero rate loan granted for renovation acquisitions. The zero rate eco-loan constitutes a complete finance solution for thermal renovation.

→ Impact: - 4.10 Mt CO₂-eq. in 2020.

Renovation of State-owned buildings: all State-owned buildings and those of its public bodies must be subject to an energy performance assessment by 2010. The renovation of these buildings will be undertaken as of 2012 and will allow energy consumption to be reduced by at least 40%, and greenhouse gas emissions by 50% within 8 years.

Renovation of social housing buildings: the 800,000 most energy-consuming social housing buildings (French energy categories E, F and G) will be subject to works before 2020. To do this, an initial budget for loans at the very special fixed rate of 1.9% has been created for 2009 and 2010, permitting the renovation of 100,000 dwellings (40,000 in 2009 and 60,000 in 2010). The social housing renovation programme aims to enable the renovation of 70,000 dwellings each year between 2011 and 2020.

→ Impact: - 0.77 Mt CO₂-eq. in 2020.

Transport

Transport represents 26% of total French emissions, i.e. 138 Mt CO₂-eq. in 2007, with a high increase between 1990 and 2001 (+22%), which then stabilised. Road transport is responsible for 95% of these emissions, of which 54% is from private vehicles alone.

The Grenelle Environment Forum fixed the objective of reducing transport sector emissions to their 1990 level by 2020.

Development of alternative modes of transport: for the transport of goods, it is planned to modernise, and in some cases create new infrastructures to encourage the use of rail, river or sea transport. For passenger transport, 2,000 kilometres of high-speed rail lines will be built by 2020 and an additional programme for 2,500 kilometres will be defined; a programme will be implemented to bring reserved transport lanes outside the Ile-de-France to 1,800 kilometres by 2020 and a strengthened public transport programme in the Ile-de-France will be put into action.

Reduction in private vehicle emissions: the European Union has fixed the objective of reducing CO₂ unit emissions from private vehicles to 120 gCO₂/km. This objective will be met by implementing the European regulation on private vehicle emissions, for which agreement was obtained in December 2008, and by putting in place additional measures adopted at the beginning of 2009 within the framework of the regulation on general vehicle safety

Automobile bonus-malus: in place in France since January 2008, it encourages the purchase of vehicles that are less polluting in terms of CO₂. A purchase bonus is paid to purchasers of vehicles emitting less than 130 gCO₂/km. Conversely, a purchase tax (malus) applies to cars emitting more than 160 gCO₂/km.
→ **Impact: - 6 Mt CO₂-eq. in 2020 for all measures aimed at reducing private vehicle emissions.**

Development of biofuels: France has advanced the 2008 European objective on incorporating 5.75% biofuels to 2010 and has set new objectives: 7% in 2010 and 10% in 2015. To reach these objectives, an additional levy of the general tax on polluting activities (TGAP) paid by operators who fail to respect these incorporation objectives and a fiscal exemption system for the domestic tax on petroleum products (TIPP) for biofuels has been put into action.
→ **Impact: - 3.8 Mt CO₂-eq. in 2020.**

Mileage eco-tax for lorries: this will be implemented from 2011 for the use of the mainland State-controlled principal roadway network. It will allow the external costs of road transport to be taken into account.

Industry

In 2007, industry represented 23% of total French greenhouse gas emissions, i.e. 121 Mt CO₂-eq. This sector's emissions for 2007 were 18% lower than those for 1990.

The Grenelle Environment Forum confirmed France's support for

putting in place economic instruments such as the European emission quota exchange system for combating greenhouse gas emissions. It supports the auctioning of quotas and proposes a mechanism for combating carbon leaks. In parallel, the involvement of industrial players in Grenelle Environment Forum procedures means voluntary commitments.

Revision of the European Directive establishing an emission quota exchange system: since 2005, the directive has introduced a cap and trade system for emission quotas for the main European Union industrial and energy activities. The revision of this directive was adopted by the European Parliament and the Council in December 2008, under the French presidency, within the framework of the adoption of the energy climate package. This enables its scope to be widened, the methods for allocating quotas to installations to be harmonised and above all the objectives to reduce greenhouse gas emissions by sectors subject to this directive to be strengthened: on a European level, their emissions must be reduced by 21% between 2005 and 2020.

Renewable heat fund, tenders for the construction of power stations supplied from biomass, and the support fund for industrial demonstrators are also measures to encourage industrial players to reduce their greenhouse gas emissions.

Agriculture and forestry

Greenhouse gas emissions from the agricultural sector stood at 106 Mt CO₂-eq. in 2007, i.e. 19.8% of total French emissions if the agricultural combustion branch is included.

French forests represent a major CO₂ sink (72.3 Mt CO₂-eq. in 2007), which has been constantly growing since 1990.

The main undertakings of the Grenelle Environment Forum in the agricultural sector aim at reducing greenhouse gas emissions in relation to energy consumption by farms, in particular with an objective of 30% of low energy-dependent farms by 2013 and an aim to develop organic agriculture (rising from 6% of the useful agricultural land in 2010 to 20% in 2020).

The agricultural and forestry sectors will also be mobilised to meet Grenelle Environment Forum objectives in terms of developing renewable energies, which must also take into account environmental requirements.

Farm energy performance plan: this is based on three lines of intervention: reduction in energy consumption (agricultural tractors, livestock sheds, greenhouses, etc.); development of renewable energies (agricultural methanisation, biomass, etc.); and assessment of energy consumption and development of energy advice.

→ **Impact: In accordance with the work of the Grenelle**

Environment Forum, this plan will enable the agricultural sector energy consumption and the resulting greenhouse gas emissions to be reduced by 10% over the period 2008-2013 (i.e. 1 Mt CO₂-eq.).

Objective Earth 2020 plan: presented in February 2009, it provides for supporting the development of crop practices that will have a positive impact in terms of the reduction of greenhouse gas emissions (development of pasturage systems, relaunching the culture of legumes, planting hedges, etc.).

Forestry mobilisation: the work of the Forestry Conference and the Grenelle Environment Forum (2008) agreed on the possibility of mobilising an additional 21 Mm³ of wood per year, which will be used both for material and for energy production.

Energy

Emissions from the energy industry sector (electricity production, urban heating, refining) stood at 74 Mt CO₂-eq. in 2007, i.e. 13% of total French emissions.

Creation of a carbon tax: The challenge of the carbon tax is to encourage low-carbon behaviour and to stimulate innovation in green technologies. The carbon tax relates to energy products put on sale, used or destined to be used as fuel (heating or transport). This tax is calculated from a price per tonne for carbon set at EUR 17 in 2010: this is intended to be re-evaluated every year by an independent commission responsible for analysing its efficiency. The aim is, in the long run, to reach an adequate signal-price to allow France to meet our objectives in reducing CO₂ emissions for 2020 and the 2050 trajectory. Installations that are already subject to the directive relating to the greenhouse gas emission quota exchange trading system within the European Community will not be subject to the carbon tax.

Energy saving certificates: in existence since 2006, this system based on an obligation to make energy savings imposed on the main energy suppliers (electricity, gas, domestic fuel retailers, etc.) will be substantially reinforced. In particular, it will be extended to automobile fuel suppliers, and actions in favour of innovation, training and information will become eligible.

→ **Impact: - 2.9 Mt CO₂-eq. in 2020, before taking into account the increase provided for by the Grenelle Environment Forum.**

Implementation of the eco-design directive: an initial series of measures were adopted during the French presidency of the European Union: the removal of incandescent light bulbs (100W lights in 2009, 75W in 2010, 60W in 2011 and the rest in 2012), limit on equipment standby (applies to all electrical equipment used in the home or office for which the maximum consumption

is limited to 1W or 2W, depending on function, at horizon 2010 and 0.5W or 1W from 2013), limit on the consumption by simple digital decoders (their consumption will be limited to 1W from 2010, then 0.5W in 2012), reduction of street and office lighting over 2 stages (2010 and 2012), improvement in charger, external feed and electric charger performance (before 2010, manufacturers must come in line with the best performing products existing today, and in 2012 must have reviewed the design of their products).

→ **Impact: - 1.60 Mt CO₂-eq. in France just for the withdrawal of incandescent light bulbs.**

Development of renewable energies: This programme (November 2008) aims to bring the share of renewable energies in energy consumption at horizon 2020 to at least 23%, thanks to an increase of 20 million tonnes of oil equivalent (Mtoe) in the annual production of renewable energy. It comprises 50 operational measures that concern all branches: bioenergies, wind power, geothermics, hydroelectricity, solar power, sea energies, etc. It aims for a complete change of scale: doubling the production of renewable energies over 12 years, increasing wood-energy production by 2, geothermics by 6, heating networks by 12 and a major change of scale for photovoltaics with production increased by 400.

In particular, this programme provides for:

- the creation of a "Renewable Heat Fund", of EUR 1 billion for the period 2009-2011. It aims to sharply develop heating production in the tertiary and industrial sectors, from renewable sources such as wood, geothermics or solar power, and to improve and diversify the heating sources in collective housing. This fund will enable financing dedicated to these energies to be increased by 4 to 5;
- with regard to taxation: the "sustainable development" tax credit, which will support in particular the purchase of renewable energy equipment by private individuals: solar water heaters, heat pumps, solar panels, etc. is extended until 2012;
- with regard to biomass: launch of a new "Biomass 3" tender in January 2009 for the construction by 2012 of power stations supplied from biomass, for a cumulated power of 250 MW (after the success of the last tender, which enabled 22 projects to be adopted for total power of 300 MW);
- with regard to geothermics: increase energy production from geothermics by 6 in 2020, by equipping 2 million homes with heat pumps and relaunching programmes on a large scale in the Ile-de-France, Alsace, Aquitaine, Midi-Pyrenees and Centre;
- with regard to wind power: for land-based wind power, the Ministry of Ecology, Energy, Sustainable Development and the Sea has on one hand confirmed the purchase price and on the other undertaken steps aimed at improving regional

planning, statutory frameworking and local consultation in order to avoid regional fragmentation and limit the impacts on the countryside, heritage and the quality of life for residents. The development of sea-based wind power will be made easier thanks to a simplification in procedures and the creation of a consultation and planning authority per coastline with all parties involved;

- with regard to solar power: in order to strongly revitalise the French market, to speed up research and to build a veritable solar industry in France, the following measures have been announced: launch of a tender for the construction by 2011 of at least one solar power station in each region of France, for a cumulated power of 300 MW, setting up a simplified tariff support system and offering long-term visibility. Creation of a tariff of 45 eurocent/kWh destined to ease deployment of solar panels in professional buildings (supermarkets, industrial buildings, large-scale farms, etc.), drastic reduction for private individuals of the administrative procedures and elimination of all taxation procedures when the area of the panels does not exceed 30 m², extension to all territorial authorities of the benefits of purchasing tariffs for electricity produced from renewable sources;
- with regard to hydroelectricity: the first source of renewable electricity in France (12% of electricity produced), the existing plant will be modernised and optimised within a sustainable development approach;
- with regard to research: an unprecedented research effort will be granted in relation to renewable energies, thanks to the additional budget of EUR 1 billion for research into the field of sustainable development, of which EUR 450M is for an industrial demonstrator support fund. A call for projects for projects was launched in 2009 in the field of solar energy, and then in the field of marine energies (underwater turbine generators, etc.).

Waste

Emissions relating to waste management represented 10 Mt CO₂-eq. in 2007, i.e. around 2% of total French GHG emissions (as opposed to 12 Mt CO₂-eq. in 1990).

The Grenelle Environment Forum has strengthened France's policy regarding waste. The Programme Law of 3 August 2009 on implementing the Grenelle Environment Forum (Grenelle Law I) reaffirms the priority of the waste prevention policy. In particular, it provides for the following objectives:

- reduce household and assimilated waste production by 7% per resident over the next five years;
- increase material and organic recycling in order to steer these branches towards a rate of 35% in 2012 and 45% in 2015 for household and assimilated waste, as against 24% in 2004, this rate being brought to 75% from 2012 for household packaging waste and corporate waste excluding building and public works,

agriculture, food processing industries and specific activities.

→ **Impact: - 2 Mt CO₂-eq. in 2020, of which 1.9 Mt are due to savings made via a reduction in the amount of waste incinerated and 0.1 Mt CO₂-eq. to savings made in the fields of recycling, composting and methanisation.**

Amendments to taxation on waste storage and incineration plants: the general tax on polluting activities (TGAP) will be modified in order to encourage the prevention and recycling of waste. It will also be adjusted in accordance with the environmental and energy performance of installations.

Creation of compulsory incentive pricing for financing the elimination of waste: the charges and tax for household waste collection must, within 5 years, include a variable part that can take into account the type, weight, volume or number of waste collections.

Strengthening awareness-raising actions: ADEME credits devoted to the waste policy will be doubled from 2009 and will be increased from EUR 55M in 2008 to EUR 259M in 2011. They are aimed at prevention as a priority, in particular with a new aid system for authorities who define local prevention plans and programmes. Furthermore, a new triennial national communication campaign about waste will be launched in 2009.

Public and territorial authorities

With regard to territorial authorities, the Grenelle Environment Forum provides for the creation of a new legislative framework in the field of urbanism and town and country planning, highlighting their major role in controlling greenhouse gas emissions. Regional climate energy plans must be generalised and will become compulsory, and adaptation to climate change and the control of energy will be integrated into town and country planning objectives.

The **regional section** of the climate policy proposed by the Grenelle Environment Forum is based in particular on:

- the creation of regional schemes for the climate, the air and energy, which guarantee a regional coherence in the actions taken by territorial authorities in the climate and energy spheres, and which will connect regional objectives to national ones;
- the regional climate energy plans that will become compulsory for all territorial authorities with populations over 50,000.

D. GHG emissions projection and quantification of the impacts of policies and measures

D.1 Results of the 2010 and 2020 projections

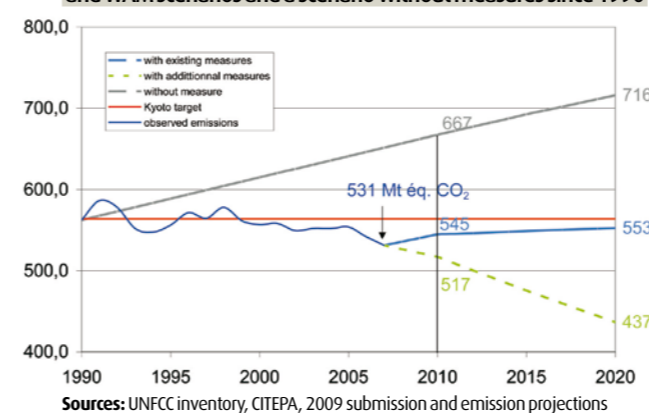
The government has constructed three projection scenarios at horizon 2010 and 2020 in order to assess the impact of the policies and measures:

- a "without measure" (WM) scenario, which represents the development of French emissions if no measures had been taken since 1990; in accordance with the UNFCCC guidelines, it will serve to estimate the total effect of the policies and measures;
- a "with existing measures" (WEM) scenario, which evaluates the emissions taking into account measures decided on by 1 January 2008 at latest;
- a "with additional measures" (WAM) scenario, which evaluates the emissions taking into account, in addition to existing measures decided on after 1 January 2008.

Within the framework of the WEM scenario (see Figure 3), French emissions in 2020 (Convention, Mainland, Overseas Departments and Collectivities perimeter) will be 553 Mt CO₂-eq., i.e. a reduction of 2.2% in relation to 1990 (565.4 Mt CO₂-eq. - Convention perimeter); the Kyoto objectives for the period 2008-2012 have been respected. Within the framework of the WAM scenario, they reach 437 Mt CO₂-eq. in 2020, i.e. a reduction of 22.8% in relation to 1990. According to the WM scenario, the new emission rate would be 667 Mt CO₂-eq. in 2010, and 716 Mt CO₂-eq. in 2020.

These assessments have been confirmed by a Boston Consulting Group study.

Figure 3: GHG emission projections (in Mt CO₂-eq.) for France, within the Convention perimeter in 2010 and 2020 for the WEM and WAM scenarios and a scenario without measures since 1990



The analysis of projected emissions per sector of activity shows that:

- the measures existing before 1 January 2008 allow the growth of emissions (energy industry) to be stabilised (or slowed) in almost all sectors of activity, but that it is necessary to supplement these measures, in particular for the residential/tertiary and transport sectors;
- the implementation of additional measures (Grenelle Environment Forum measures) and measures existing before 1 January 2008 must lead to:
 - a halving of the residential/tertiary sector emissions in 2020 compared to the 1990 level,
 - stabilisation of the transport sector emissions at the 1990 level,
 - a reduction in emissions from the agricultural sector, industrial processes and waste treatment of 15%, 20% and 29% respectively.

D.2 Projection sensitivity analyses

WAM scenario sensitivity

Within the framework of the WAM scenario, we see a reduction in total GHG emissions of 22.8% between 1990 and 2020. These results reflect France's ambition in terms of combating climate change and in particular the ambition of the objectives set within the framework of the Grenelle Environment Forum. They are also in line with the EU's aim to reduce its GHG emissions by 20%, as defined in the energy climate package, and even to reach -30% in its GHG emissions between 1990 and 2020 in the event of a satisfactory international agreement.

Nevertheless, the actual achievement of this ambitious result remains dependent in particular on:

- maintaining a fast rhythm across the entire period of renewal to existing buildings;
- maintaining powerful incentive tools that support this renewal rhythm;
- the actual capacity for adaptation of the branches and sectors (innovation, technological breaks, etc.) which will permit the costs to be reduced (renewable energies for example);
- the level of mobilisation of all players and the efficiency of the accompanying systems (training, changes in behaviour, etc.).

Sensitivity to the current economic crisis

The GHG emission projection scenarios for France "with existing measures" and "with additional measures" are based on the hypothesis of an increase in Gross Domestic Product (GDP) of +2.1% per year over the period 2008-2020. These scenarios do not therefore take into account the

impact of the financial and economic crisis which has hit France and the rest of the world since mid-2008. However, despite the continued drop in GHG intensity in French GDP since 1990, a brutal slowdown of economic activity will certainly lead to a drop in France's GHG emissions at least in the short term. Within the MEEDDM, the General Commission for Sustainable Development (CGDD) has led a study on modelling the short-term determining factors in the development of emissions in France. This study highlights the impact of the slowdown in economic growth in 2009 on CO₂ emissions. Taking into account the scale of the impending recession, CO₂ emissions must slow down significantly. For climatic conditions comparable to those seen in 2008, the level of CO₂ emissions in 2009 could, according to this estimate, be within a range of between -6% and -8% (i.e. -23 Mt CO₂-eq. to -31 Mt CO₂-eq.) compared to the emissions for 2008. Other estimates point to the idea of a 2009 emissions level lower than that for 2008.

The study also shows an increase in emissions in 2010 and 2011 which is linked to the restart in growth and the increase in GDP for these years, but also to a delayed GDP effect, with a negative impact. This late but negative GDP impact means in particular a risk of a rebound effect on greenhouse gas emissions in the event of a drop in investments

D.3 Quantification of policies and measures

The impact of all GHG in 2020 with the existing measures is 163 Mt CO₂-eq. compared to the emissions level reached in the "without measure" scenario. The impact of the additional measures in 2020 equates to 116 Mt CO₂-eq. compared to the emissions level reached with the existing measures scenario. These evaluations remain dependent on the vigilance and sensitivity points outlined above.

E. Impacts, vulnerability and adaptation

E.1 Changes seen and trends

In France, the rise in average temperatures is very clear. From the end of the 1980s, average temperatures have risen rapidly. The Overseas Departments have seen a similar trend.

The consequences of the change in climatic conditions will be felt in several areas. The French Alpine glaciers have seen a have shrunk, and the glaciers in the Pyrenees are showing the same trend. For example, over 6 years the Ossue glacier has lost approximately 10.6m in thickness across its entire area.

The fauna and flora are also affected by these changes. The influence of global warming on vine maturity dates and thus the dates for the grape harvest is well known, but fruit trees are also seeing a variation in their growth cycle. We are also seeing changes in the behaviour of birds, in particular in relation to migrations. Gross numbers, such as the moving average, clearly show an increase in the population of greylag geese over-wintering since the beginning of the 1980s, and this increase has sped up since the middle of the 1990s.

E.2 Predicted impacts of climate change

Since March 2007, the MEEDDM, with the aid of various ministerial departments (MAAP, Health, DIACT) has set up an interministerial working group for assessing impacts, adaptation and associated costs. From a methodological point of view, the impacts have been assessed by comparing climate models at horizons 2030, 2050 and 2100 (created by Météo-France and the Institut Pierre Simon Laplace) and the results from impact models or the feedback from experiences for mainland France.

The main conclusions of this work, in relation to impacts, are as follows:

Water: if we consider the demand for water as being stable, a deficit of 2 billion m³ in meeting the current needs of industry, agriculture (irrigation) and drinking water supply will be seen at horizon 2050, especially in areas that are already showing a deficit.

Health: the 2003 heatwave in France led to an abnormally high death rate, totalling at 14,800 people. Conversely, in 2006, no significant incidents were detected in terms of mortality. The "Heatwave Plan" created by the Ministry for Health and Sports thus allowed the effects to be prevented.

Agriculture: the growth models for field crops show an increase in yield for France in response to climate change but without taking into account the effects of extreme events. In the case of meadows, while the northern half of France will see an increase in yield, they will show increased vulnerability in the peri-Mediterranean area.

Forestry: in the short to medium term (up to 2030 or 2050, depending on the scenario), the impact of gradual climate changes on wood production will be more or less positive, with economic benefits that could reach EUR 150M per year.

Nevertheless, in the long term (up to 2100), effects will be clearly negative, because of more frequent extreme events and the spread of the Mediterranean forest.

Transport infrastructures: the French road network behaved well overall in the face of the 2003 heatwave, even though localised problems were observed. As a result of France's vast coastline, the road network is vulnerable to temporary or permanent submersion due to a rise in sea level.

Energy: the increase in temperatures will lead to a reduction in heating requirements, but it will increase the demand in relation to air conditioning. At horizon 2100 a drop in national energy consumption of over 3% is predicted, in comparison to the current situation and based on the hypothesis known as "constant economy".

Biodiversity: an economic assessment of the loss in biodiversity, based on the concept of ecosystem services, applied to coral ecosystems and non-goods services provided by forests, shows clearly negative impacts.

E.3 Adaptation

On 13 November 2006, the government adopted a **national climate change adaptation strategy**. It sets out four major aims: the need to act for safety and public health; the inclusion of social aspects and inequalities in the face of hazards; limiting costs and the possibility of taking a share of the benefits; and the preservation of natural heritage. The above-mentioned **interministerial group for assessing the impacts of climate change** has also identified several adaptation measures in the various thematic fields covered. Thus for agriculture, for example, it is recommended that new irrigation techniques are developed for viticulture.

Further to the Grenelle Environment Forum, a vast consultation plan on adaptation will be undertaken at the end of 2009 in order to allow a **national adaptation plan** to be drawn up **by 2011**.

The action of territorial authorities in terms of adaptation was also strengthened within the framework of the Grenelle Environment Forum: adaptation has already been included within the framework of State-Region project contracts (CPER). However, regional climate, air and energy plans must encompass a specific section devoted to adaptation, and territorial climate energy plans will include measures aimed at both mitigation and adaptation.

F. Financial resources and transfer of technology

As part of its commitments (Articles 4.3 and 4.5 of the Climate Convention) France undertook to facilitate transfers of technology to emerging and developing countries, in particular by providing "new and additional" financial resources. In order to meet this objective, France is supplying financial aid and technological cooperation via several bilateral and multilateral channels, and in particular via aid for development. Therefore, France's actions in terms of funding and transfer of technologies operate on several levels, and involve numerous players and multilateral institutions: territorial authorities, businesses and the private sector.

F.1 Public aid for development – bilateral cooperation

France is a major player in bilateral aid for development within the climate field with a very wide scope for intervention, an acknowledged level of expertise and a substantial financial commitment (approximately EUR 800M in 2008). The main player in French aid, especially in relation to the environment, is the French Development Agency (AFD). Another operator is the French Global Environment Facility (FFEM). In detail, the climate-related undertakings of the AFD group have been constantly increasing since 2005, regardless of the number of projects or the amounts: in 2008, 34 emissions limitation projects benefited from aid to the weighted¹ amount of EUR 735M. This represents an increase of 63% in the amounts committed to combating climate change, compared to 2007.

F.2 Public aid for development – multilateral cooperation

The financial resources set aside by France for multilateral aid represented more than EUR 2.5bn on average over 2005-2008. This amount reached EUR 3bn in 2008. This aid was allocated via multilateral development banks, the European Union and the United Nations. On average, France is the fourth-largest backer of multilateral development institutions and these multilateral contributions represent almost one-third of all French aid for development over the period 2005-2008. France was one of the States behind the creation of the Global Environment Facility (GEF), which is the main multilateral instrument for the preservation of the world's environment. France is the fifth-largest contributor to the GEF and will fund it up to EUR 164M between 2007-2010 (including the participation in the less-developed countries fund – LDCF – managed by the GEF). Since its creation, the GEF has financed

¹ When combating climate change is the main aim of a project, 100% of the amount committed by the AFD is included in the total indicated. When combating climate change is a secondary objective, 40% of the amount committed by the AFD is included.

approximately USD 2.7bn for projects helping to combat climate change and currently funds approximately USD 250M for climate-related projects per year.

Furthermore, the Directorate-General for the Treasury and Economic Policy of the Ministry for the Economy, Industry and Employment funds:

- **the FASEP-Studies:** The projects financed by FASEP that are having a positive impact in combating climate change are estimated on average at nearly EUR 5.3M per year between 2001 and 2008, representing a total of 76 projects. The amounts of financial assistance are between EUR 150,000 and 700,000, with an average of EUR 500,000.
- **the Emerging Countries Reserve (RPE)** is an aid credit (i.e. concessional) aimed at projects participating in the economic development of borrowing countries. The credits granted since 2000 involved 62 projects in 22 different countries, for total finance of almost EUR 2.4bn. The main sectors concerned are, in total, transport (65% of credits), water and the environment (20%), other services and health (10%), energy (3%) and industry and agro-industry (2%). The amount of projects participating in the reduction of GHG emissions that benefited from RPE finance rose on average to almost EUR 130M per year between 2001 and 2008 (15 projects in total) or EUR 55M when weighting these figures with the Rio markers.

F.3 French technological cooperation outside public aid for development

In addition to the bilateral and multilateral channels for public aid for development, France is also committed to several international projects and forums that generate technological cooperation on a grand scale.

On a bilateral level, this cooperation is through work with Africa in particular, but also with large emerging countries such as Brazil or China. Likewise, the French territorial authorities are very active in the technological cooperation field, and are committed to several projects and initiatives.

On a multilateral level, it is via large international energy partnerships, such as the International Energy Agency, of which France is a member, but also wide-scale multilateral treaties, and at the top of the list are those of the UNFCCC.

Two of the large projects in which France has invested are:

- **IRENA (International Renewable Energy Agency)** Launched during a conference that brought 125 countries together in Bonn on 26 January 2009, IRENA aims to promote the use of all renewable energies throughout the world in order to combat climate change, ensure energy security and

enable access to energy by populations in developing countries.

■ the IPEEC (International Partnership for Energy Efficiency Cooperation)

Further to the work of previous G8 summits in terms of energy efficiency (Gleneagles, Saint Petersburg, Heiligendamm), on 8 June 2008 in Aomori, Japan, the G8 Energy, widened to India, China and Korea (G8+3 format), adopted a declaration creating an international partnership for energy efficiency cooperation (IPEEC). Within the framework of the IPEEC, the parties have undertaken to:

- develop national indicators in terms of energy efficiency, compile best practices,
- adopt measures likely to improve energy efficiency significantly, on sectoral and multi-sectoral bases.

An analysis was carried out by French teams in 2008² on patent applications for inventions and associated transfers of technology occurring between 1978 and 2003 in seven renewable energy categories³, and six other fields contributing to the reduction of GHG emissions⁴, as well as on transfers of technology⁵. These revealed that France comes 7th among all the developed countries, with 2.4% of all 3rd-level patented inventions in the world in relation to the export rate for new climate technologies.

G. Research and observation

G.1 Research

French climate research strongly contributes to the advancement of knowledge in several fields: from refining climate models, in order to produce data on more operational scales for the various disciplines involved in locating and managing impacts (confirmed or potential), to technological research, which develops systems for adaptation to and mitigation of climate change. All these fields of research currently benefit from a central position in France's research priorities, both for long-term aims and for the implementation of suitable responses in short spaces of time.

National research agencies

In order to find better synergy between public and industrial research, France created a new support mechanism for the best public and private laboratory projects and for innovation. This mechanism included the creation in 2005 of the National Research Agency (ANR), the Industrial Innovation Agency (AII) and the

OSEO-ANVAR. The action of these three agencies comes within a long-term policy: the budget of EUR 350M in 2005 will grow to EUR 2.5bn in 2010. The three agencies participate in financing 66 competitiveness centres that were recognised in 2005, and supplement the joint action of the Environment and Energy Management Agency (ADEME), the Ministry for Ecology, Energy, Sustainable Development and the Sea (MEEDDM) and the ministry in charge of research, in order to define the approaches for national research programmes. The ANR plays a central role in climate research. The global amount of research credits it devoted to financing its 20 research programmes on the themes "Sustainable Energy and the Environment" and "Ecosystems and Sustainable Development" over the period 2005-2008 reached approximately EUR 560M, allocated to 766 projects (i.e. a budget of nearly EUR 860,000 per research project). It can be estimated that approximately 60% of these directly relate to the climate problem, i.e. EUR 330M over this period (over EUR 80M per year)⁶.

Financial commitment by the French State

The State's financial commitment in terms of climate research for 2008 can be assessed at EUR 1.12bn, and at 1.4bn for 2009, via all the public aid in various themes of climate research. Furthermore, the Programme Law of 3 August 2009 on implementing the Grenelle Environment Forum provides for the mobilisation by the State of an additional EUR 1bn by 2012 in relation to research into sustainable development, in particular on climate change, future energies and engines, biodiversity, the impact of the environment on health, and technologies relating to the treatment of waste and recycling. This increasing budgetary undertaking by France includes, in accordance with the commitments of the Grenelle Environment Forum, budgets for "resources agencies" devoted to climate change research; these budgets have been and continue to be significantly increased⁷. This budgetary dynamic has also enabled the creation of an innovative mechanism illustrating the strength of France's commitment to environmental research: the Research Demonstrator Fund. Managed by the ADEME, this fund has a budget of EUR 325M over the period 2009-2012, and aims to reveal new projects relating to new energy technologies. With regard to energy management, a 5-year building-energy research programme (PREBAT) financed by the MEEDDM and the ministry for research was set up in 2005. Focused on controlling the energy in buildings, this programme puts its efforts into two directions: the modernisation of existing buildings and the construction of new buildings with high energy performance. The budget allocated to PREBAT was EUR 6M in 2006, and 15M from 2007 up to 2010.

French research structure

One of the great original features of the French research system is that it presents an extremely diverse organisation of its players, comprising university teams, agencies, national research bodies and applied research.

Private research is assured by companies via their own research structures. The State strongly supports private initiative in terms of research, via 4 main mechanisms⁸:

- the Research Tax Credit (CIR), which aims at stimulating R&D expenditure by companies located in France. The 2008 reform has simplified the system: the rate of tax credit applied to the volume of R&D expenditure is from 30% up to EUR 100M (50% the first year and 40% the second). Beyond that, companies benefit from a tax credit of 5%, with no ceiling. The 2008 State fiscal debt in relation to CIR has been estimated at EUR 4bn. In addition, CIR has given rise to advance refunds to companies by the State, within the framework of the government's relaunch plan. In 2008, the reform of this mechanism permitted a general and clear rise in corporate R&D expenditure;
 - support for competitiveness centres has enabled the deployment of a total of 645 projects since 2005. These projects represent an R&D expenditure amount of almost EUR 3.6bn, mobilising 13,000 researchers and public funding of approximately EUR 1.3bn (of which more than 830 million is from the State);
 - support for industrial foundations, following the example of the Building-Energy Foundation, instituted by 4 major players in the building and energy sectors (Arcelor, EDF, GDF Suez and Lafarge). In addition to the research programmes supported by the State, and in particular the PREBAT, this foundation aims to financially support, for at least five years, research operations as well as funding the assessment of supported work and increasing its value. It possesses a budget of EUR 8M, of which half is provided by the State;
 - support for innovation by small and medium enterprises (SME) and very small enterprises (TPE) through the OSEO agency.
- OSEO is a public institution responsible for supporting innovation and the growth of SMEs by simplifying their access to private and public funding. Its action consists in allocating direct aid for innovation against the risks taken in relation to the development of innovation programmes with a technological component. Its budget dedicated to innovation is EUR 300M per year. Only its activities in aiding innovation and guaranteeing bank loans benefit from State and regional contributions.

G.2 Systemic observation

France participates in the Global Climate Observing System (GCOS). This climate observing programme comes under the aegis of the World Meteorological Organisation (WMO, website: www.wmo.int/pages/prog/gcos), the International Council for Science (ICSU), the International Oceanographic Commission (IOC) and the United Nations Environment Programme (UNEP). The aim of the GCOS National Communication is to verify that the French system allows the climate to be monitored (spatial resolution, temporal frequency, operating status) and respects the scientific aspects relating to the

2. Mines ParisTech, CERNA, AFD, Innovation and distribution in technologies aiding the fight against global warming on an international level, December 2008.

3. Wind power, solar power, geothermics, marine energy, biomass, hydroelectricity, energy produced from waste.

4. Methane destruction, CO2 emission reduction processes for cement manufacture, energy efficiency in buildings, injection motors, low-energy lighting, carbon capture and storage.

5. The study is based on the PATSTAT international patent database, jointly developed by the European Patent Office and the OECD.

6. These statistics are taken from the ANR activity reports, in which the amount has been validated by the Directorate-General of the ANR.

7. Source: Document de Politique Transversale 2010 (2010 Cross Policy Document), MEEDDM/DLCE, October 2009.

8. Source: 2009 draft monitoring report for the national reform programme.

Climate Convention (Rio, 1992) and the Kyoto Protocol (1997). In December 2007, COP 13, which met in Bali, decided to revise the “UNFCCC guidelines for establishing relationships between global climate change observing systems”. These new guidelines have been taken into account by France when drafting its fifth national communication.

Météo-France occupies a central position in the systematic observation mechanism because of its history, its links with the WMO and its territorial location. This organisation represents France in all European and international arenas intended to deal with climate observation. The main elements of this French contribution are described below.

The meteorological observation mechanism managed by Météo-France comprises 6 GSN surface stations on the mainland (the daily data is regularly supplied to the World Climate Centre in Asheville (USA) in the form of CLIMATE messages) and 14 stations for the Overseas Collectivities. At altitude, the network comprises 9 GUAN stations overseas. The GCOS monitoring principles have been integrated into the Météo-France quality management system (“observation” task). Lastly, an important action in backing up old and long-term data has been undertaken, especially for the Mediterranean (MEDARE project).

With regard to atmospheric chemistry, the RAMCES network developed by the Laboratory of Climatic and Environmental Sciences (LSCE (Atomic Energy Commission)) enables the CO₂ report to be calculated for a region or a continent. France also contributes to the following European projects: The GEOMON project (Geophysical Fields Monitoring, <http://geomon.ipsl.jussieu.fr>), which involves measuring GHGs, atmospheric pollution, aerosols and the stratospheric ozone; the MACC project (Monitoring Atmospheric Composition and Change) following on from GEMS (2005-2009), building an assimilation and prevention system for these components (including reactive gases); and finally the pan-European ICOS system (www.icos-infrastructure.eu), a composite (towers, planes, satellites) GHG observation that must allow maps to be drawn up daily for CO₂ and other GHG concentrations.

For the ocean component, the contribution comes within the MERCATOR project, with its Coriolis observational component (<http://www.coriolis.eu.org>), which includes data bases from various sensors (buoys, ARGO profilers, XBT probes, etc.). Lastly, France participates in the GLOSS sea level observation network and in the moorings for the tropical Atlantic PIRATA project. For the land-based sphere, France participates in the international Fluxnet programme, which has 6 sites for measuring CO₂ flows in ecosystems, with the following organisations: INRA, CNRM, LSCE, etc. Finally, in terms of spatial observation, the National Centre for Spatial Studies (CNES) has made major commitments

to the specific CEOS (Committee on Earth Observation Satellites) response at GCOS implementation level.

With reference to GCOS in Africa, the AMMA international experience, backed by France, has enabled a complete observation network to be restarted in West Africa. Various projects (RIPIECSA, AMMA2) are working to perpetuate these networks, while conferring their management to African institutions.

H. Public education, training and awareness-raising

At the request of SOeS (CGDD/MEEDDM), Crédoc has, since 1994, monitored French opinions on the actions that the State must take as a priority in order to protect the environment. Global warming was entered onto the list of subjects given to the people interviewed in 2007. When we asked the French public at the beginning of 2007 “what are the two actions that the State must take as a priority in order to protect the environment?” they put combating global warming in first place at 46%. In 2009, three-quarters of European citizens confirmed that they take the problem of climate change very seriously (74%). 81% of the French themselves all acknowledge that this problem is very serious (Eurobarometer).

H.1 Education-Training

Education on the environment for sustainable development (EEDD) has become a priority for French education system, which in 2004 wanted to this to be generalised as of primary school level, in line with the environment charter. This charter, which was entered into the Constitution since 2005, sanctions the place of environmental issues, and in particular environmental education and training, in the main principles of the French Republic. This means raising the awareness of children about protecting the environment in their everyday actions, and giving them a sense of responsibility over the way they act and consume, in order to make them aware of their roles as citizens. This strategy is based on multi-disciplinary education tools that are part of school and establishment projects.

The implementation of the Grenelle Environment Forum, especially in the renewable energy, building and thermal renovation sectors, could create numerous jobs by 2020, in particular in the building sector. Consequently, the training of a qualified labour force is henceforth a priority. Of the 220,000 jobs related to energy efficiency in 2007, 98,000 were devoted to residential improvements, of which 87,000 were for insulation alone. All trades will be mobilised, from finishing-stage craftsmen and

technicians from CAP (Vocational Training Certificate) to Bac+2 (Baccalaureate + 2 years additional study, roughly equivalent to HND) level, to sales representatives able to offer and advise clients on the full offer available. A study by the National Association for Adult Education (Afp) showed that in 2008, 52% of the working population were interested in training related to these trades.

H.2 Raising awareness

On 5 June 2009, the MEEDDM, with the support of the ADEME, once again launched a national mobilisation campaign in favour of energy management actions and raising awareness about climate change. This new campaign, which targets private individuals as well as professionals, aims to explain the measures resulting from the Grenelle Environment Forum around a **central message: “We can act today. Why wait?”**. This comes within an extension of the “Let’s be quick, it’s heating up!” campaign launched in 2004. With a three-year duration, it is based on a full media system: television, radio and internet announcements, local information via the Info-Energy Areas network, dedicated website (www.faisonsvite.fr), and land partnership operations via the “Planète gagnante” (“winning planet”) club. This campaign aims at showing that every citizen can act at any time and in any situation, and is based around four moments in life that correspond to our everyday lives: “finding accommodation”, “equipping oneself”, “getting about” and “everyday consumption”. Each message therefore relates to a moment in life and a behaviour, and highlights the double benefit of action, from a financial point of view (“I save energy, therefore I save money”), and in terms of quality of life (“I emit less greenhouse gas, therefore my environment is healthier”). Market research and statistics highlight marked changes in behaviour and an increase in the sale of low-energy appliances (purchase of solar panels, condensing boilers, low-energy light bulbs, high-performance household appliances, etc.) since the first “Let’s be quick, it’s heating up!” campaign. Two years after the conclusions of the Grenelle Environment Forum, the MEEDDM is launching the “tomorrow’s world” campaign. This campaign comprises a manifesto that will be published in every national newspaper and magazine and a 30-second film broadcast on all major television channels. The aim of this campaign is to continue to convince French citizens that they must change their lifestyles and that it is up to every one of us to act.

Furthermore, over the last few years, France has expanded the **energy labels** for household appliances, which have been obligatory since 1994 under a European directive. In 2007, 79% of the French public who knew of them considered that they had a major influence on their choices. In relation to buildings, a key sector in combating climate change, France created a regulation in 2006 making an Energy Performance Survey compulsory. **The CO₂ label for private vehicles**, compulsory by Decree since 10 May 2006 for new vehicles, has allowed the awareness of potential

buyers to be raised by providing them with information on the CO₂ emissions and fuel consumption of the vehicle concerned. Following on from the energy labels applied to cars, household appliances and even buildings, large-scale distributors have developed a **“carbon label” for food products**. Consequently, in 2009, major names in commerce and distribution, the Federation of Commerce and Distribution Companies (FCD) and the MEEDDM have signed a five-year “eco-responsible” agreement, which in particular opens the way to doubling, within three years, the number of products benefiting from an eco classification in the form of a “carbon label”. In the end, this label will therefore be displayed on 300 staple food products and indicate to consumers the weight in grams of CO₂ for the product bought. The principle behind this label is to inform the consumer of the environmental impact of the product bought by signalling the weight in CO₂ emitted for the packaging, the percentage of recyclable waste in this packaging and the number of kilometres travelled by the product in order to arrive on the shelf.

H.3 Cooperation

In accordance with Article 6 of the Convention, governments must also cooperate amongst themselves in order to encourage the preparation, exchange and use of equipment and programmes aimed at meeting common objectives in public education, training and awareness-raising about climate change.

Six regional workshops have been organised around this subject since 2002. France has partly financed the organisation of two of these (African workshop in Gambia and European workshop in Belgium) by taking responsibility for translating the speeches into French. Furthermore, workshops enabling the transfer of knowledge to developing countries were created by France between 2006 and 2009. For example, France, the GTZ (German cooperation) and the COMIFAC (Commission for the Forests in Central Africa), with the technical assistance of CITEPA and the ONFI (National Forestry Office), organised two training sessions on inventory calculation methodologies and the use of software, for UNFCCC non-Annex I countries so that they can calculate their GHG emissions.

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