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Preface

France's environmental policy is proactive and ambitious, as exemplified in 2015 by the passage of the Energy Transition for Green Growth Act and the adoption of the Paris Agreement by the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21). The OECD has worked tirelessly to support this agreement and will continue to back international efforts to fight climate change. Against a domestic backdrop of low economic growth over the last decade, France has made progress in decoupling by reducing emissions of greenhouse gases (GHG) and the main atmospheric pollutants, curtailing freshwater abstraction and stabilising the generation of municipal waste. Nevertheless, intensive farming, urbanisation, land take and expanding transport infrastructure continue to have a negative impact on water and air pollution and on ecosystems. It is therefore vital to develop green activities to underpin growth while maintaining a focus on environmental protection and the sustainable management of natural resources.

This third *Environmental Performance Review* of France examines the progress made in achieving the country's environmental objectives since the OECD's previous review, published in 2005. It presents 33 recommendations to make the economy greener and to improve environmental governance and management. Recent advances in French environmental policy include the incorporation of a carbon component into fossil fuel taxation. France also contributed to the launch of the Carbon Pricing Leadership Coalition at the COP21. However, there is still room for further green tax reform, which would help ease the tax burden on labour and businesses. A more modern approach to territorial organisation and simplified rules and regulations are other positive developments which should be pursued.

The *Environmental Performance Review* pays special attention to France's energy transition. The Energy Transition for Green Growth Act sets ambitious GHG emission reduction targets for a country which already has one of the lowest-carbon economies in the OECD. Further efforts will be required to step up the deployment of renewable energies and manage energy demand in the building and transport sectors, especially in the short term so as to avoid any misplaced dilution of efforts linked to the fall in fossil fuel prices. The new strategic framework created by the Act will help clarify the timetable and methods for greening the energy mix while optimising the costs involved.

In Europe and overseas, France has an extremely rich natural heritage. It is also one of the ten countries in the world with the greatest number of endangered species, giving France great responsibility where biodiversity is concerned. Between now and 2030, the trend scenario is one of a decline in ordinary biodiversity and an increase in generalist species, which are the only ones that can resist increasing land take. The *Review* is in favour of ongoing legislative changes designed to rationalise biodiversity governance and strengthen instruments for incorporating biodiversity into planning policies. It also

recommends redirecting public subsidies towards behaviour supporting the conservation and sustainable use of biodiversity and promoting agro-ecology.

This report is the result of a constructive dialogue between France and the other countries participating in the OECD Working Party on Environmental Performance. The examples from France are highly instructive for any countries wishing to promote green growth. I am convinced that this collaboration will be useful in overcoming the many common challenges facing the other OECD Member countries and partners.

Angel Gurría

Secretary-General of the OECD

Foreword

The principal aim of the OECD's Environmental Performance Review programme is to improve the individual and collective environmental performance of Member countries and partners by:

- *helping individual governments assess progress in achieving their environmental goals;*
- *promoting continuous policy dialogue and peer learning;*
- *stimulating greater accountability from governments towards each other and public opinion.*

This report reviews the environmental performance of France since the previous OECD environmental review published by the OECD in 2005. Progress in achieving domestic objectives and international commitments provides the basis for assessing the country's environmental performance. Such objectives and commitments may be broad aims, qualitative goals or quantitative targets. A distinction is made between intentions, actions and results. Assessment of environmental performance is also placed within the context of France's historical environmental record, present state of the environment, physical endowment in natural resources, economic conditions and demographic trends.

The OECD is indebted to the government of France for its co-operation in providing information, for the organisation of the review mission to Paris and the Nord-Pas-de-Calais region in May 2015 and a strategy meeting in January 2016, and for facilitating contacts both inside and outside government institutions.

Thanks are also due to the representatives of the two examining countries, Elisa Rivera Mendoza (Spain) and Eva Hauser (Germany).

This report was written by Adam Barbe, Anna Drutschinin, Virginie Marchal, Eugene Mazur, Sarah Sentier and Frédérique Zegel of the OECD's Environment Directorate, and by Fabien Quétier from Biotope. It also benefited from comments and suggestions from Sylvia Beyer of the International Energy Agency. The review was co-ordinated by Frédérique Zegel, under the supervision of Nathalie Girouard. Carla Bertuzzi provided statistical support and Sylvaine Herold revised the document. Elvira Berrueta, Ulrike Chaplar and Clara Tomasini also helped with its production and publication.

The OECD Working Party on Environmental Performance discussed the draft Environmental Performance Review of France at its meeting on 8 March 2016 in Paris, and approved the Assessment and Recommendations formulated therein.

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General Notes

Signs

The following signs are used in Figures and Tables:

. . : not available

– : nil or negligible

. : decimal point

Country aggregates

OECD Europe: This zone includes all European Member countries of the OECD, i.e. Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

OECD: This zone includes all Member countries of the OECD, i.e. the countries of OECD Europe plus Australia, Canada, Chile, Israel, Japan, Korea, Mexico, New Zealand and the United States.

Country aggregates may include Secretariat estimates.

Currency

Monetary unit: euro (EUR).

In 2014, USD 1.00 = EUR 0.75

Cut-off date

This report is based on information and data available up to the beginning of March 2016.

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This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

Abbreviations and acronyms

ADEME	French Environment and Energy Management Agency
AEM	Agri-environmental measures
AFB	French Biodiversity Agency
AFD	French Development Agency
ASN	Nuclear Safety Authority
CAP	Common Agricultural Policy of the European Union
CBD	Convention on Biological Diversity
CEE	Energy saving certificates
CGDD	General Commissariat for Sustainable Development
CGEDD	General Council for the Environment and Sustainable Development
CIDD	Sustainable development tax credit
CNPN	National Nature Conservation Council
CNTE	National Council for Ecological Transition
CPER	Central-regional planning contract
CSPE	Contribution to the electricity public services
DAC	Development Assistance Committee of the OECD
DEB	Directorate for Water and Biodiversity
DGPR	General Directorate for Risk Prevention
DOCOB	Action plan for Natura 2000 sites
DREAL	Regional departments for the environment, planning and housing
ÉCO-PTZ	Interest-free eco loan
EEA	European Environment Agency
EIA	Environmental impact assessment
EMS	Environmental Management System
EnR	Renewable energies
ERC	Avoid, reduce, offset approach
EU	European Union
EU ETS	European Union Emissions Trading System
EUR	Euro
FAO	United Nations Food and Agriculture Organisation
FGEF	French Global Environment Facility
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse gas
IAS	Invasive alien species
IEA	International Energy Agency
IFRECOR	French initiative for coral reefs
INPN	National inventory of natural heritage
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IUCN	International Union for Conservation of Nature and Natural Resources
LEMA	Law on water and aquatic environments
LGV	High-speed railway line
LPG	Liquefied Petroleum Gas
LULUCF	Land Use, Land Use Change and Forestry

MEDDE	Ministry of Ecology, Sustainable Development and Energy
MEEM	Ministry of the Environment, Energy and Marine Affairs
MNHN	National museum of natural history
MPA	Marine Protected Area
NBS	National Biodiversity Strategy
NCP	National Contact Point for the OECD guidelines for multinational enterprises
NEEAP	National energy efficiency action plan
NGO	Non-governmental organisation
NH_3	Ammonia
NO_x	Nitrogen oxides
NOTRE	Act under which the French administrative territory will be reorganised
NSDS	National Sustainable Development Strategy
ODA	Official Development Assistance
ONB	National biodiversity observatory
ONCFS	National Hunting and Wildlife Agency
ONEMA	French National Agency for Water and Aquatic Environments
ONF	National Forests Office
PCET	Regional climate and energy plan
PES	Payments for ecosystem services
PIA	Investments for the future programme
PM	Particulate matter
PNR	Regional natural park
POPE	Act setting the direction of energy policy
PPE	Multi-annual energy programme
PPP	Purchasing power parity
R-D	Research and Development
RD-D	Research, Development and Demonstration
RT	Thermal regulations
RTE	Electricity transport network
SCAP	Strategy for the creation of protected metropolitan land areas
SEA	Strategic Environmental Assessment
SINP	Information system on nature and landscapes
SME	Small and medium-sized Enterprises
SNA	Sensitive Natural Areas
SNBC	National low-carbon strategy
SNTEDD	National strategy of ecological transition towards sustainable development
SOeS	Observation and Statistics Directorate
SO_x	Sulphur oxides
SRCAE	Regional climate, air quality and energy plan
SRCE	Regional ecological coherence scheme
TGAP	General tax on polluting activities
TIC	Domestic consumption taxes
TICPE	Domestic tax on consumption of energy products
toe	Tonne of oil equivalent
TPES	Total primary Energy supply
TVB	Green and blue belt network

UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar
VAT	Value Added Tax
WFD	Water Framework Directive
ZNIEFF	Natural areas of interest for their ecology, fauna and flora

BASIC STATISTICS OF FRANCE (2014 or latest available year)*

(OECD average values in parentheses)[a]

PEOPLE AND SOCIETY

Population (million)	64		Population density per km^2	117	(35)
Share of population by type of region:			Population compound annual growth rate, latest 5 years	0.6	(0.6)
Predominantly urban (%)	35	(49)	Income inequality (Gini coefficient)	0.3	(0.3)
Intermediate (%)	48	(26)	Poverty rate (% of population with less than 50% med.income)	8	
Rural (%)	17	(25)	Life expectancy	82	(80)

ECONOMY AND EXTERNAL ACCOUNTS

Total GDP (GDP, EUR, billion)	2 140		Imports of goods and services (% of GDP)	31	(29)
Total GDP (GDP, 2014 PPPs, billion)	2 613		Main exports (% of total merchandise exports)		
GDP, latest 5-year average real annual growth (%)	1	(2)	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	12	
GDP per capita (1 000 USD 2014 PPPs)	39	(39)	Aircraft, spacecraft, and parts thereof	10	
Value added shares (%)			Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof	8	
Primary	2	(2)	Main imports (% of total merchandise imports)		
Industry, including construction	19	(24)	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	15	
Services	79	(75)	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	11	
Exports of goods and services (% of GDP)	28	(29)	Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof	9	

GENERAL GOVERNMENT

as percentage of GDP

Expenditure	57	(46)	Education expenditure	6	(6)
Revenue	54	(43)	Environment protection expenditure[b]	2	
Gross financial debt	119	(88)	Health expenditure	8	(7)
Net lending/net borrowing	-4	-(2)	Environmental taxes: (% of GDP)	2.0	(1.6)
			(of total tax revenue)	4.4	(5.1)

LABOUR MARKET, SKILLS AND INNOVATION

Unemployment rate (% of civilian labour force)	10	(8)	Patent applications in environment-related technologies (% of all technologies, average of latest 3 years)[c]	12	(11)
Tertiary educational attainment of 25-64 year-olds (%)	32	(31)	Environmental management	5	(5)
Gross expenditure on R&D, % of GDP	2	(2)	Water-related adaptation technologies	1	(0.5)
			Climate change mitigation technologies	10	(9)

ENVIRONMENT

Energy intensity: TPES per capita (toe/cap.)	4	(4)	Road vehicle stock (veh./100 inhabitants)	62	(58)
TPES per GDP (toe/1 000 USD, 2010 PPPs)	0.10	(0.11)	Water stress (abstraction as % of available resources)	16	(10)
Renewables (% of TPES)	9	(9)	Water abstraction per capita (m^3/cap./year)	472	(829)
Carbon intensity (energy-related CO_2):			Municipal waste per capita, (kg/capita)	509	(522)
per capita (t/cap.)	4.9	(9.6)	Material productivity (USD, 2010 PPPs/DMC, kg)	3.0	(2.1)
per GDP (t/1 000 USD, 2010 PPPs)	0.13	(0.27)	Land area (1 000 km^2)	548	(34 341)
GHG intensity:[d]			% of arable land and permanent crops	35	(12)
per capita (t/cap.)	8	(12)	% of permanent meadows and pastures	17	(23)
per GDP (t/1 000 USD, 2010 PPPs)	0.21	(0.35)	% of forest area	29	(31)
Exposure to air pollution ($PM_{2.5}$) (µg/m^3)	12		% of other land (built-up and other land)	18	(33)

* Values earlier than 2010 are not taken into consideration.

a) OECD average values = simple or weighted averages of available countries' values.

b) Investments and current expenditure of households, business sector and specialised producers of environmental services, and public sector.

c) Higher-value inventions that have sought patent protection in at least two jurisdictions.

d) Excluding emissions/removals from land use, land-use change and forestry.

Source: Calculations based on data extracted from databases of the OECD, IEA, Eurostat and the World Bank.

Executive summary

France has pursued an ambitious environmental policy even if the results sometimes fall short of expectations

France has set itself ambitious environmental objectives, especially in the 2009 and 2010 Grenelle legislation and the 2015 Energy Transition for Green Growth Act. At the international level, France was a driving force in the adoption of the Paris Agreement by the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21). Against a domestic backdrop of low economic growth over the last decade, France has made progress in decoupling by reducing emissions of greenhouse gases (GHG) and main atmospheric pollutants, curtailing freshwater abstraction and stabilising the generation of municipal waste.

Nevertheless, a number of environmental pressures remain. Like many other European countries, France has not achieved the "good status" objective set for 2015 by the EU Water Framework Directive (WFD), due mainly to diffuse pollution by nitrates and pesticides. France is one of the largest users of plant protection products in the world, and consumption has increased, also leading to soil and air contamination. Modal shift objectives are not on track and concentrations of ozone, NO_2 and particulates in the air regularly exceed human health protection thresholds in some areas. Land take is gaining pace, especially on the outskirts of towns and cities and along the coast, fragmenting habitats and diminishing biodiversity. The recovery rate for municipal waste (recycling and composting) remains well below those for Germany and Belgium.

Reforms have been undertaken to modernise environmental governance and law

By extending the powers of the Ministry of Ecology and Sustainable Development to cover transport, infrastructure, tourism and the sea, and then energy, France has been able to align sector and environmental policies, yet some integration issues remain unresolved. The creation of the General Commissariat for Sustainable Development (CGDD) in 2008 helped improve inter-ministerial co-ordination in this area. However, the implementation of environmental policies remains challenged by the complexity of the multiple layers of French administration. The recent reform of regional organisation is going smoothly, clarifying the powers of local authorities, simplifying planning documents and encouraging inter-municipality co-operation. There are still over 35 000 public water distribution and waste water treatment utilities in France, most of which are not big enough to benefit from economies of scale.

The legal framework governing strategic environmental assessments of plans and programmes and environmental impact assessments (EIA) of projects has been strengthened, but clarification of the links between the respective regulations is required.

The French approach results in projects having several EIAs, which prevents any global overview of the project and its potential impacts. France has simplified environmental permitting and streamlined control and compliance procedures. However, the transition of installations to the new registration scheme is taking longer than expected and inspection planning fails to adequately account for the track record of regulated installations.

The Grenelle Forum founded a five-part governance system to involve all stakeholders in policymaking. This system of participatory governance was carried over into the annual environmental conferences and institutionalised by the National Council for the Ecological Transition. Nonetheless, stronger environmental democracy remains a challenge and requires public consultation to be sufficiently in advance of decision making.

Increasing priority given to green growth

Investment in sustainable modes of transport, energy-efficient building renovation and clean technologies were promoted as growth engines in the 2009 fiscal stimulus package. France is a European leader in eco-innovation, with particular strength in water management, waste management and technologies to combat climate change. Tax breaks and subsidies for research and development, such as the Investments for the Future Programme, have helped some French green industries maintain and develop their competitive advantage. Over the last ten years, value added and employment in eco-activities have grown faster than the economy as a whole. A national plan to promote green jobs and careers has been drawn up and a specific national observatory has been created. Since 2012, the Environmental Taxation Committee, which was renamed the Green Economy Committee in 2015, promotes greater use of economic instruments in environmental policy.

However, environmental taxation remains relatively light. Fuel and vehicle taxes have given preferential treatment to diesel-powered vehicles, which pollute more, and the proportion of private diesel cars jumped from 35% in 2000 to 62% in 2014, one of the highest rates in Europe. The incorporation of a carbon component into fossil fuel taxation in 2014 was a significant step towards harmonising carbon prices. The climate-energy contribution will rise from EUR 22 per tonne of CO_2 in 2016 to EUR 30.5 in 2017 (2015 Budget Act). Future Budget Acts are expected to follow suit, with target values of EUR 56 per tonne of carbon in 2020 and EUR 100 in 2030, levels that are compatible with commitments to reduce GHG emissions. The recent reduction in the tax differential between diesel and petrol is encouraging, and could be stepped up. While France has abolished several subsidies which are harmful to the environment, there is room for improvement in reorienting direct and indirect public subsidies towards environmentally friendly behaviour, and the conservation and sustainable use of biodiversity.

More details are needed regarding implementation of the energy transition

France is one of the lowest-carbon economies in the OECD due to the predominance of nuclear power in the energy mix, and outperformed the objective that it had set, in the context of the Kyoto Protocol, of limiting its GHG emissions over the period 2008-12 to their 1990 levels. However, it is not on track to meet its renewable energy and energy consumption targets under the European climate and energy package for 2020. Policy governance and tracking progress have been complicated by the multitude of energy and climate objectives with different timeframes. The effectiveness of policies has also been diminished by the instability of measures to support renewable energies and energy efficiency, complex regulation and the accumulation of instruments.

The Energy Transition for Green Growth Act created new governance tools, including the pluriannual energy programme (PPE) and the national low-carbon strategy (SNBC) which are expected to improve energy policy steering and visibility for investors. The Act sets ambitious objectives: increasing renewable energy to 32% of final energy consumption by 2030; cutting final energy consumption by 20% by 2030 and by 50% by 2050; cutting GHG emissions by 40% between 1990 and 2030 and by 75% by 2050. It also provides for a 50% reduction in the share of nuclear power in electricity production by 2025. The targets, however, are numerous and difficult to reconcile. Reducing the proportion of nuclear power while also reducing energy consumption will mean setting clear rules concerning the lifetime of reactors and wide-scale deployment of renewable energy sources. In particular, it will require developing the interconnection of the European network, tighter control over energy demand and the production costs of the different energy industries, and adapting support schemes for renewable energies.

France has strengthened its role as a leader in biodiversity

Due to its geographical position in Europe and overseas, France has an extremely rich natural heritage. It is also one of the ten countries with the largest number of endangered species and therefore has huge responsibilities in this regard. Like other countries, it did not meet the commitment set out in the Convention on Biological Diversity of reducing biodiversity loss by 2010. In metropolitan France, three-quarters of habitats of Community interest have an unfavourable conservation status and one species in five is threatened. The situation is even more alarming overseas. The main threats to biodiversity are the homogenisation of the landscape as a result of the intensification of agriculture, habitat fragmentation, and land take, as well as alien invasive species, overexploitation of fish stocks and climate change, which are particularly critical overseas. France has already achieved the objectives defined in the context of the Convention on Biological Diversity of protecting at least 17% of its land area and at least 10% of its territorial waters by 2020. However, barely 0.7% of metropolitan France is covered by protected areas in the strictest protection categories of the International Union for the Conservation of Nature (IUCN) classification.

At the international level, France has strengthened its role as a leader by almost tripling official development assistance for biodiversity since 2007-08 and by supporting the creation of the International Science-Policy Platform on Biodiversity and Ecosystem Services. Significant progress has been made in renewing the national legislative and institutional framework. In particular, the Grenelle II Law strengthened the "avoid, reduce, offset" sequence in impact assessments, and established a national green and blue belt network and regional ecological consistency schemes. The law on biodiversity conservation, which is scheduled to be adopted in 2016, seeks to rationalise governance, mainly through the creation of the French Biodiversity Agency. It also provides for the introduction of a scheme providing access to genetic resources and to the sharing of advantages arising out of their use following the ratification of the Nagoya Protocol. In order to strengthen the effectiveness of instruments for integrating biodiversity into regional development, France will have to promote the use and sharing between actors of outcome indicators. A culture of economic effectiveness of biodiversity policies still needs to be developed. Efforts must also be continued to promote agro-ecology as a solution for environmental challenges.

Assessment and recommendations

The Assessment and Recommendations present the main findings of the OECD Environmental Performance Review *of France and identifies 33 recommendations to support the country's further progress towards its environmental policy objectives and international commitments. The OECD Working Party on Environmental Performance reviewed and approved the Assessment and recommendations at its meeting on 8 March 2016. Actions taken to implement selected recommendations from the 2003* OECD Environmental Performance Review *are summarised in the Annex.*

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1. Environmental performance: trends and recent developments

France is the country with the largest surface area in the European Union (EU) and has the fifth largest economy among OECD members. Its population is well educated and enjoys a high standard of living. Although it withstood the global economic crisis fairly well, growth since has been weak and unemployment is high. Through its geographical position in Europe and overseas, France has a wide variety of terrestrial and marine ecosystems. However it has few fossil fuel and mineral resources, and its freshwater resources are moderate. France has continued to make progress in decoupling environmental pressures from economic growth over the last ten years (Figure 1). However, intensive farming, urbanisation, land take and the expansion of transport infrastructure continue to have harmful effects on water and air pollution and on ecosystems.

Transition to a low-carbon and energy-efficient economy

France has one of the lowest-carbon economies of any OECD country due to the preponderance of nuclear power in the energy mix (Figure 1). In 2014, nuclear energy accounted for nearly half the total primary energy supply (TPES) and over three-quarters of electricity generation. Renewable sources of energy accounted for 9% of TPES and 16% of electricity generation, which is low compared with the respective OECD Europe averages of 13% and 31% (IEA, 2015). France's aim of reaching 23% of renewables in gross final energy consumption by 2020, to comply with the relevant EU directive (2009/28/EC), will be difficult to achieve.

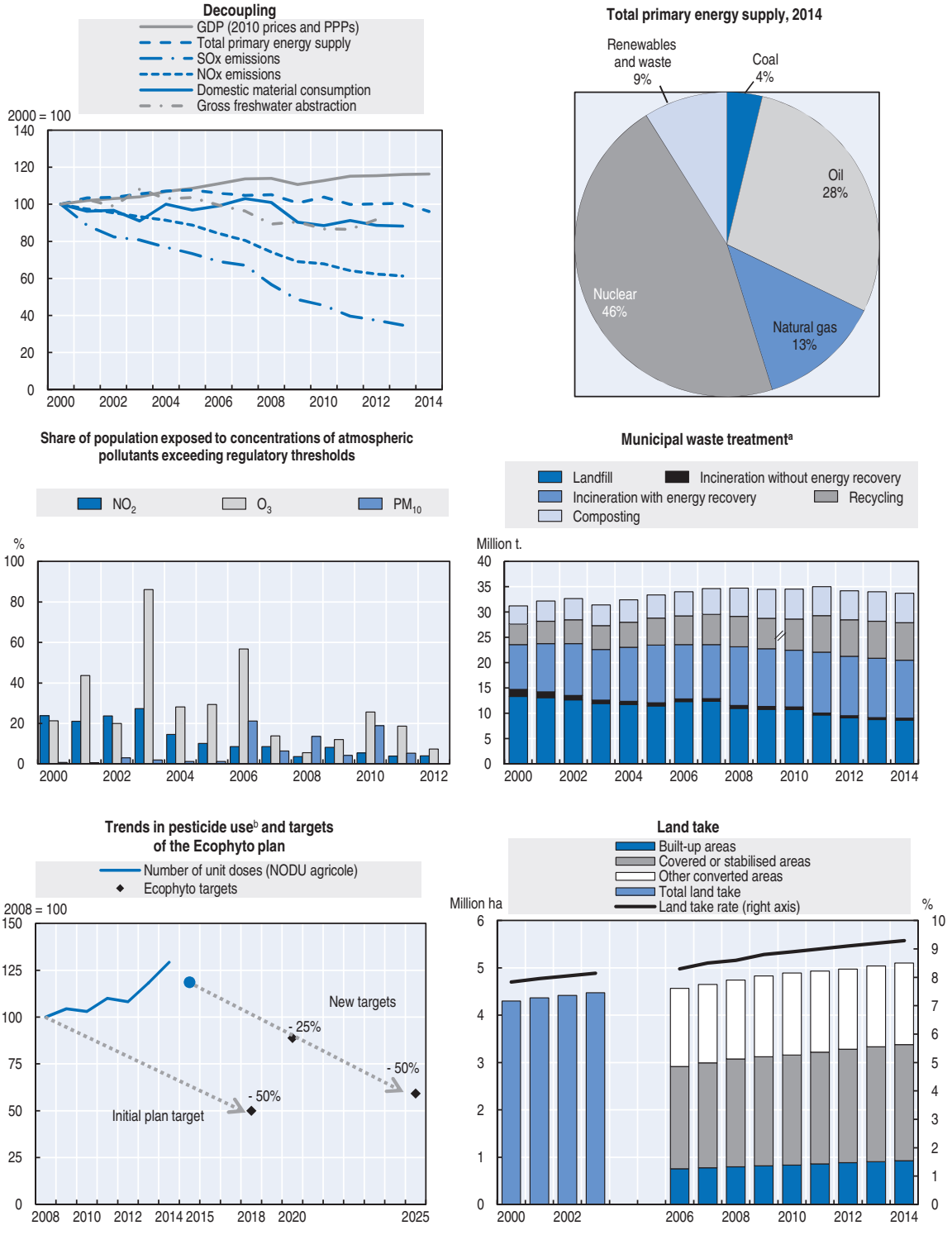
France outperformed the target it set itself under the Kyoto Protocol of limiting greenhouse gas (GHG) emissions over 2008-12 to 1990 levels (Figure 3). The decoupling of GHG and CO_2 emissions from economic growth has continued since 2000. The transport sector remains the largest GHG emitter, though emissions fell slightly between 2000 and 2013. A decline in road freight due to the economic crisis and the introduction of lower-carbon vehicles helped limit transport-related emissions (SOeS, 2014).

The French economy is more energy efficient than the OECD average, though its energy intensity has diminished less since 2000 than that of the OECD as a whole. Overall, final energy consumption has decreased and France has exceeded its intermediate energy saving target for 2010, set in the first National Energy Efficiency Action Plan in 2008 (MEDDE, 2014). Energy consumption has fallen sharply in manufacturing but has risen in the residential and service sectors.

Emissions of the main air pollutants fell between 2000 and 2013 due to stricter regulations, lower fossil fuel consumption, energy savings and de-industrialisation of the economy (Figure 1). Emissions remained below the national emission ceilings for 2010 set in EU Directive 2001/81/EC except in the case of NO_X emissions, due in particular to growth in the vehicle fleet and in the use of diesel cars since 2000.

The proportion of the population exposed to concentrations of air pollutants higher than the regulatory threshold has fallen (Figure 1). Despite numerous plans to combat air

Figure 1. **Selected environmental performance indicators**



a) Change of methodology in 2010.
b) Measured as number of unit doses for agricultural use (NODU agricole), linking the quantity of an active substance to a specific unit dose. 2015 is estimated as a three-year average (2012-14).
Source: OECD (2015), *OECD National Accounts Statistics* (database); IEA (2015), *IEA World Energy Statistics and Balances*, (database); EEA (2015), *AirBase* (database); OECD (2015), *OECD Environment Statistics* (database); MAAF (2016), *Tendances du recours aux produits phytopharmaceutiques de 2009 à 2014 ;* MAAF (2015), *Teruti-Lucas land use survey* (database).

StatLink http://dx.doi.org/10.1787/888933405839

pollution, however, human health protection thresholds are regularly exceeded in some locations for ozone, NO_2 and fine particles (PM_{10}, $PM_{2.5}$) (CGDD, 2015a). This is because the plans are not restrictive enough, their governance is ambiguous and some of the statutory instruments available to limit urban traffic (congestion pricing and restricted access for the most polluting vehicles) were barely used until recently. Along with climate change, air pollution is the environmental problem that French people say they are most concerned about (CGDD, 2015b). The economic cost of its health effects is estimated at 2.5% of GDP (WHO/Europe and OECD, 2015).

Transition to efficient resource management

Material productivity (the amount of economic value generated per unit of material input) has improved, especially since the economic crisis, which caused a fall in domestic consumption of materials, particularly construction materials (Figure 1). Less primary waste has been generated as a result of the economic slowdown and the amount of municipal waste generated has levelled off. The French generate more waste per capita than the European average. The recovery rate for municipal waste (recycling and composting) has improved to reach 39% in 2014, but is still much lower than in Germany (65%) and Belgium (50%). This is partly because economic actors are insufficiently sensitised to the concepts of waste prevention and recycling, as well as the absence of price signals (Section 3). In addition, unlike some other European countries, France has not prohibited direct landfill disposal of municipal waste, which still accounted for more than a quarter of the waste treated in 2043 (Figure 1). The 2015 Energy Transition for Green Growth Act calls for halving the amount of waste landfilled between 2010 and 2025. It also institutes a five-year strategy for a circular economy, including a programming plan for the resources required by the economy in order to optimise their use.

France is the EU's leading agricultural producer, though output has fallen slightly since 2000. Nutrient surpluses (nitrogen and phosphorus) have also declined. In contrast, the use of pesticides has increased, making France one of the world's largest consumers of plant protection products. The use of these products is linked to the type of cultivation (vines and arboriculture), the increase in the surface of field crops at the expense of grasslands, and climate conditions. The target of halving their use between 2008 and 2018 will not be met and has been pushed back to 2025 (Figure 1). The presence of pesticides in watercourses and aquifers is a cause for concern and the situation has changed little since 2000. These products also contaminate the air and soil, for which current control measures are insufficient.

Management of natural assets

France has an abundance of natural assets. However, urbanisation and habitat fragmentation are putting increased pressure on biodiversity. The increase in land take has accelerated, especially on the outskirts of towns and cities and along the coast (Figure 1), mainly at the expense of farmland and woodland, generating many environmental impacts (Section 5).

France as a whole suffers from moderate water stress, but water resources are becoming scarcer in some areas and low-water periods are worsening in the south. Water abstraction has declined since 2000 (Figure 1). The pollution of watercourses by organic and phosphorous matter has decreased, mostly because of stricter regulation and better water treatment, though nitrate and pesticide pollution continues. Like many other European

countries, France has asked for a deadline extension (to 2021) in view of its inability to achieve the 2015 good water status objective set in the EU Water Framework Directive. Nevertheless, almost the entire population has access to drinking water of excellent quality (Onema, 2015).

The strength of France's water policy lies in its system of integrated management by catchment basin with decentralised and participatory governance. However, effective governance and water policy implementation are hindered by the number of players, the complexity of the links between them and the dispersal of responsibility (Levraut et al., 2013). Water policy is insufficiently incorporated into sectoral policies. At local level, the large number of public water and sanitation services prevents economies of scale.

Recommendations on air and waste management

Air management

- Adopt and implement the national plan to reduce emissions of atmospheric pollutants, coupled with a precise timetable in order to ensure compliance with standards for the protection of human health; clarify responsibilities between central and local government in order to implement plans to counter air pollution in large conglomerations and particularly polluted zones; promote the creation of restricted traffic zones and experiments with urban tolls; encourage the replacement of inefficient wood-burning domestic heating systems.
- Improve knowledge of the drivers of air pollution and its impacts on health.

Waste management

- Strengthen awareness of and information on preventing and recycling waste; develop indicators of material and waste flows and encourage businesses to use them in order to track progress in implementing the circular economy strategy and resource programming plan.

2. Environmental governance and management

Sustainable development action framework

France's environmental policy is proactive and ambitious, as exemplified in 2015 by the passage of the Energy Transition for Green Growth Act, adoption of the Paris Agreement at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), recognition of the Lima-Paris Action Agenda at COP21 and parliamentary debate on a bill for restoring biodiversity. An earlier milestone was the Grenelle Forum in 2007. This multi-stakeholder consultation process and the two laws which arose from it put French environmental policy on a new footing by generating an extensive body of legislation, setting high goals and institutionalising participatory governance. Although the Grenelle laws have been called a "legal monster" (Petit, 2011), they have served to structure the environmental action of sectors and local authorities by deploying a battery of financial, regulatory and planning instruments. In the wake of the forum, the second National Sustainable Development Strategy for 2010-13 provided a general framework which brought all stakeholders together around a common vision, though it has been criticised for taking a sectoral approach which diluted priorities (MEDDE, 2013). The National Strategy for Ecological Transition to Sustainable Development for 2015-20 addresses this criticism by taking a cross-cutting approach and formalising stakeholders' actions by means of progress

reviews. The strategy serves as a base for France to elaborate a roadmap to implement the Sustainable Development Goals adopted by the international community in 2015 within the framework of the 2030 Agenda for Sustainable Development.

Most French environmental legislation and policy is determined by EU law. Since 2007, France has systematically exceeded the EU average number of infringements of EU environmental legislation (European Commission, 2014a). Breaches particularly concern nitrate water pollution, urban wastewater treatment and air quality.

Environmental institutions and governance

Environmental strategies and policies are overseen by the Ministry of Environment, Energy and the Sea (MEEM). MEEM supervises specialist public agencies in fields such as water, energy and forestry, and its action is carried out in the regions and departments by dedicated decentralised government bodies. To encourage sectoral integration of environmental issues, in 2007 the Ministry of Ecology and Sustainable Development was merged with the Ministry of Transport, Infrastructure, Tourism and the Sea, as well as the Industry Ministry's energy arm. The measure had mixed results. Although it gave MEEM greater clout within the government, it proved unable to break the hold of certain forms of corporate behaviour within the ministry's departments. The sensitive issue of balancing infrastructure projects and environmental impact now takes place within MEEM and not at prime-ministerial level, making decisions less transparent, sometimes to the detriment of environmental objectives (Bettina, 2010; Lepage, 2008).

Regions, departments and municipalities implement environmental policies at local level. However, the complexity of France's multi-level governance system hampers the attainment of environmental objectives and fuels demands for simplification; the system suffers from overlapping responsibilities between central and local government, and from an unclear relationship between central government and its decentralised bodies as well as between those bodies and the regional branches of national agencies. The recent reform of France's territorial organisation[1] is a step in the right direction, clarifying the division of powers, simplifying planning and encouraging co-operation between municipalities.

Environmental assessment

France has made clear progress in policy evaluation. New bodies such as the Inter-ministerial Committee on Modernisation of Public Action have helped bring policy evaluation closer to decision making. New sustainable development indicators and more frequent use of indicator dashboards to guide public action (e.g. indicators for inequality, quality of life and sustainable development in budget acts,[2] the dashboard for marine protected areas) make evaluation more rigorous. However, the multiple goals prescribed by law and the frequent use of means-based rather than results-based indicators make evaluation difficult (Crosemarie, 2012; HCSP, 2013).

The legal framework for strategic environmental assessment (SEA) of plans and programmes and environmental impact assessment (EIA) of projects has been strengthened since the 2005 *OECD Environmental Performance Review* by defining their scope and requirements more precisely. Nevertheless, differences between EU directives and French law continue to pose problems (AE, 2015), as with the French notion of "programme of works" which has no basis in the EU directive (Vernier, 2015), or the interpretation of what is needed for environmental authorities to be "independent" in their assessments (Vernier, 2015; European Commission, 2015). The relationship between SEA and EIA is less clearly defined

than in other EU countries, a point which the 2015 Growth, Activity and Equal Economic Opportunity Act (Macron Act) aims to clarify.

The French policy of one EIA per procedure means several EIAs are carried out for the same project. This duplication of efforts wastes time and resources and leads to fragmentation, so that the client, the environmental authority and the public lose the comprehensive overview of the project and its potential impact. A "one EIA per project" approach, favoured by several of the actors involved, would bring the situation more into line with the EU directive.

Licensing, compliance and enforcement

France streamlined its environmental permitting system in 2009, easing the administrative burden on the regulated community. It introduced a registration system for some sectors mostly dominated by small and medium-sized enterprises. However, the switch to registration of installations formerly subject to authorisation has been slower than expected because of the difficulty of drawing up new technical requirements specific to each sector.

The infringement detection rate has not improved since 2006. The scheduling of inspections does not take sufficient account of the behaviour of controlled installations. In addition, environmental inspection authorities do not use results-based indicators to measure the compliance of installations, taken individually or not, which undermines the effectiveness of their strategic planning. Recent regulations have rationalised compliance control procedures and stepped up the use of administrative and daily fines. However, the procedures and the instructions on their use by the inspection authorities are still pending. Criminal procedures continue to dominate enforcement measures, even though criminal penalties are rarely applied.

In 2008, France introduced the notion of strict environmental liability for damage to water, biological species, natural habitats and the soil. As the current legislation makes no provision for procedures or methods for remedying damage to the environment, strict environmental liability remains difficult to apply in practice. To make it operational, the government is working on the introduction of additional legislation that will give priority to direct rehabilitation of a damaged ecosystem by the party responsible.

Promoting environmental democracy

The Grenelle Forum was a high point for environmental democracy in France. Laying the foundations for "five-part governance" bringing together central government, elected officials, businesses, trade unions and non-government organisations (NGOs), it involved citizens directly in the process through local debates and online consultations. This participatory approach has been adopted in France's annual environmental conferences and institutionalised through the National Ecological Transition Council (CNTE). At the Grenelle Forum and even now, however, the extent to which participation is representative is open to question. Trade unions and NGOs do not always have the capacity to be present, and even when they can participate, they do not guarantee representation of civil society (Gossement, 2013).

Strengthening dialogue on environmental and social issues remains a priority following protest movements which shook up government policy. The public is consulted about plans, programmes and projects too late, at a point where the project can no longer

be called into question and only marginal changes can be made (AE, 2015; Duport, 2015). The CNTE has proposed two systems to improve civil society involvement (CNTE, 2015). The Macron Act streamlines and modernises the procedure for public participation in the preparation of projects, plans and programmes. At the same time, however, it gives the government the power to reform environmental law by order, thus freezing parliament out of discussions.

Access to environmental information is of good quality: it is supported both by the role played by MEEM's Observation and Statistics Department in circulating information and by the many online data portals set up in recent years. However, French people consider themselves less well informed on environmental matters than their counterparts elsewhere in Europe (European Commission, 2014b). Substantial progress has been made in environmental education concerning sustainable development, as a result of an ambitious initiative spanning 2004 to 2015 that concerned primary to tertiary education and culminated in the certification of many schools. However, the tradition of separate disciplines in French education remains a stumbling block, making it more difficult for an intrinsically interdisciplinary approach to take root (ADEME, 2014). Another initiative is the "Learn to produce differently" plan, which has allowed the "agroecology" approach to be integrated into agricultural education (Section 5).

In compliance with the Aarhus Convention, France has several channels allowing citizens to access environmental justice, including the Commission for Access to Administrative Documents, the Ombudsman, assistance with access to the courts or legal advice, and the ability of environmental protection groups to take legal action on behalf of collective interests. However, referrals to the courts can get tied up in red tape and legal action can be expensive for those who lack access to legal aid (UN Economic Commission for Europe, 2014).

Recommendations on environmental governance and management

- Simplify planning documents relating to the environment and adopt a more global and integrated approach to environmental issues.
- Strengthen and simplify environmental evaluation by:
  - introducing more results-based indicators in public policy evaluation;
  - promoting a single EIA per project;
  - continuing to clarify the relationship between EIA and SEA.
- Continue to reform the environmental permitting system by extending the range of sectors eligible for registration and further rationalise the relevant procedural and substantive rules.
- Improve the targeting of inspections on the basis of the compliance history of regulated installations; introduce performance indicators to measure non-compliance for both individual installations and the regulated community as a whole; strengthen administrative enforcement measures by introducing administrative fines proportionate to the economic advantages of non-compliance; consider making minor infringements punishable by administrative measures.
- Strengthen the legal framework for environmental liability by defining procedures and standards obliging responsible parties to remedy the environmental damage they cause.

Recommendations on environmental governance and management *(cont.)*

- Simplify public participation in the preparation of plans, programmes and projects by making it easier to involve the public at an earlier stage, by creating a procedure for participation on a project-by-project basis and by modernising the opportunities for participation (e.g. via the Internet); bolster public information and communication on environmental costs (externalities and environmental protection expenditure).
- Strengthen teacher training on sustainable development issues.

3. Towards green growth

A coherent action framework for sustainable development and green growth

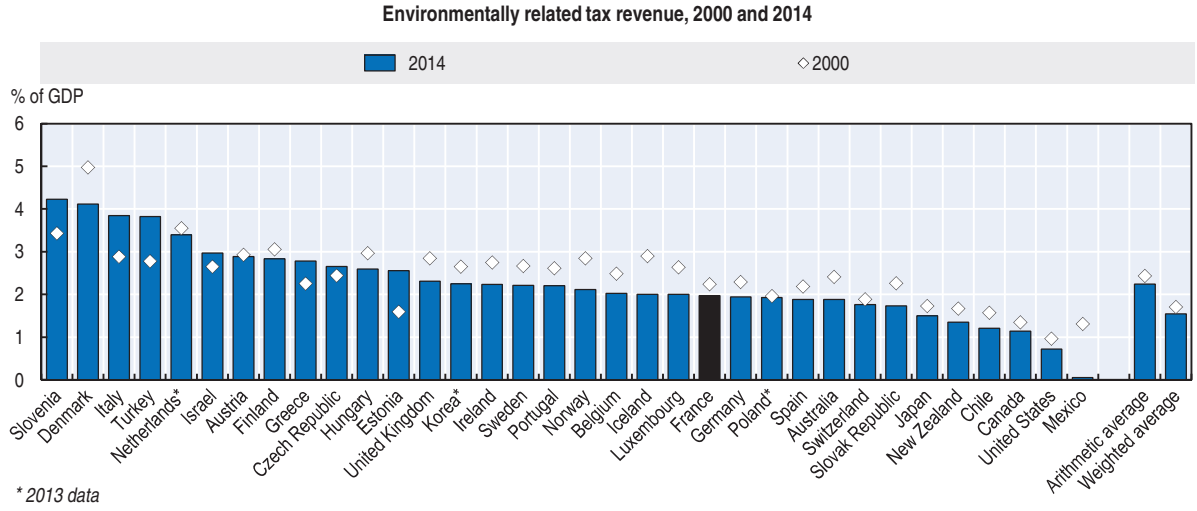
Green growth has been given increasingly high priority since the economic crisis. The Grenelle Forum favoured the promotion of investment in sustainable transport, the thermal renovation of buildings and clean technology as drivers of growth in the 2009 budget stimulus plan. It also revived interest in the greater use of economic instruments in environmental policy. Much work has been done to advance the valuation of environmental externalities, for example by the Stiglitz-Sen-Fitoussi Commission (2009) on the measurement of economic performance and social progress, the Quinet Commission (2009) on the shadow price of carbon and Bernard Chevassus-au-Louis on the monetisation of ecosystem services and the value of biodiversity (CAS, 2009). The 2015 Energy Transition for Green Growth Act gave a definition of green growth comparable to that of the OECD (OECD, 2011). The act fits within the National Strategy for Ecological Transition to Sustainable Development for 2015-20, which aims to ensure coherence in public action to meet the challenges of climate change, accelerated biodiversity loss, growing resource scarcity and proliferating health risks.

Towards greener taxation

The Environmental Taxation Committee, established in 2012 and renamed the Green Economy Committee in 2015, has increased the acceptance of the importance of including the cost of environmental harm in prices. In 2015, during COP21, the French president along with several other heads of state, the World Bank, the IMF, the OECD, business leaders and civil society representatives from around the world launched the Carbon Pricing Leadership Coalition. In addition, the government committed to harmonising diesel and petrol taxes within five years. In 2014, a carbon component (the climate-energy contribution) was incorporated into the taxation of fossil fuels and the 2015 Budget Act[3] confirmed its gradual increase from EUR 7.00 to EUR 30.50/t CO_2 in 2017. The scope of the general tax on polluting activities has been extended and certain rates have been increased. The annual tax on company vehicles has been modified to take account of CO_2 and other pollutants emitted by such vehicles.

However, environmental taxation remains relatively light at a time when heavy fiscal pressure on jobs and businesses is holding back investment and innovation. Over 2000-14, environment-related tax revenue fell as a proportion of both GDP and total tax revenue (Figure 2). It represented 2.0% of GDP and 4.4% of tax revenue in 2014, one of the lowest levels among European OECD countries. Revenue from taxes on oil products has fallen significantly since 2000 due to lower consumption, lower real tax rates and a switch from

Figure 2. **The share of environmental taxation in the economy is low and decreasing**



Source: OECD (2015), *OECD Database on Instruments Used for Environmental Policy and Natural Resources Management.*

StatLink http://dx.doi.org/10.1787/888933405840

petrol vehicles to more lightly taxed diesel ones. Nevertheless, the growth of the climate-energy contribution and another instrument, the contribution to public service charges for electricity (Section 4), should change this situation in coming years.

The implicit energy tax rate[4] varies considerably depending on fuels and users and only partially reflects environmental externalities. The introduction of a climate-energy contribution in taxes on energy product consumption is an important step towards carbon price harmonisation, but their many exemptions limit its scope, and the average effective rate of carbon taxation remains fairly low by OECD Europe standards (OECD, 2015a). As in a majority of OECD countries, taxation of road fuel significantly favours diesel, which is unjustified from an environmental standpoint since diesel has a higher carbon content and emits more local pollutants (fine particles, NO_2) than petrol (Harding, 2014). The reduction under recent budget acts of the tax differential between diesel and petrol, from EUR 0.18/litre in 2014 to EUR 0.12 in 2017, is noteworthy and could be accelerated given the current drop in oil prices.

Progress has been made in eliminating environmentally harmful subsidies, such as exemptions from the tax on biofuels and on consumption of coal and natural gas for individuals, and the reduced rate of VAT on fertiliser and pesticides. However, many other subsidies continue to harm the environment and biodiversity, in particular by encouraging the use of diesel (especially for road freight and farming), to the detriment of air quality, or by encouraging urban sprawl without taking account of the harm caused by land take (Section 5). Tax expenditure related to fossil fuel consumption represented 20% of energy tax revenue[5] and 0.3% of GDP in 2015.

Vehicle taxation is relatively low compared to other OECD countries. By focusing on CO_2 emissions, the bonus/malus programme for vehicle purchases which combines a subsidy and a purchase tax, and the scrapping premium introduced to sustain demand during the financial crisis have helped reduce average emissions per kilometre for new vehicles registered in France to a level well below the EU average. However, they have generated an overall subsidy worth more than EUR 2 billion which encourages consumers

to buy diesel vehicles, with harmful health effects (WHO/Europe and OECD, 2015). The proportion of diesel vehicles in the car fleet rose from 35% in 2000 to 62% in 2014, one of the highest levels in Europe.

The tightening of the bonus/malus programme and the annual tax on company vehicles, combined with the entry into force of stricter emission standards, have resulted in a recent downturn in diesel registrations in favour of petrol. However, the company car fleet still mostly comprises diesel vehicles, which are more advantageous in the long run: excise duty on diesel is lower than on petrol, and companies can deduct most of the VAT charged on diesel consumption but not on petrol. Furthermore, the tax breaks granted to employees for the use of a company vehicle do not take account of distance travelled, which encourages them to drive more.

Investing in the environment to promote green growth

Expenditure[6] on environmental protection[7] went from 1.9% to 2.2% of GDP between 2000 and 2013, a relatively high figure in comparison with other EU countries. The rise was mainly due to higher current expenditure on waste management, while capital expenditure fell in the second half of the 2000s, especially for wastewater treatment (CGDD, 2015c). Waste management and wastewater treatment remain the largest items of expenditure.

The amount of waste generated per capita has been relatively stable; the rise in expenditure is due partly to improved management methods (especially the widespread use of separate collection) but also to inadequate cost control in collection and processing. The polluter-pays principle is not well applied in municipal waste management and the way the service is funded provides little incentive to keep costs down (Cour des Comptes, 2014a). The majority of the population pays a household waste collection tax which is not directly linked to the service provided. In practice, businesses which use the public waste collection service contribute little to its funding. The reform of the general tax on polluting activities, applied to household and similar waste processing plants in 2009, has not produced the expected results in terms of switching waste flows from elimination to prevention and recycling.

Water supply and wastewater infrastructure is of good quality but ageing, and falling consumption could pose a problem with regard to paying for network replacement. After strong growth until 2007, driven by the need to bring sewerage networks and treatment plants into line with EU standards, capital expenditure diminished until 2012. The system of water charges is effective in terms of covering service provision costs but applies the polluter-pays principle imperfectly, with the result being that externalities related to agricultural and economic activities are borne by consumers (CGDD, 2012; Levraut et al., 2013). For example, the level of the abstraction charge does little to encourage water conservation, and the diffuse pollution tax provides few incentives and does not cover the use of mineral fertiliser. An experimental system involving savings certificates for plant protection products will be introduced in 2016 to encourage more sparing use of agricultural inputs.

The 2011 National Transport Infrastructure Plan, which emerged from the Grenelle Forum, provided for EUR 245 billion in investment over 25 years, with the rail sector accounting for 71%. Capital spending on the high-speed rail network more than quadrupled between 2010 and 2013, while spending on urban public transport increased by 50%. However, modal shift targets are not being met and low investment in the conventional rail network could compromise its long-term viability (Commission sur l'Avenir des Trains d'Équilibre du Territoire, 2015). The Mobility 21 Commission reviewed the socio-economic

evaluations and the impact assessments of large transport infrastructure projects and recommended modernising the conventional network before building new high-speed lines. However, recent commitments to new lines raise questions about the consideration given to socio-economic assessment in decision making (Cour des Comptes, 2014b). The shelving of an eco-tax on heavy goods vehicles clearly contradicts the polluter-pays principle by maintaining only partial coverage of external costs, including environmental costs, of using road infrastructure.

Promoting green markets and jobs

Added value and employment in eco-activities[8] have grown faster than the economy as a whole since 2004. They represented 1.5% of GDP in 2013 and over 440 000 jobs (1.7% of total employment), about half of them in waste management, wastewater treatment and renewables (CGDD, 2015d). Growth was strongest in soil and water rehabilitation, renewables and waste. A national plan to promote employment and jobs in the green economy has been drawn up and a national observatory created. Going beyond eco-activities, its remit spans "greening" activities,[9] an area in which recent momentum has been driven by rising employment in the maintenance and repair of cars and light utility vehicles and in railway infrastructure maintenance. Overall, eco-activities and greening activities accounted for around 1 million jobs in 2013. Recruitment problems persist in skilled building trades, underlining the importance of training and certification programmes focusing on energy efficiency and the installation of renewable energy systems.

Promoting eco-innovation as a new source of economic growth

Eco-innovation has been given increasing priority in environmental and economic policies. Climate change, the energy sources and economic engines of the future, recycling, and efficient resource management are some of the priorities of research and innovation strategies and of key industries promoted as new sources of economic growth. In 2013, the EU eco-innovation scoreboard ranked France among the leaders in Europe, behind Germany, the UK and Spain but ahead of Italy and the Netherlands (EIO, 2014). Expenditure on environmental research and development (R&D) has risen faster than total R&D spending since 2000, and public R&D and demonstration (RD&D) budgets dedicated to renewables and energy efficiency have increased substantially. However, the share of public RD&D budgets devoted to energy in 2013 (31%) was still lower than in a majority of OECD countries, with nuclear power accounting for nearly half. The share of environment-related technology in patent applications (12%) has doubled since 2000 but was barely above the OECD average (11%) in 2010-12.

France is particularly strong in water management, wastewater treatment, waste management and environmental engineering, boasting large firms and highly reputed public research institutes. Likewise, in technology to combat climate change it has taken advantage of industrial champions in sectors that are already mature, such as heating, hydraulics, insulation and cement, and of industries that have not really taken off yet, such as electric vehicles, which have both reaped the rewards of publicly funded research (Ménière et al., 2013). In contrast, weak positions in emerging sectors such as renewables reveal a lack of stable support mechanisms as well as a greater need for public-private co-operation in research, and more frequent monitoring of market trends and potential comparative advantages in French industry (Section 4).

Many regulatory, pricing and tax instruments used in environmental policy have stimulated eco-innovation, such as the bonus/malus programme and EU regulations on vehicle emissions or feed-in tariffs for renewables. On the demand side, the importance of public procurement in the French economy provides an opportunity to encourage green sourcing: less than 7% of public procurement contracts in 2013 contained an environmental clause. Within the framework of innovation policy, tax breaks and subsidies for R&D, such as the Investments for the Future Programme, have enabled some green industries to preserve and enhance their competitive advantage. However, large firms are still the main beneficiaries of such support, and the environmental, economic and social impacts of funded projects need to be assessed. The innovation support system is highly complex and induces growing tax expenditure. France has the OECD's highest rate of R&D tax incentives as a proportion of GDP.

Environment, trade and development

France's net official development assistance (ODA) has fallen significantly since 2010. It was predicted to reach 0.4% of gross national income in 2015 and remain at that level over 2016-17. France did not achieve its EU objective of devoting 0.5% of gross national income to ODA in 2010 and will not meet the 2015 goal of 0.7%.

Preserving the environment, combating climate change and protecting biodiversity have assumed growing importance in French development co-operation policy, with increasing amounts of ODA devoted to them. On average over 2013-14, France was the fourth largest provider of bilateral environment-related ODA. This placed France above the OECD Development Assistance Committee (DAC) average for environment-related ODA as a proportion of total screened ODA (40% versus 26%), though the share allocated in the form of soft loans was almost twice the OECD DAC average. Environment-related ODA increasingly targets projects containing environmental objectives outside the environment sector (transport, energy). Four times as many funds are allocated to climate change mitigation than to adaptation, a significant imbalance compared to other DAC members.

France is a leader in innovative financing for the environment. It has set up the French Global Environment Fund, which contributes to the development of innovative finance mechanisms through the projects it supports. The fund also earmarks some of the revenue from the financial transaction tax for environmental protection and action against climate change in developing countries. The French development agency AFD issues climate bonds on financial markets to raise funds for mitigation and adaptation projects. AFD also has many ways to integrate environmental considerations into development co-operation and to avoid financing environmentally harmful activities.

France promotes the OECD Guidelines for Multinational Enterprises and backs the 2012 OECD Recommendation on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence. It was the first country to require institutional investors to measure and disclose GHG emissions from their activities and their contribution to financing the energy transition, which should favour socially responsible investment and could serve as an example to other countries. In 2015, France announced that it was suspending export credits for the construction of coal-fired power stations unless they are equipped with operational carbon capture and storage. As part of the EU, France is participating in negotiations on a plurilateral agreement to liberalise trade in environmental goods.

Recommendations on green growth

- Speed up the reform of energy and vehicle taxation to better internalise costs associated with climate change and air pollution by:
  - confirming in upcoming budget acts that the carbon component (climate-energy contribution) of energy consumption taxes will gradually rise in line with commitments to reduce GHG emissions (EUR 100/t CO_2 by 2030);
  - confirming the time scale and schedule for aligning diesel and petrol taxation in the medium term;
  - reconsidering experimenting with a voluntary regional tax on heavy goods vehicles.
- Develop environmental assessment of direct and indirect public support, in particular via prior evaluation of Budget Act measures, with a view to eliminating measures that may harm the environment; gradually eliminate exemptions to the transport fuel consumption tax; ensure fair treatment of diesel and petrol with regard to recovery of VAT on companies' fuel consumption; eliminate the bonus part of the bonus/malus programme; revise the tax breaks granted to employees for use of a company vehicle in order to take account of distance travelled.
- Ensure the sustainability of financing for water and sanitation services in a context of declining consumption and rising financing needs:
  - speed up inter-municipal co-operation to promote economies of scale;
  - explore sources of funding compatible with resource management policy, including water savings in water stressed areas;
  - introduce a progressive component into the abstraction charge and local or seasonal variations linked to the scarcity of the resource;
  - continue to increase the diffuse pollution charge and extend it to cover mineral nitrogen fertiliser;
  - oversee and regularly evaluate the results of plant protection product savings certificates.
- Accelerate the introduction of incentive pricing for municipal waste management, including for companies and professional producers served by municipal waste collection services; reform the general tax on polluting activities in order to promote waste prevention and recycling; expand the use of cost accounting system for waste and cost tracking indicators in annual municipal waste management reports in line with the ADEME reference framework.
- Systematically conduct a cost-benefit analysis of public investment, giving consideration to environmental externalities, and ensure it is taken into account in decision making; continue research into the valuation of environmental costs.
- Continue efforts to foster R&D and the spread of environment-related technology by:
  - promoting co-operation between public research and the private sector;
  - making access to funding easier for businesses, especially small and medium-sized enterprises;
  - including mandatory environmental criteria in public procurement procedures;
  - regularly monitoring industries that might acquire a competitive advantage;
  - anticipating and developing the necessary skills for such industries;
  - expanding the analysis of the social, economic and environmental impact of aid to eco-innovation within an overall evaluation of measures to support innovation.
- Ensure a better balance between climate change adaptation and mitigation in environment-related ODA; earmark more of such aid for low-income countries, especially in the form of grants.
- Accompany investors in implementing the new environmental reporting requirements, and study the possibility of eventually including their carbon footprint; evaluate the results of the requirements and ensure their consistency with related international initiatives.

4. Energy transition: Towards a low-carbon economy

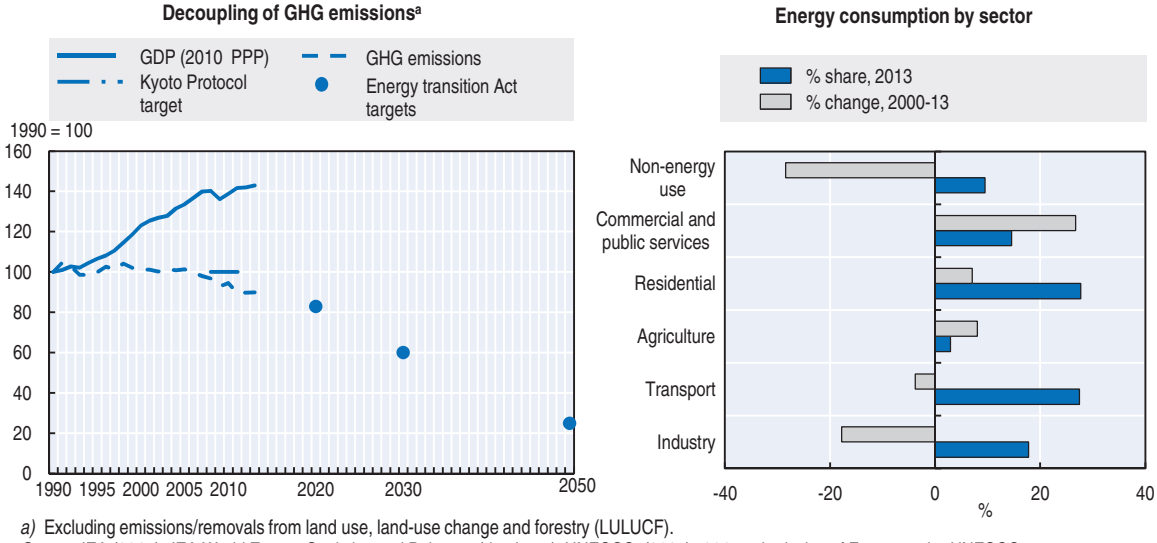
Strategic and institutional framework

The environment has loomed larger in France's energy policy over the last ten years, a development consistent with its EU and wider international commitments on energy and climate. The fight against climate change was declared a national priority in 2001 and, alongside the preservation of human health and the environment, was included in the objectives of the Energy Policy Guidelines Act in 2005. Ambitious targets have been adopted for deploying renewables, improving energy efficiency and reducing GHG emissions, including the Factor 4 approach, which aims to divide emissions by four between 1990 and 2050. A national debate preceded the drafting and adoption of the Energy Transition Act in August 2015, which aims to pave the way for an economy less dependent on fossil fuels and to implement a new, more sustainable energy model in response to the challenges of energy supply, price trends, resource depletion and the requirements of environmental protection, especially climate change. The act confirms the objectives set in the EU and international framework, adding a target for electricity generation diversification based on a 50% reduction in the share of nuclear by 2025.

The expansion of MEEM to encompass energy policy has made sectoral integration easier. Multiple strategies have been introduced at national level (Climate Plan, National Energy Efficiency Action Plan, National Renewable Energy Action Plan, etc.) and local level (Regional Climate-Air-Energy Plans, Territorial Climate-Air-Energy Plans), setting numerous objectives for all economic sectors. These framework documents are backed up by a battery of economic, financial and regulatory instruments that have enabled France to make progress in terms of GHG emissions, energy consumption and air pollution (Figures 1 and 3).

However, results have not matched the objectives. A proliferation of energy and climate legislation plus a multitude of often overambitious targets with differing and overlapping time horizons have complicated governance and hampered the evaluation and tracking of

Figure 3. **A lower-energy and lower-carbon economy**



a) Excluding emissions/removals from land use, land-use change and forestry (LULUCF).
Source: IEA (2015), *IEA World Energy Statistics and Balances* (database); UNFCCC (2015), *2015 submission of France to the UNFCCC*; UNFCCC (2014), *First biennial report of France under the UNFCCC* ; OECD (2015), *OECD National Accounts statistics* (database).

StatLink http://dx.doi.org/10.1787/888933405855

progress. Administrative complexity, legal instability, multiplication of instruments and overlap of powers at various levels of sub-national government have also held back implementation and undermined the effectiveness of policies, slowing the pace of renewables installation, for example. The Energy Transition Act aims to improve energy policy steering by creating an integrated framework for multiyear investment programming covering all energy sources and defining a national low-carbon strategy, setting indicative sectoral ceilings for GHG emissions over five-year periods in order to achieve Factor 4.

Developing renewables

The development of renewable energy sources is a determining factor for the economy's capacity to achieve low-carbon objectives while reducing the share of nuclear energy in the electricity generation mix. However, the rollout rate of renewables to date has not been sufficient to achieve the objective of lifting their share to 23% of gross final energy consumption by 2020 (MEDDE, 2009). To achieve this, efforts since 2005 to increase renewables-based electricity generation would have to be roughly tripled and those for heat production nearly quadrupled between 2014 and 2020. Although the intermediate targets in the national renewables action plan for the use of solar photovoltaic (PV) energy have been greatly exceeded, the development of onshore wind power and of solid biomass (for the production of heat and electricity) have fallen short of expectations. Offshore wind power has not even started (SOeS, 2014).

As in other OECD countries, unstable support measures combined with the red tape surrounding licence applications have held back renewables development. In particular, feed-in tariffs to support the solar PV industry were badly calibrated at the outset, generating windfall effects, and have been changed several times, sometimes retroactively, resulting in investment slumping and several firms going out of business. Under the Energy Transition for Green Growth Act, the feed-in tariff will be gradually replaced by feed-in premiums for installations in mature segments above a certain size. This should encourage integration of renewables into the electricity market while limiting windfall effects, provided that the system is easy enough for investors to understand. The complexity of regulations has also slowed the deployment of projects: in 2013, the time lapse in France between submitting an application for an onshore wind turbine and actual construction was triple that in Germany (Cour des Comptes, 2013a). Recent streamlining measures, such as the single licence procedure in regions with significant wind power potential, are welcome and should be continued. Since 2009, the Heat Fund has accelerated renewable heat production. However, the budget allocated to the fund (EUR 1.2 billion between 2009 and 2014) is below initial intentions. The government intends to double allocations by 2017.

Support measures for renewables are mainly financed by a tax called the contribution to public service charges for electricity (CSPE), paid by electricity consumers. It has soared, mainly due to the expansion of renewables industries, the growing burden of additional costs resulting from overgenerous feed-in tariffs in the first solar PV contracts, and falling electricity prices (the benchmark for calculating additional cost offsets). The CSPE has been repeatedly criticised (Cour des Comptes, 2013a), especially because it puts the full burden of developing renewables on consumption of electricity which in France has a low carbon content. It was reformed in November 2015 to give parliament greater control and restore balance in the taxation of different energy sources: feed-in tariffs will also be financed by a part of revenue from the growing carbon component in taxes on fossil fuel consumption.

The growing integration of renewables raises many issues. The first is a more flexible electricity system, which can be encouraged by the development of national grids and interconnection to the European grid, and by better demand management through smart grids and territorial planning (IDDRI, 2015). In France, flexibility stems from hydropower, which can provide storage capacity, and from nuclear power, which provides baseload power. Because France is committed to reducing the share of nuclear energy in the electricity generation mix to 50% by 2025 and limiting nuclear generation capacity, it must clarify its policy choices on closure and extension of the operating life of reactors in order to smooth the investment that would be required when many plants reach their 40-year limit (MEDDE, 2015). Multiannual energy programming, which will define the direction of public policy on demand management, infrastructure optimisation and interaction between energy vectors, should improve visibility for investors. The power generation base should also be optimised economically, which means improving control of production costs in different energy industries and adapting support mechanisms for renewables, against a backdrop of falling wholesale electricity prices, which is hardly conducive to investment.

Improving energy efficiency

Reducing energy consumption has long been a mainstay of French energy policy. However, the fall in final consumption has not matched ambitions (MEDDE, 2015). Although progress has been made in all sectors, further effort will be needed to meet the ambitious objective set in the Energy Transition Act of halving final consumption between 2012 and 2050 (EEA, 2015).

The residential and commercial sector, which accounts for over 40% of final consumption, represents a major policy challenge. Energy savings certificates, thermal regulations and financial incentives, such as sustainable development tax credits and soft loans, are the main instruments introduced to improve energy performance in the sector. The certificate programme, which obliges energy suppliers to make energy savings, has been tightened over time. In response to recommendations by the Cour des comptes (2013b), which audits the use of public funds in France, and to new EU rules, the programme was simplified and made more transparent for the third implementation period (2015-17). It now serves as a model for other sectors. France's thermal regulations for new buildings are an example of good practice because they are based on outcomes rather than inputs, unlike those for existing buildings, which need to be improved.

Although progress has been made, achieving the objective of 500 000 renovations a year by 2017 is a big task: only 265 000 energy improvement projects were carried out in 2013 (OPEN, 2015). There are many barriers to lift. The terms, scope and conditions of eligibility for financial incentives have been revised many times in recent years and the links between them, not always clear, have made access to them difficult for individuals. They have also generated considerable windfall effects and encouraged piecemeal renovations which are less efficient than complete renovations. The problem has been compounded by a lack of professionalism in the industry, resulting in considerable disparity in the quality of diagnoses and services provided. The environmental cross-compliance requirement, introduced in 2014, should help remedy the situation. Financing issues have also been raised: the tax credit weighs heavily on public expenditure (Cour des Comptes, 2011; MINEFI, 2015); local banks lack the technical skills to process eco-loan applications (Hilke and Ryan, 2012) which led technical responsibility for eligibility to be entrusted to building contractors; and the energy performance contract, a third-party

financing mechanism, has been less successful than expected because local authorities are put off by its complexity, individuals face high transaction costs and it cannot be combined with other support measures (MINEFI-MEDDE, 2013).

Improving the thermal performance of residential properties is also a way of combating fuel poverty, which was estimated to affect nearly 20% of the population in 2015 (ONPE, 2015). Between 2010 and 2015, the Habiter Mieux programme financed energy efficiency improvements for 140 700 households in fuel poverty, compared with a target of 300 000 by 2017 (ANAH, 2015). Difficulties persist in identifying and informing isolated individuals entitled to help and in financing the residual amount they have to pay (Chancel et al., 2015). The introduction of a "Habiter mieux" eco-loan in 2016 is aimed at facilitating such financing.

France has tried various ways to provide help with paying energy bills to combat fuel poverty, though their effectiveness has not yet been proved. The concessionary tariffs currently in place have been criticised as providing insufficient support and for being unequal depending on the type of heating used, incapable of targeting the poorest households and prohibitively expensive to administer (ADEME, 2013). The replacement of concessionary tariffs with a means-tested energy voucher from 2016 should improve targeting and be simpler to run. However, insofar as it is restricted to payment of heating bills (or purchases to make the home more energy-efficient), it could reduce the incentive to consume less energy. A new obligation aimed at fighting fuel poverty was introduced into the energy savings certificate programme in 2016.

Recommendations on energy transition

- Complete and implement the strategic framework for energy policy:
  - draw up the multiyear energy programme in consultation with the regions, defining road maps for developing generation capacity compatible with the national low-carbon strategy;
  - continue efforts to monitor production costs of energy industries;
  - put in place arrangements for revising implementation measurements when annual tracking indicators for the multiyear energy programme and the national low-carbon strategy stray too far from the road map.
- Ensure long-term clarity and transparency of measures to support renewables and energy efficiency; tighten monitoring to reflect changing technology costs and ensure that they do not lead to windfall profits; step up efforts to simplify and stabilise the legal framework regulating the installation and operation of renewables-based supply; strengthen efforts to develop biomass use and biogas production.
- Promote EU co-operation on the electricity market; develop interconnection capacities with EU grids to integrate renewables.
- Add overall building energy performance obligations to thermal regulations for existing buildings; make financial incentives for energy efficiency renovation conditional on an improvement in overall building performance.
- Encourage third-party investment.
- Structure the building renovation sector and increase training.
- Improve information on fuel poverty in order to better identify the issue and target assistance; evaluate the cost-effectiveness of such assistance.

5. Biodiversity: protection of natural and outstanding areas

Situation, trends and pressures on biodiversity

France's geographical position in Europe and overseas gives it a wealth of natural resources which make it one of the world's 18 megadiverse countries (Mittermeier et al., 2008).[10] It is also one of the ten countries with the most endangered species, giving it great responsibility where biodiversity is concerned.

Despite many initiatives over the last ten years, France, like other countries, did not achieve the objective set by the Convention on Biological Diversity (CBD) to significantly reduce the rate of biodiversity loss by 2010. Three-quarters of habitats of community interest (as per Annex 1 of the EU Habitats Directive 92/43/EEC) in metropolitan France are in an unfavourable state and there has been no noticeable improvement since 2007. Grasslands, wetlands and coastal areas are most affected, together with their associated species. The share of endangered species, although generally lower than in most OECD countries, is still high: one species in five in metropolitan France is endangered. The situation is even more worrying in the overseas areas of France: over 30% of birds in Reunion and Guadeloupe are endangered or have disappeared. A third of the indigenous vascular plants in Reunion are under threat. The homogenisation of environments associated with agricultural intensification and specialisation, habitat fragmentation and land take are the main threats to biodiversity. Additional pressures include exotic invasive species, overfishing and climate change, all of which are especially critical overseas.

Strategic and institutional framework

In line with its commitments under the CBD, France adopted a first National Biodiversity Strategy in 2004 for the period until 2010. A strategy review highlighted the lack of involvement of the players concerned and a lack of a cross-cutting approach. The momentum generated by the Grenelle Forum helped remedy these shortcomings and many actors took part in the framing of the second National Biodiversity Strategy for 2011-20. Greater openness encouraged wider ownership of the issues at stake and biodiversity policy now concerns many economic sectors across France. However, local authority involvement needs to be stepped up, especially overseas (Juffé et al., 2012), and the 2011-20 strategy emphasises the mobilisation of associations and businesses rather than individuals. In response, the General Council for the Environment and Sustainable Development recommended the mobilisation of regions and of the heads of professional and association networks (CGEDD, 2015). Finally, no figures or deadlines are attached to the objectives of the 2011-20 strategy, and it does not include a resource mobilisation strategy. It is therefore difficult to measure its ambition or evaluate its implementation and effectiveness.

Although EU law is the main driver of legislation on biodiversity in EU member countries, the Grenelle Forum spurred a number of advances. The Grenelle 2 Act, in particular, led to the reform of environmental impact assessment, the definition of the green- and blue-belt network and regional ecological coherence initiatives, as well as the definition of a national strategy for integrated management of sea and coastal areas. France is overhauling its legal framework, unchanged since 1976, with a bill on restoring biodiversity. France has also strengthened its leadership on the international scene: biodiversity-related ODA has almost tripled since 2007-08, France played a leading role in setting up the Intergovernmental Platform on Biodiversity and Ecosystem Services and it is one of the ten framework partners of the International Union for Conservation of Nature (IUCN).

French biodiversity policy, especially the 2011-20 National Biodiversity Strategy, is based on voluntary stakeholder commitment and the use of pilot projects. While the approach has garnered support, strategic documents often overlook capacity for regulatory action and fail to give a clear overall picture of public action, especially the role of ministries other than MEEM. The approach also represents a curtailment of central government's ability to impose requirements on economic players and local elected representatives, whose role in environmental issues has been strengthened by decentralisation. This results in uneven implementation of guidelines set at national level, which is dependent on the will of local politicians, sometimes to the detriment of biodiversity.

Biodiversity governance in France is partially decentralised, with local authorities taking the initiative and generally involving several levels of administration co-ordinated in ad hoc structures overseen by the central government. The government also acts through specialist bodies such as the Marine Protected Areas Agency and the National Hunting and Wildlife Commission. Regions are playing a growing role and in particular will oversee agro-environmental funding and the implementation of sustainable development programmes. The effect of decentralisation is to dilute responsibilities and reduce the visibility of public action in favour of biodiversity, due to the increase in the number of bodies with considerable overlap but no organised interaction. In addition, central government is ultimately responsible for mediation and co-ordination even though it has divested some of the legal and financial resources that would enable it to meet these commitments. Under such circumstances, the creation of a French Biodiversity Agency, a flagship measure of the bill on restoring biodiversity, should rationalise governance if it effectively brings together the various bodies responsible for biodiversity and does not add yet another level of complexity.

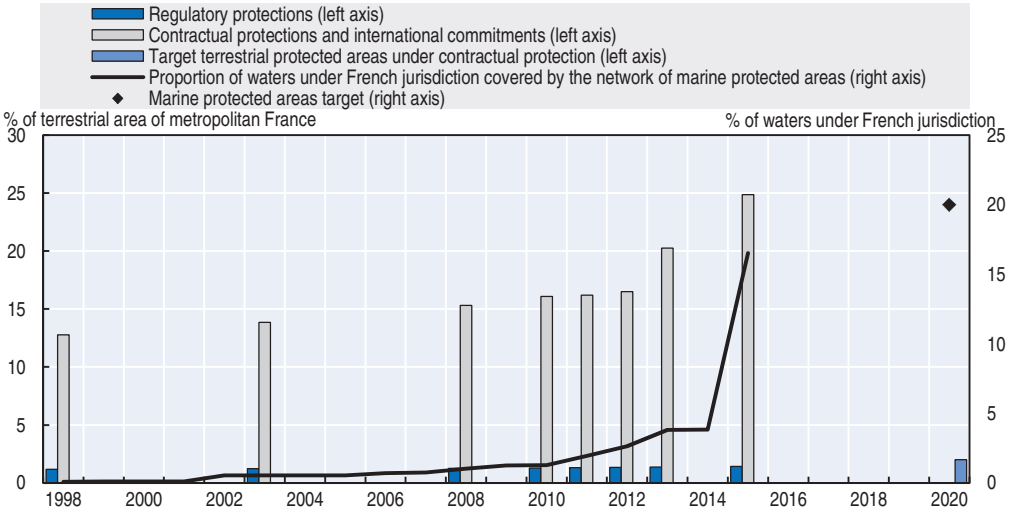
Information systems

France has multiple biodiversity information systems consolidated and showcased in a National Biodiversity Observatory, which compiles indicators on biodiversity and its links with society, monitors implementation of the National Biodiversity Strategy and participates in France's reporting to the CBD. The Nature and Landscape Information System, which includes observations by amateur naturalists, has helped improve knowledge of the status and distribution of species and habitats. The draft law on biodiversity conservation envisions an acceleration of open data in the biodiversity domain. However some environments, especially overseas (where new species are regularly discovered) are still little known, and knowledge of marine biodiversity and the pressures on it is insufficient. The French Assessment of Ecosystems and Ecosystem Services, along with studies on the value of protected areas at subnational level, has shown that the benefits of protecting natural areas (e.g. Natura 2000, the Port Cros and Guadeloupe national parks) outweigh the cost of managing them (PNF, 2015). However, there is not yet sufficient consensus on methods for valuing ecosystem services for them to be included in socio-economic calculations and they are little used in designing innovative financing mechanisms.

Protected areas

France has already achieved the CBD objectives of protecting at least 17% of its land area and at least 10% of the waters under its jurisdiction by 2020. Following the creation of the Natural Park of the Coral Sea, covering the entire maritime area of New Caledonia, 16.5% of French waters are now classed as marine protected areas, representing a major step towards the national objective of 20% of waters under protection by 2020 (Figure 4). The partnership-

Figure 4. **The surface of protected areas is increasing**



Source: MNHN -INPN (2015), *Espaces protégés* (database); SOeS (2014), *L'environnement en France*; Agence des Aires Marines Protégées, 2015.

StatLink http://dx.doi.org/10.1787/888933406012

based, decentralised approach promoted by the National Biodiversity Strategy has helped overcome the conflicts of interest that initially hampered creation of the Natura 2000 network: thanks to consultation among stakeholders and the requirement to draw up a management plan for each site, the network is now stable. However, with 1.4% of the land area of metropolitan France under regulatory protection in 2015, the country is still short of its target of 2% by 2020. In 2015, barely 0.7% of metropolitan France was covered by protected zones in IUCN Categories I and II (the highest levels of protection), compared with an OECD average of 3%. The network of protected areas in metropolitan France is satisfactory for only a quarter of the species targeted by the strategy for creating protected areas on land (Coste et al., 2010). It should be extended as a priority to species in open environments such as heathlands and grasslands. The national policy for the development of green- and blue- belts (trames vertes et bleues) provides an important framework to ensure ecological continuity between biodiversity reservoirs, (i.e. ecological corridors).

France has stepped up the protection of certain species of fauna and flora, in particular through national action plans for the conservation and restoration of endangered species. Thanks to the plans' clear objectives, targeted actions, deadlines and outcome-based indicators they have resulted in real progress as can be seen, for example, from the increase in the vulture population. Other instruments could be made more effective by adopting this framework. However, there is no national action plan for the majority of endangered species. In a context of limited resources, species which share habitats and have similar ecological requirements could be brought together under cross-cutting national action plans (Challéat and Lavarde, 2014). In 2007, the procedure for exemption from protection of species of Community interest was brought into line with EU requirements, strengthening habitat protection. France is already seeing the results of these efforts, for example for vultures, otters and wolves (the latter whose presence in areas of agro-silvo-pastoral activity still necessitates the development of a cohabitation solution). However, efforts must be pursued for other protected species such as the bear, some migratory birds and fauna associated with agricultural areas.

Financing biodiversity

Spending on protection of biodiversity and landscapes has increased by nearly 50% since 2000, mainly due to a rise in the amounts spent by water agencies and local authorities on preserving and restoring aquatic environments under the Water Framework Directive (CGDD, 2015c). Public authorities now fund three-quarters of spending on biodiversity protection, compared with half in 2000. In addition to ministerial grants to agencies and public establishments, biodiversity protection is financed by earmarked resources such as water charges collected by water agencies, part of the development tax for the establishment and management of protected areas by departments, and the annual vessel registration fee which enables the Coastline Conservation Agency to acquire and manage land. Despite higher spending, the additional resources that public operators will have to provide until 2020 on protection of land and marine areas were estimated at EUR 400 million per year, representing an increase of about 30% in public spending on biodiversity (Michel and Chevassus-au-Louis, 2013).

Rather than increasing public spending, France has considerable scope for reducing support measures that are harmful to biodiversity (i.e. that encourage natural habitat destruction, overexploitation of natural resources, and pollution) and redirecting them towards conservation and sustainable use (CAS, 2012). Several studies have identified opportunities for tax reform, especially adjusting the planning tax rate to favour activities which use little space and eliminating exemptions for public infrastructure which encourage land take (CFE, 2013). Not enough use is made of existing measures beneficial to biodiversity. In 2013, for example, only 34 municipalities had introduced the low-density tax, which would be effective against urban sprawl. Likewise, charges for using the maritime public domain do not sufficiently reflect the environmental costs associated with the impact on marine biodiversity (Miquel, 2014).

Integrating biodiversity into agriculture and land use planning

The Common Agricultural Policy (CAP) has become greener over the last ten years through environmental cross-compliance under Pillar One and agri-environment measures (AEM) under Pillar Two. Several initiatives have been put in place, including the Ecophyto Plan to reduce pesticide use, the Ambition Bio 2017 plan to promote organic farming, and the "Energy, methalisation, nitrogen autonomy" plan to recover organic effluents. However, these measures have not had the expected effects: AEMs have been criticised as economically inefficient, pesticide use is rising and organic farming is still marginal (4% of agricultural land in use in 2014) (Agence Bio, 2015). Barriers continue to hamper access to support and information, the link between initiatives is not always clear and actors in the sector are still reluctant to accept a model which differs significantly from the conventional one (Quelin, 2010; Potier, 2014). France's agroecology project, in place since 2014, aims to reconcile the economic and environmental performance of agriculture based on the plans described above. Coupled with the recent reform of the CAP, it should allow for environmental issues to be better taken into account in agricultural policy.

Integrating biodiversity into land use planning is a challenge, as can be seen from the fact that urban planners were not involved in framing the first National Biodiversity Strategy. The combining of biodiversity and land use planning within a single ministry in 2007 represented progress, as did the creation of the green- and blue-belt network, which has made local politicians more aware of the interaction between development and biodiversity. Nonetheless, actors involved in land use planning need to take better account

of biodiversity. This could take the form of gradually introducing regional green and blue belts at appropriate scales for guiding planning decisions, incorporating the mitigation hierarchy[11] into land use and urban development plans, and effectively deploying local biodiversity atlases. Significantly greater vigilance on the part of central government departments with regard to environmental assessment of land use plans, programmes and projects would be a prerequisite for the virtuous application of the mitigation hierarchy.

Strengthening the offset component of the sequence is one of France's main advances in relation to biodiversity. However, a performance tracking and evaluation mechanism is still lacking (it should be based on a public register of residual impacts and offsets), as is a mechanism to provide feedback on the effectiveness of developer-financed conservation and restoration initiatives. France has also begun to experiment with biobanking. As such mechanisms have proved their worth in other countries, their use in France could be extended, in particular to better offset recurrent impacts on wetlands and grasslands.

Recommendations on biodiversity

- Review and update the National Biodiversity Strategy, insuring that it incorporates:
  - quantitative targets and indicators for the government and its partners;
  - prospects in terms of regulation, funding and governance.
- Rationalise biodiversity governance and management by bringing together all relevant bodies, including the National Hunting and Wildlife Commission, and setting up a single national consultative body; reform the National Nature Protection Council to concentrate scientific expertise there; roll out the model at regional level.
- Improve the effectiveness of instruments integrating biodiversity into land use planning policies (e.g. the green- and blue-belt network, agri-environment measures, the mitigation hierarchy) through results-based indicators and strengthened governance inspired, for example, by the national action plans for endangered species.
- Gradually eliminate support measures which are harmful to biodiversity and redirect tax instruments towards behaviour which favours the conservation and sustainable use of biodiversity; in particular:
  - eliminate exemptions from the development tax for public infrastructure, which encourage land take, and adapt the rate according to location;
  - encourage municipalities to use the low-density tax;
  - reform the system of charges for using the maritime public domain to better internalise the cost of impacts on marine biodiversity.
- Promote agroecology as a solution to environmental challenges (circular economy, reduction of inputs, renewable energy production, biomaterials, carbon storage); pursue the implementation of support measures (information, training, research and funding) to facilitate the transition to sustainable methods of production; ensure linkage between the various agroecology initiatives and promote synergies between them.
- Improve the effectiveness of the mitigation hierarchy by promoting the use of ecological outcome indicators in the design and evaluation of solutions proposed by developers and by centralising and circulating feedback on the rollout of offsetting measures; strengthen the role of the mitigation hierarchy in the development of planning tools; create a framework for extending the application of biobanking, clarifying the requirements of ecological equivalence (in its qualitative and quantitative dimensions),

Recommendations on biodiversity *(cont.)*

commitment periods and expected guarantees concerning the financing and ecological vocation of land set aside for offsetting. In socio-economic assessments, effectively integrate the costs of the mitigation hierarchy into project expenditure.

- Promote a culture of economic efficiency for biodiversity policies, for example by developing *ex post* economic evaluation indicators shared between actors; continue the French Assessment of Ecosystems and Ecosystem Services and foster the use of valuation methods.
- Ratify the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD.

Notes

1. Act No. 2015-991 of 7 August 2015 on the new territorial organisation of the Republic (loi Notre).
2. Act No. 2015-411 of 13 April 2015 targeting the use of new wealth indicators in the development of public policies (loi Eva Sas).
3. Act No. 2015-1786 of 29 December 2015 on finance, amendment for 2015.
4. The ratio between total revenue from energy taxation and final energy consumption.
5. Includes tax exemptions on fuel used in international air transport, not counted in the OECD Inventory of Support Measures for Fossil Fuels (OECD, 2015b).
6. Expenditure comprises investment and current expenditure of households, businesses specialising in environment protection services or not, public bodies (including local authorities, public inter-municipal co-operation establishments, water agencies) and EU funds (mainly the European Regional Development Fund and the European Agricultural Fund for Rural Development).
7. Environmental protection spans all activities which seek directly to prevent, reduce and eliminate pollution and any other deterioration of the environment resulting from production or consumption processes.
8. Activities which produce goods and services whose purpose is to protect the environment or sustainably manage natural resources.
9. Activities which produce goods and services favourable to better environmental quality.
10. To be megadiverse, a country must be home to at least 1% (3 000) of the world's endemic vascular plants. New Caledonia is the main reason for France's classification as a megadiverse country.
11. "avoid, reduce, offset".

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ANNEX

Actions taken to implement the recommendations of the 2005 Environmental Performance Review of France

Information provided by the country

RECOMMENDATION	MEASURES TAKEN
Chapter 1. Environmental performance: Trends and recent developments	
In water management, maintain the basin-wide approach and setting of charges by the river basin authorities in a context of overall control by the Parliament.	The 2006 Water and Aquatic Environment Act maintained the basin-wide approach. Planning and financial incentives are organised by catchment area committees and water agencies at the level of the catchment area. The new law sets a cap for charges, below which each catchment area committee is free to set its rate according to local priorities and quality targets. The integrated management system by catchment area with devolved, participatory governance is recognised as a "fundamental achievement that must be preserved" (Chapters 1 and 3).
Step up measures to reduce NO_x emissions from transport, agriculture, industry and energy.	Many plans have been adopted to combat air pollution, at the different levels of government. Road transport remains the principal source of NO_x emissions. The widespread adoption of catalytic converters, more stringent vehicle emissions standards and the turnover of cars on the road have all helped bring transport emissions down since 2000. But these measures have not been enough to offset increased traffic and the dieselisation of the car fleet, preventing France meeting the 2010 target for maximum NO_x emissions set by the European Union's Directive 2001/81/EC.
Strengthen measures to limit particulate emissions (e.g. from wood, biomass and diesel combustion) and consider introducing ambient quality standards for fine and ultrafine particulates ($PM_{2.5}$ and $PM_{1.0}$).	There are plans for particulates, health and the environment, and protection of the atmosphere that all aim to limit particulate pollution. Emissions of fine particulates have been falling since 2000 and the target for $PM_{2.5}$ emissions reduction set for 2020 by the Gothenburg Protocol has almost been reached. Levels of fine particulates regularly rise above safe limits for human health in certain areas, however.
Chapter 2. Environmental governance and management	
Ensure that national and EU policies relating to environmental impact assessment (EIA) and strategic environmental assessment (SEA) procedures are fully implemented, including at subnational level.	France has strengthened both procedures, mainly by appointing three environmental authorities responsible for rulings, introducing a case-by-case evaluation and boosting the preliminary examination. It reformed EIAs in 2011 and issued two decrees to improve the transposition into law of the EU's Directive concerning the evaluation of the environmental impacts of certain plans and programmes (2001/42/EC) in 2012. The 2015 law for growth, activity and equality of economic opportunities aims to improve the co-ordination of EIAs and SEAs and increase public participation.
Strengthen the role of indicators in measuring environmental and sustainable development progress and in policy formulation.	Since 2005, the observation and statistics department (SOeS) of the General Commissariat for Sustainable Development (CGDD) has published an annual selection of key environmental figures. A dashboard of 54 follow-up indicators is included in the annual report to parliament on the implementation of the 2010-13 National Sustainable Development Strategy (SNDD). Since 2015, the principal reforms undertaken, especially in the framework of the French budget Act, have to be evaluated according to indicators of inequality, quality of life and sustainable development (Law No. 2015-411 of 13 April 2015).

Information provided by the country

RECOMMENDATION	MEASURES TAKEN
More explicitly integrate an economic dimension when implementing the national sustainable development strategy, and promote integration of environmental concerns into sectoral policies (e.g. for agriculture, transport and energy).	The national strategy of ecological transition towards sustainable development (SNTEDD) for 2015-20 replaced the SNDD 2010-13. It is based on nine strategic points, three of which specifically include an economic dimension: the commitment to a circular, low-carbon economy, the invention of new economic and financial models, and the support for the ecological shift in economic activity.
Pursue efforts to ensure that legislation on access to environmental information complies with recent EU directives, and take the necessary steps to implement the directives and the Aarhus Convention; better inform the public about its right of access to environmental information.	France enacted the European Directive concerning public access to environmental information (2003/4/EC) in 2005. The national public information portal dedicated to the environment, *Tout sur l'environnement,* was launched in 2009 in response to the first pillar of the Aarhus Convention. The Environment Code has, since 2005, required public authorities to adopt measures to inform people of their right to access the environmental information in their possession.
Continue to improve the co-ordination of information systems and the coverage and quality of environmental data, and increase the accessibility and use of such data in the development and monitoring of public policies.	In application of the INSPIRE Directive (2007/2/EC), the National Council of Geographic Information (*Conseil national de l'information géographique*) co-ordinates environmental geographic data. The various tools for disseminating environmental information – Eider, Geoidd, and the portals of the different environmental observatories – have been expanded. The public information portal for water and GéoKit3 (internal to MEEM) also supply tools for the implementation of central and local government policy.
Increase environmental education in primary and secondary schools.	As early as 2004, the Ministry of Education launched a process to roll out sustainable development education, backed by a 2007 circular and the Grenelle II Law in 2010 providing for the integration of sustainable development into all school subjects. Education about the environment and sustainable development was also included in the Education Code in 2013.
Chapter 3. Towards green growth	
Establish a green tax commission.	The Green Taxation Committee (*Comité pour la fiscalité écologique*) was set up in 2012 under the joint authority of the Minister for the Economy and Finance and the Minister for Ecology, Sustainable Development and Energy. This body is composed of the different stakeholders (five-party governance) and promotes the greening of the French tax system. In 2015, it became the Committee for the Green Economy (*Comité pour l'économie verte*), with a remit expanded to include all economic instruments for green growth.
Increase rates of environmental taxes and charges, thereby increasing their incentive effect and reducing the budgetary cost of government environmental policies. Reform energy taxation to better integrate environmental concerns (e.g. continue moving towards balanced taxation on diesel and petrol, abolish the tax on hydroelectricity); set up a green tax commission.	In 2014, carbon was included in the taxation of fossil fuels, and the gradual increase of this tax until 2017 was restated in the Amending Finance Act for 2015. Fuel oil duty was also increased in 2015 and 2016 to offset the abolition of the environmental tax on lorries. The gap between duty on diesel and fuel oil narrowed by almost six centimes per litre between 2014 and 2017. The general tax on polluting activities (TGAP) was extended and some rates raised. The annual tax on company vehicles has been adapted to take account of emissions of CO_2 and other pollutants emitted by vehicles.
Continue to reform existing environmental taxes to take better account of environmental externalities and eliminate the environmentally harmful aspects of energy and transport taxation.	Several environmentally harmful subsidies have been abolished, such as the exemption from the TIC domestic tax on coal and natural gas for consumers and on biofuels, as well as the reduced VAT rate for fertilisers and plant protection products.
Continue efforts to reduce environmentally harmful subsidies, and systematically examine all types of support programme from the standpoint of their net impact on environmental effectiveness and economic efficiency.	Since 2010, every provision of the Budget Act must be subject to a prior evaluation of its economic, financial, social and environmental impact. The Centre for Strategic Analysis (CAS) issued a report in 2012 on public assistance (subsidies, tax expenditure, the non-internalisation of costs) harmful to biodiversity.
Increase efforts to make an economic valuation of environmental damage caused by the energy sector so as to better internalise external costs in energy prices.	In 2009, the Quinet commission set a value for carbon at EUR 100 per tonne for 2030. The Energy Transition Act aims to reach this level.
Continue to carry out economic studies necessary for efficient action on the environment.	The department for the economics, evaluation and integration of sustainable development and SOeS, the CGDD's observation and statistics department publish many economic papers. Other bodies, such as Insee and France Stratégie, also produce economic research that is useful for environmental action. The Stiglitz-Sen-Fitoussi and Quinet commissions and work by Bernard Chevassus-au-Louis have also brought progress in measuring the integration of environmental externalities into the economy.
Ensure that economic instruments are introduced to address externalities associated with agriculture.	Since the 2006 Water and Aquatic Environment Act, farming has been subject to three fees: the fee for diffuse pollution, charged to distributors of plant protection products and graded according to product toxicity; the fee for non-domestic water pollution linked to livestock breeding, calculated per livestock unit; the fee for abstraction, modulated according to the purpose of the abstracted water and according to the resulting pressure on water resources in the zone in which the water is abstracted.

Information provided by the country

RECOMMENDATION	MEASURES TAKEN
Implement urban mobility plans, increase the use of economic instruments in urban transport (notably as regards private vehicle parking and use) and introduce measures to improve emissions from heavy vehicles (e.g. bus traffic, transport of goods and waste).	Urban mobility plans (PDUs) are mandatory for cities of over 100 000 inhabitants, but their take-up has also grown in medium-sized cities, encouraging the development of public transport. Parking pricing has been almost universally adopted in central urban areas. The Grenelle II Law authorises the testing of congestion charges and traffic restrictions for the most polluting vehicles. The Energy Transition Act includes various measures to step up the renewal of vehicle fleets with low-emission vehicles, including in public transport networks (especially buses). It also allows local authorities to give road access and parking privileges to the least polluting vehicles.
Increase the use of rail for passenger and goods transport and the use of combined goods transport, in the context of a modal shift framework policy based on improved internalisation of road transport externalities.	The national commitment to rail freight presented to the Council of Ministers in 2009 included an objective to push the non-road and non-air modal share up from 14% in 2012 to 25% in 2022. The share of these modes of transport has been stable since 2009. The 2011 proposal for a national plan for transport infrastructure, which emerged from the Grenelle, included investments of EUR 174 billion over 25 years for the rail sector. The Mobilité 21 commission recommended modernising the network before developing new lines. The share of road continues to dominate the transport of both goods and people, despite the constant increase in public transport. For rail passenger transport, under the 2015 roadmap for the future of *Trains d'Equilibre du Territoire* the government has undertaken to renew the rolling stock of these long-distance trains between now and 2025 for a total investment of around EUR 1.5 billion. A regular Ministerial conference has been held since 2013 on the subject of reviving rail freight.
Continue to promote environmental protection through proactive employment policies involving measures such as job creation and assuring a better match between training and employment.	2010 saw the creation of a National Plan for the mobilisation for jobs and professions in the green economy in order to predict, support and accelerate the transition to a green economy by adapting skills to changes in technology, the economy and society. A national observatory for jobs and professions in the green economy was set up to identify the skills and training required to meet the needs of employers.
Implement measures (e.g. taxation, emission permit trading, other flexibility mechanisms) to enable fulfilment of Kyoto Protocol commitments, paying particular attention to the transport sector.	France has surpassed its target under the Kyoto Protocol. The emissions quota trading system has been extended to aviation for flights within Europe. Since 2008, the "bonus-malus" scheme for cars has combined the subsidised purchase of new, low- CO_2 emissions cars by consumers with a tax on the purchase of more energy-hungry vehicles. Other measures include the factoring of CO_2 emissions into the taxation of company vehicles since 2006, and the inclusion of carbon in the taxation of fossil fuels since 2014.
Ensure that environmental assessment of projects supported by export credits and credit guarantees is consistent with recommended practices (international standards or equivalent standards set by the host country).	Since 2005, France's credit insurer Coface has been applying the safeguard policies and social and environmental performance standards of the World Bank to the projects it underwrites.
Continue to increase the level of official development assistance and the emphasis placed on environmental projects.	Bilateral official development assistance (ODA) commitments linked to the environment grew by volume and as a proportion of total bilateral ODA between 2006-07 and 2012-13. In 2014, the French Development Agency (AFD) reached 53% of climate awards, passing its annual target of 50% for the first time.
Chapter 4. Energy transition: Towards a low-carbon economy	
Step up efforts to save energy, with due attention to the cost-effectiveness of the measures taken.	Energy savings in the housing sector have been pushed up by incentive measures such as energy saving certificates (ESCs), the sustainable development tax credit ("energy transition tax credit" since 2015), the interest-free eco-loan, the social housing eco-loan and a lower VAT rate for retrofitting. New thermal regulations for new builds came into force in 2012. In industry, energy savings have been incentivised by ESCs, green loans and eco-energy loans. In agriculture, energy savings are promoted by the 2009 Energy Performance Plan for Farms (*Plan de performance énergétique des exploitations agricoles*) and the 2010 Vegetation Plan for the Environment (*Plan végétal pour l'environnement*).
Undertake economic analysis of government policies to promote renewable energy sources so as to minimise the cost to society.	The Cour des Comptes, FranceAgriMer, the General Council for the Economy, Industry, Energy and Technology and the General Council for Food, Agriculture and Rural Land have evaluated the policy, taxation and costs of renewable energies. In 2013, the Cour des comptes said that meeting the 2020 targets for biofuels would carry a high cost for the public purse, that choices needed to be made in terms of the types of energy to promote and the most efficient support mechanisms, and that a realistic evaluation of the cost of CO_2 needed to be carried out. Exemptions from the TIC domestic tax on biofuels will be phased out between 2014 and 2016.
Continue to make the nuclear sector more transparent, including through greater access to information.	The 2006 law on transparency and safety in the nuclear sector led to the creation of the High Committee for transparency and information on nuclear safety (HCTISN) and the Nuclear Safety Authority (ASN). The ASN issues an annual report and several bulletins. Since 2012, the Cour des comptes has published two reports on the costs of the electronuclear sector.

Information provided by the country

RECOMMENDATION	MEASURES TAKEN
Continue to improve solidarity funds for access to essential goods (water, energy, housing) by encouraging effective, long-term personal support; ensure that the planned water law favours access to water.	In 2012, the allocation of social energy tariffs was automated using data from the family allowances fund (CAF) and from energy suppliers, increasing the number of beneficiaries, while the 2013 Briottes Act broadened the eligibility criteria for recipients. In 2016, social energy tariffs will be replaced by a means-tested "energy cheque" to help consumers pay their energy bills, regardless of their heating modes, or to finance energy retrofits. The right to water is mainly protected by housing solidarity funds (FSL) that maintain the water supply. The Briottes Act allows local councils to offer progressive rates with a first tranche that is free of charge; to modulate this rate according to income; to cover all or part of the help supplied by the department for the payment of vulnerable households' water bills with their own budget.
Chapter 5. Biodiversity: The protection of natural and extraordinary areas	
Reduce pollution of agricultural origin (from both crop and livestock farming) by continuing to reform farm subsidies (to decrease incentives for pollution-prone intensive farming), by implementing cross-compliance in agricultural support and by introducing efficient, targeted measures to reduce excessive nitrogen use at individual farm level.	The main measures implemented are the first pillar of the common agricultural policy (CAP), especially the greening and cross-compliance of direct payments; transferring payments to support organic farming from the first to the second pillar of the CAP; environmental payments of the second pillar of the CAP (agro-environmental and climatic payments, and contributions to environmental investments); the nitrates action programme; the Ecophyto plan; water agency action and subsidies; the use of the fee for diffuse pollution and the livestock breeding fee. Since 2014, the French agro-ecological project has aimed to reconcile the economic and environmental performance of the agricultural sector. An experimental certification system for plant protection product savings will be implemented in 2016 in order to encourage a reduction in the use of farm inputs (Chapters 1, 3 and 5).
Integrate biodiversity concerns into sectoral policies (dealing with farming, forestry, tourism and land use planning) in accordance with the national biodiversity strategy, and periodically evaluate progress on action plans.	The 2004-10 SNB was rolled out as ten sectoral action plans: agriculture, international co-operation, transport infrastructure, the sea, natural heritage, city planning, forests, research, tourism and overseas. The 2011-20 SNB promotes the inclusion of biodiversity issues in sectoral policies by means of calls for projects open to local authorities. An activity report on the 2004-10 SNB has been presented every year since 2006 and a progress report was published in 2011. The national biodiversity observatory, which compiles various indicators on biodiversity and its links to French society, tracks implementation of the SNB.
Increase the integration of biodiversity concerns into local decisions relating to economic development, land use planning, infrastructure and tourism activities.	The "avoid, reduce, compensate" mantra is the primary tool for embedding biodiversity concerns in local decisions about economic development and land use. Since the Grenelle II Law, the measures proposed by contractors for the application of "avoid, reduce, compensate" must appear in the project's impact study. In 2012, this tool was boosted with the publication of a doctrine and national guidelines.
Continue to expand protected areas, especially through extension of: i) the network of protected areas under Natura 2000 to 15% of Metropolitan France; ii) marine areas, and iii) protected areas in overseas départements.	The land-based part of the Natura 2000 sites covered 12.6% of metropolitan France in May 2014. Since 2005, three new national parks have been created (the national park of Reunion, the Amazonian park of French Guiana and the national park of the Calanques), as well as five new regional natural parks. Since the law of 14 April 2006, France has had a 15th category of protected marine areas: natural marine parks (PNM). These parks currently cover 128 000 km^2 of coastal and deep-sea marine areas, through seven PNMs.
Seek out and improve partnerships to build consensus regarding the issues at stake in connection with the EU directives on habitats and birds and the Bern Convention.	The Natura 2000 network supports implementation of the EU Directives on habitats, fauna and flora and on birds. Local parties interested in a Natura 2000 site may help to manage it through a steering committee that draws up the site's objectives in a document called the Docob, which acts as a management plan. Local authorities were responsible for 62% of Docobs in 2013, compared to 40% in 2009. The process has proved its worth: the network was said to have been stabilised in 2013.
Organise and increase the resources for studies on biodiversity (e.g. at the Natural History Museum, at the French Institute for the Environment, and in the overseas départements); increase funding for nature conservation, including by adjusting local taxation and finance.	Biodiversity knowledge has been organised and strengthened with: the creation of an information system about nature and landscapes and a national biodiversity observatory; the enrichment of the national natural heritage inventory. France has also begun its own evaluations of ecosystems and ecosystem services, designed to paint a picture of ecosystems and their trends and to estimate the value of the services they provide. Spending on the protection of biodiversity and landscapes has grown by almost 50% since 2000, because of a rise in spending by water agencies and local authorities on maintaining and rehabilitating aquatic environments as part of the implementation of the framework Directive on water. The reform of land use taxation started in 2010 covered some of the issues linked to land take. There exists a certain number of tax provisions to support biodiversity, but they are rarely used.
Continue to strengthen enforcement of environmental regulations; improve their integration in land use planning documents, including at local level; strictly apply the laws on risk, mountains and coastal areas, including at local level.	The provisions of the laws on risk, mountains and coastal areas have been included in the territorial coherence plans (SCOTs), local zoning plans (PLUs) and municipal maps.

Information provided by the country

RECOMMENDATION	MEASURES TAKEN
Enforce the coastal law more strictly and speed up the Coastal Conservatory's land acquisitions by significantly increasing its budget to achieve the targets for the metropolitan coastline (200 000 hectares in 30 years); give the Conservatory an objective and resources that match the scale of the coastline challenges in overseas départements; continue to draw up and implement marine enhancement plans for the main coastal regions, in particular by introducing monitoring mechanisms.	A 2015 circular is designed to help local authorities with the integration of the provisions of the law on coastal areas into city planning documents. Since 2005, the area under the protection of the Coastal Conservatory has almost doubled; in 2016 it was greater than 166 000 hectares, representing 13% of the coastline and 700 natural sites. In 2006, the allocation of ships' yearly registration fees (DAFN) to the Coastal Conservatory significantly boosted the budget allocated thereto between 2005 and 2015. In 2013, however, the Cour des comptes highlighted the paucity of the Conservatory's resources with regard to its objectives. Law No. 2005-157 of 23 February 2005 introduced two main changes to maritime enhancement plans (SMVMs): the SMVM procedure has been devolved, and regional authorities are now able to introduce an individualised Chapter in their coastal SCOT that is equivalent to an SMVM.

PART I

Progress towards sustainable development

PART I

Chapter 1

Environmental performance: Trends and recent developments

This chapter provides an overview of the main environmental trends observed in France since 2000. It describes the progress made and the challenges that France needs to overcome if it wants to continue decoupling environmental pressures from economic growth. It reviews the main economic and social developments, takes stock of changes in economic energy, carbon and material intensities, and measures the steps taken towards the sustainable management of natural resources, including water resources and ecosystems.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

1. Introduction

France is the largest country in the European Union by area and the fifth largest economy in the OECD. Its people enjoy relatively high levels of education and quality of life. Although it has withstood the global economic crisis fairly well, growth has been weak since, and the unemployment rate is high. Thanks to its geographic position within Europe and its overseas possessions, France embraces a great diversity of land-based and marine ecosystems. In contrast, it has little in the way of fossil fuel or mineral deposits, and its freshwater resources are modest.

This chapter provides a snapshot of key environmental trends in France and highlights the main outcomes as well as the important challenges that will have to be addressed with a view to achieving green growth and sustainable development. It relies on indicators derived from national and international sources to evaluate the country's progress since 2000 in pursuit of its national and international objectives. Wherever possible, the state of the environment and the main environmental changes are compared with those in other OECD Member countries. In this way, the chapter establishes a frame of reference for the following chapters, which assess the extent to which French environmental policies have succeeded in influencing trends and using environmental objectives to create economic and social opportunities.

2. Main economic and social developments

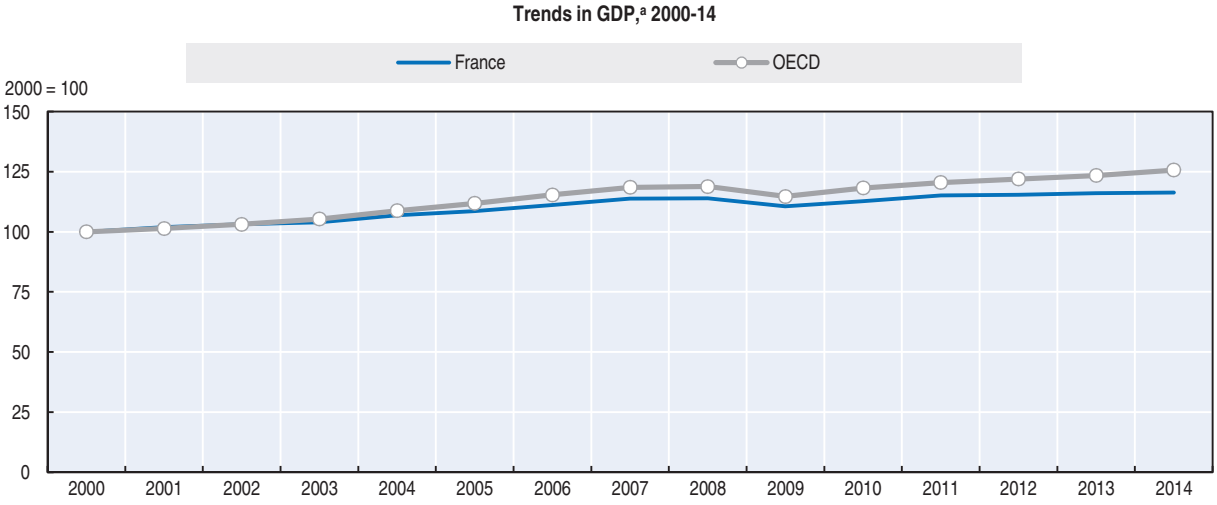
2.1. Economic performance is weaker than the OECD average

Per capita GDP in France is equal to the average for OECD member countries. Labour productivity is high, thanks to a relatively skilled workforce. The government's cost of borrowing remains low. The banking system is sound and, in contrast to some other countries in the euro zone, the supply of credit does not seem to be constraining economic activity, even for small and medium-sized enterprises (OECD, 2015a).

Over the period 2000-14, French economic growth has been weaker than the average for OECD member countries (Figure 1.1). While GDP for the OECD as a whole rose 26% by volume and 14% on a per capita basis, in France GDP increased by only 16% and 7%, respectively. This gap has widened in recent years. French GDP was up by 14% between 2000 and 2008, then fell by 3% in 2009 due to the economic crisis. After a slight rebound in 2010 and 2011, GDP has stagnated since 2012, with an annual growth rate of less than 1%. This can be blamed, among other things, on insufficient domestic demand, a steady decline in French export performance since 2002, as well as recurrent deficits on the current account balance and low investment by businesses. Forecasts point to a slight recovery for 2015 and 2016, with a GDP growth rate close to 1.1% and 1.5% respectively (OECD, 2015b).

French businesses are experiencing competitiveness problems. Exports of goods and services represented 28% of GDP in 2014, a ratio that has remained stable since 2000. In contrast, the weight of French trade and exports vis-à-vis the rest of the world declined steadily over the same period. Lack of competition in certain sectors leads to high prices

Figure 1.1. **Economic growth is below the OECD average**



a) GDP at 2010 prices and purchasing power parities.
Source: OECD (2015), *OECD National Accounts Statistics* (database).

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and high costs, which depress productivity and purchasing power and hence economic performance. France is in thrall to heavy rules and regulations, cumbersome administrative and business procedures, and a complex taxation system that impedes business creation (OECD, 2015a).

In an effort to boost economic growth, the government undertook significant structural reforms in 2012 which, if they are applied, could have a major impact on the economy. The reforms already under way involve reducing regulatory constraints on competition, improving the labour market and tax structure, and simplifying the country's territorial organisation. The reforms announced, although not yet implemented, call for the reduction of regulatory barriers to competition in the network industries (gas and electricity) and in regulated professions. The overall impact of these measures is expected to boost GDP by 1.6% over the next five years, and by 3.7% in 10 years (OECD, 2015a).

The weight of public spending is higher than in the majority of OECD member countries. Since 2000, such spending has risen from 51% to more than 57% of GDP. This can be laid to the fact that in France public employment, social benefits, health spending and retirement pensions are higher than in most European countries. (Insee, 2015) (OECD, 2015a).

Fiscal pressure has increased sharply since 2009, and exceeded 45% of GDP in 2014, placing France in second position among OECD member countries in terms of the rate of compulsory contributions (chapter 3). On the other hand, environmentally related tax revenues shrank over the period 2000-14, both as a share of GDP and as a proportion of total tax revenues. In 2014, they represented 2.0% of GDP and 4.4% of tax revenues, ratios that are among the lowest in OECD Europe (Chapter 3).

2.2. A services-based economy characterised by high unemployment and sharp regional disparities

France is one of the most highly tertiarised economies in the OECD, despite its relatively diversified industrial structure. In 2014, the services sector accounted for 79% of value added

(versus 74% in 2000), followed by the industrial sector (including construction), which contributes 19% of GDP, and agriculture, at 2%. The construction sector has been particularly hard hit by the economic crisis. While it saw strong growth in its value added until 2007 (+15% over 2000), that growth then dropped to 19% between 2007 and 2014 (OECD, 2015c).

In 2013, the tertiary sector represented 76% of employment, while the equivalent figure for industry was 20% (including 7% for construction) and 3% for agriculture. Public administration, education and health alone account for around 30% of employment, followed by retail and wholesale trade, at 12% (Insee, 2015).

France is also characterised by a high unemployment rate, attributable for the most part to rigidities in the labour market. Unemployment has been rising steadily since the 2008 crisis: in 2013 it exceeded 10%, and now stands well above the OECD average of 7%. Young people under the age of 25 are particularly affected, with an unemployment rate that stood at 24% in 2013, compared to the OECD average of 16% (OECD, 2015b).

Some 80% of the population is concentrated in major urban areas, which occupy a third of the territory. Apart from the megalopolis of Île-de-France, which surrounds the capital, urban zones are concentrated along the country's borders and its coastline. Île-de-France generates around 30% of French GDP and is home to 20% of the economically active population. The North and East regions of France, where mining, steel making and textile industries are located, have been particularly affected by the decline in the industrial sector, and they have high unemployment rates. On the other hand, the high unemployment rate of the Mediterranean basin is explained by its surplus balance of migration. The drop in agricultural employment has been felt particularly in the West and Southwest regions. The Southeast (Rhône-Alpes and Provence-Alpes-Côte d'Azur) is the second most dynamic economic centre of France, accounting for 17% of the active population and 18% of the country's GDP (OECD, 2015d, 2015e, SOeS, 2014).

2.3. The standard of living is relatively high

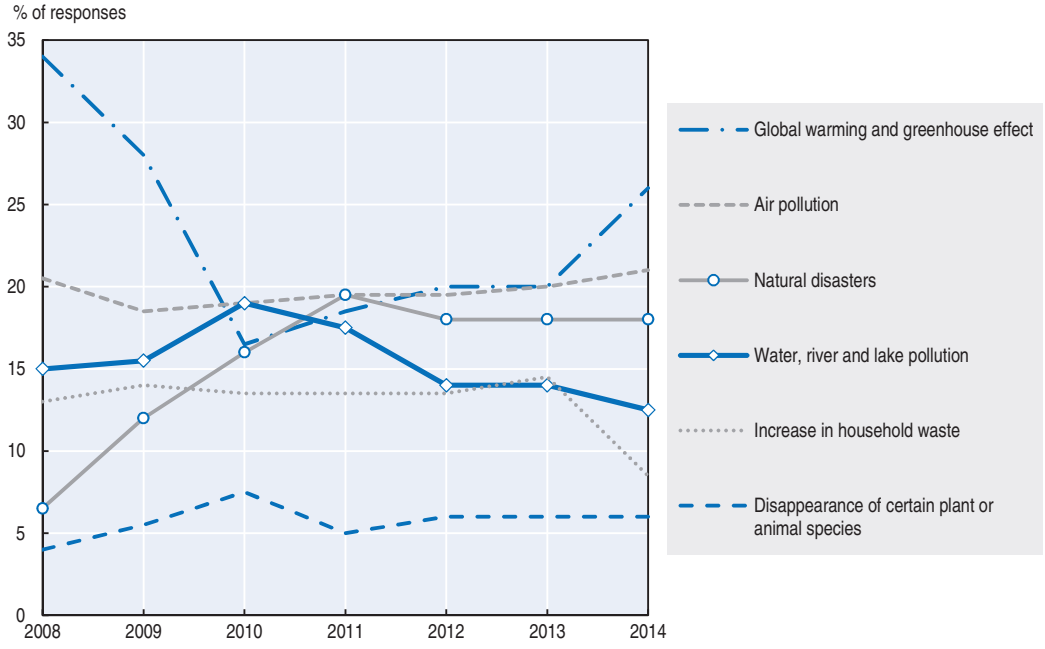
France has relatively high levels of well-being and quality of life. It ranks above the majority of OECD member countries in terms of income and wealth, balance between working and private life, and health and social relationships. Life expectancy at birth is high, at 85 years for women and 79 years for men, compared to an average life expectancy in OECD member countries of 82 and 77 years respectively. The fertility rate is among the highest in the OECD, with an average of two children per woman, whereas the OECD average is 1.7. France also has a relatively well-educated workforce, although the proportion of the population with a senior secondary school diploma or higher (73%) is below the OECD average (75%) (OECD, 2015f).

Compared to countries with equivalent living standards, the state of health is good overall in France, with respect to the major indicators such as standardised mortality or life expectancy (at birth or at 65 years), and other thematic indicators such as cardiovascular mortality, the second-ranking cause of death in France. Life expectancy continues to rise, contributing to the ageing of the population and an increase in the number of persons afflicted by chronic illnesses and functional disabilities. Important disparities persist, however, between men and women and between regions and social categories (Drees, 2015).

While the economic crisis may have shunted the environment to second rank[1] among the French people's concerns, the subject remains a source of concern. Climate change and air pollution are the environmental problems that most preoccupy the French. This

tendency can be explained by the growing communication on these subjects and by repeated surges of pollution in recent years. Natural disasters rank third among public concerns, as a result of recent floods and storms. By contrast, the increase in waste attracts less interest than in the past. The survey also shows that the French do not seem to place great importance on the loss of biodiversity (CGDD, 2015) (Figure 1.2).

Figure 1.2. **Climate change and air pollution are the primary environmental concerns among the French**



Source: CGDD (2015), *Opinions et pratiques environnementales des Français en 2014*, Chiffres et statistiques.

3. Transition to an energy-efficient and low-carbon economy

3.1. Energy use

A low-carbon energy mix

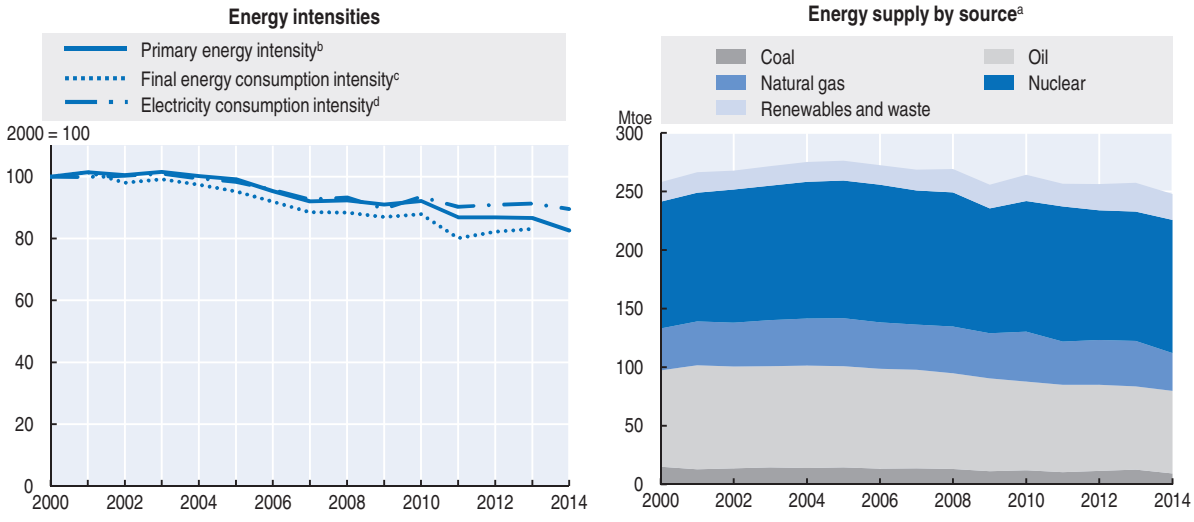
The energy mix is dominated by nuclear power, which in 2014 accounted for 47% of total primary energy supply (TPES) and 78% of electricity generation (Figure 1.3). Since 2000, the share of fossil fuels in TPES has shrunk in favour of nuclear and renewables. This translates into an energy mix that is less carbon-intensive than the OECD average. Following the Fukushima incidents in 2011, the French government committed itself to reducing the nuclear share in power generation to 50% by the year 2025 (Chapter 4).

Although their share has risen since 2000 overall, renewables accounted for only 47% of total primary energy supply in 2014, and 78% of electricity generation (Figure 1.3). Similarly, 16% of French electricity generation was of renewable origin, compared to 22% for the OECD average and 31% for European countries (AIE, 2015).

Energy intensity

The French economy is less energy-intensive than the OECD average. After rising by 8% in the years 2000-05, TPES declined by more than 10% between 2005 and 2014 (Figure 1.3).

Figure 1.3. **Nuclear is predominant in the energy mix**



a) Total primary energy supply. Breakdown excludes trade of electricity.
b) Total primary energy supply per unit of GDP (2010 prices and PPPs).
c) Final energy consumption per unit of GDP (2010 prices and PPPs).
d) Electricity consumption per unit of GDP (2010 prices and PPPs).
Source: IEA (2015), *IEA World Energy Statistics and Balances* (database); OECD (2015), *OECD National Account Statistics* (database).

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Over that period as a whole, GDP rose by 16%, with the result that the economy's primary energy intensity dropped by 17%. This progress is however less significant than the average of OECD member countries.

The decline in final energy consumption, which began in 2005, was accentuated by the 2008 crisis, despite some fluctuations (Figure 1.4). Whereas energy demand in the residential, trade and agriculture sectors increased between 2000 and 2013, it fell sharply (by 18%) in the industrial sector and declined more modestly in the transport sector (by 4%).

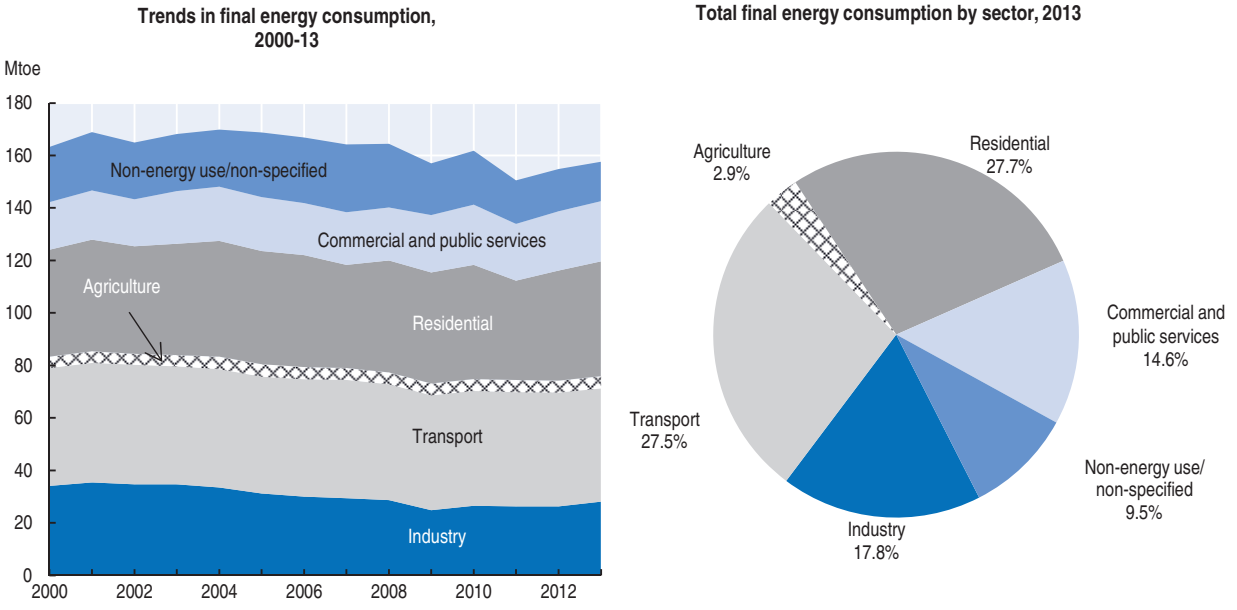
France has exceeded the intermediate objective for energy savings set for 2010 in the First National Plan for Energy Efficiency, established in 2008[2] (Medde, 2014a). In the context of the EU Energy Efficiency Directive (2012/27/EU[3]), France has set a goal of reducing its energy consumption to 131 Mtep of final energy and 236 Mtep of primary energy by 2020. Between 2005 and 2012, primary energy consumption declined more swiftly than projected by the scenario established for achieving the 2020 target. The improvement in energy efficiency in the processing industries and the reduction in losses from distribution systems could yield further gains. On the other hand, final energy consumption has been falling more slowly than expected. While there has been progress in all sectors, further efforts will be needed in transportation and the residential sector (EEA, 2014).

Renewable energies

Although the supply of energy from renewable sources has risen by 33% since 2000, it still represented only 9% of TPES in 2014. More than 60% of the renewable energy supply comes from biomass (primarily solid biomass for heat production) and renewable wastes, followed by hydropower (25%) and wind and solar energy (10%) (EEA, 2015).

France has set itself a target of 23% for the share of renewables in gross final energy consumption by the year 2020, pursuant to the applicable European directive (2009/28/EC).

Figure 1.4. **Energy consumption is dropping in industry and rising in the residential-tertiary sector**



Source: IEA (2015), *IEA World Energy Statistics and Balances* (database).

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Solid biomass and wind power are the two main sources identified by the National Action Plan for Renewable Energies (Chapter 4). In 2014, renewables represented 14.6% of gross final consumption, short of the intermediate target set at 16% (Figure 1.5). This lag relates to both electrical and thermal components (Medde, 2015a).

While the objective set for solar power has been practically achieved, if the target of 23% is to be met the efforts made since 2005 will have to be nearly tripled in the case of renewable electricity and nearly quadrupled in the case of renewable heat between 2014 and 2020.

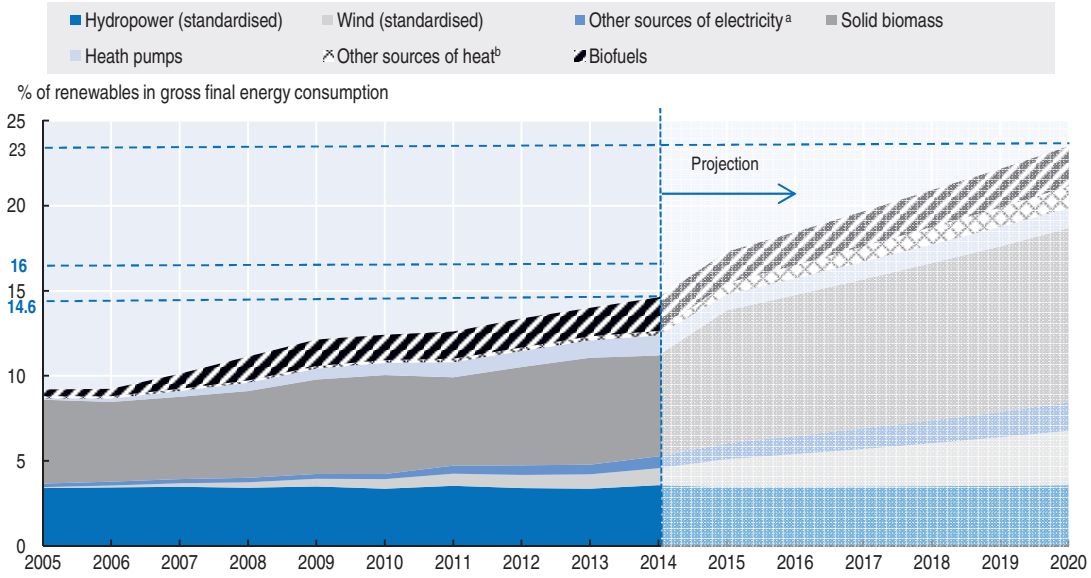
3.2. Road transport predominates

The transport sector is the second biggest consumer of energy (28% of final consumption in 2013) and produces the most greenhouse gas emissions (27% of total emissions) (Figure 1.7). As in most countries, road transportation accounts for nearly all of the energy consumed by the transport sector (94%).

Since 2000, energy consumption in transportation has slowed. Apart from the decline in road freight haulage following the crisis, this slowdown can be explained by the fact that the growth of the automobile fleet has been largely offset by lower average vehicle mileage and by lower unit consumption (thanks to the switch to diesel and improved energy efficiency of engines) (Medde, 2014a).

The Grenelle Forum (Chapter 2) goal of boosting the non-road and non-air modal share from 14% to 25% by 2022 seems out of reach (Figure 1.6). Road haulage is still the principal mode of freight transport: its share went up from 81% in 2000 to 88% in 2014, at the expense of rail transport, which represented only 10% in 2014.

Figure 1.5. **The 23% target for renewables will be hard to achieve**



a) Solar photovoltaics, marine energy, geothermal electricity, biomass electricity (fuel wood, biogas, incinerated waste, bagasse).
b) Thermal solar power, geothermal power, biogas.
Source: SOeS, B*ilan de l'énergie* (achieved, up to 2014) and *national action plan* (projection, as of 2014).

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Passenger transportation is still dominated by private vehicles, which carried 83% of travellers in 2014. Collective transportation has been rising steadily (+26% for trains and +29% for busses and tramway), but the share of these two modes (10% and 5% respectively) remains far behind that of automobiles (Figure 1.6).

With 51 vehicles per 100 inhabitants in 2014, France has one of the highest vehicle ownership rates among European members of the OECD (45) (Annex 1.A). In 2012, moreover, 33% of private vehicles had been on the road for more than 10 years, and 34% for between five and 10 years, both figures up slightly from 2000. This increase has come at the expense of newer vehicles (less than two years), which represented only 13% of the fleet, versus 16% in 2000 (Eurostat, 2015a).

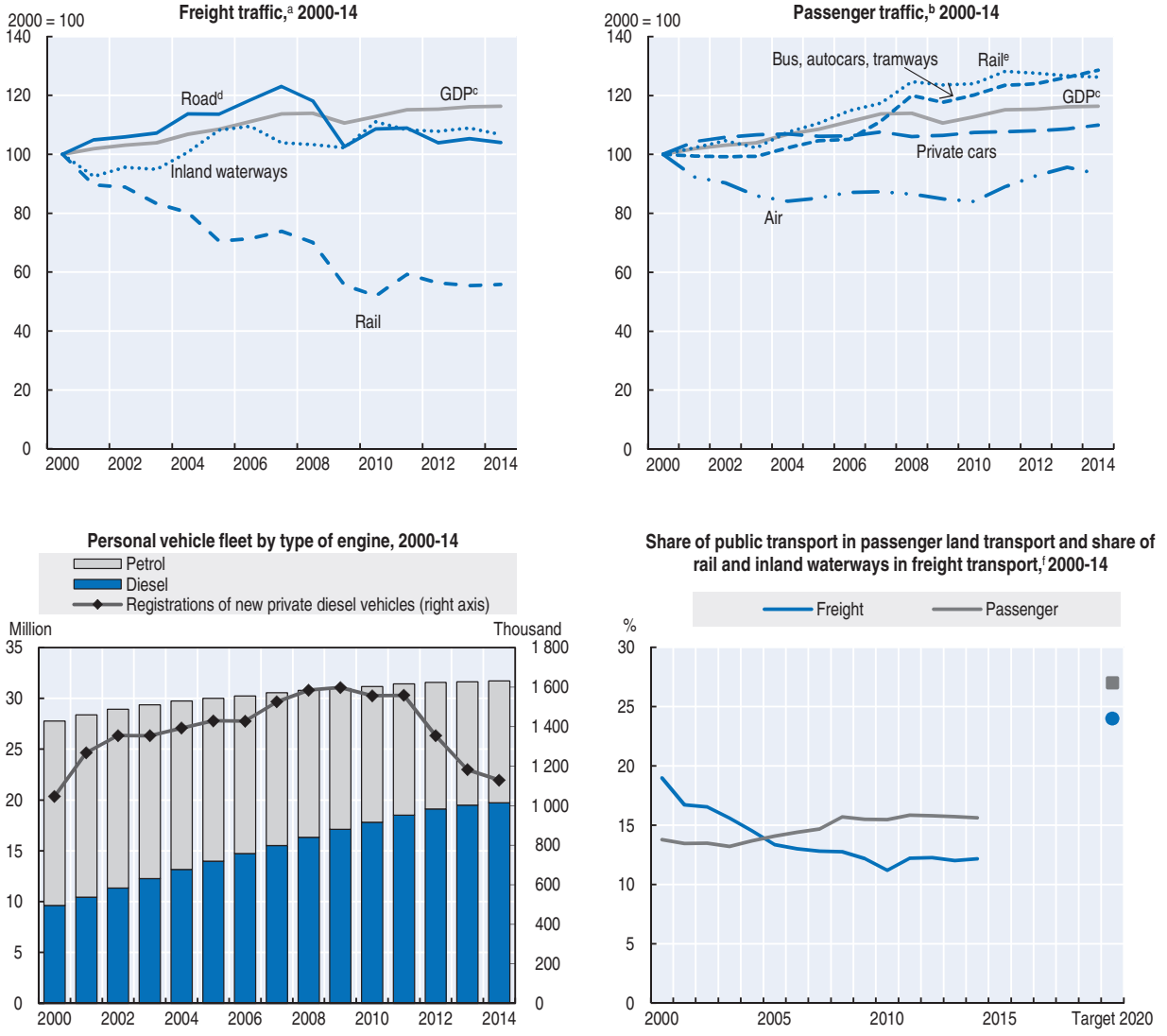
The proportion of diesel-powered automobiles has increased spectacularly, jumping from 35% in 2000 to 62% in 2014, one of the highest rates in Europe. This is due in part to relatively low taxes on diesel as compared to petrol, as well as to the preferential tax treatment of diesel-powered vehicles (chapter 3). Since 2010, however, there has been a decline in the registrations of new diesel vehicles, reflecting the elimination of the vehicle scrappage scheme and a tightening of the bonus-malus insurance scale (Figure 1.6).

3.3. Greenhouse gas emissions

Profile of emissions

Greenhouse gas (GHG) emissions in France other than those due to land use, land-use change and forestry (LULUCF), declined by 10% between 1990 and 2013. France has thus surpassed the objective that it had set, in the context of the Kyoto Protocol, of limiting its GHG emissions over the period 2008-12 to their 1990 levels. Since 2000, the decoupling of GHG and CO_2 emissions from economic growth has continued (Figure 1.7).

Figure 1.6. **Road transport and diesel fuel still predominate**

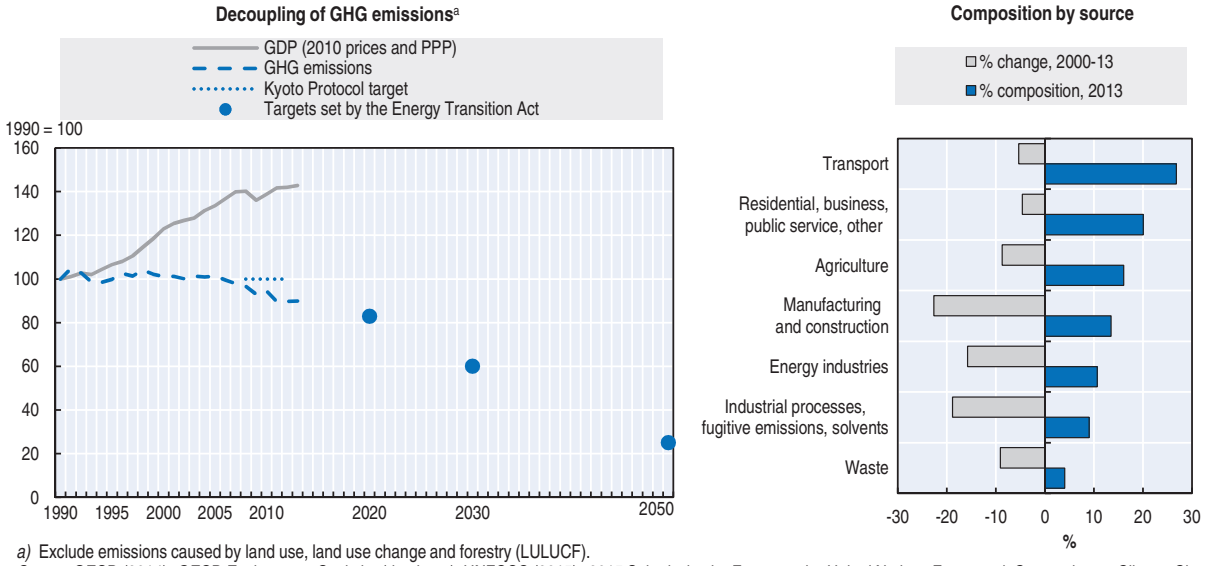


a) Based on values expressed in tonne-kilometre.
b) Based on values expressed in passenger-kilometre.
c) GDP at 2010 prices and PPPs.
d) Includes foreign vehicles. As of 2006, excludes transit but includes tonne-kilometres travelled within the national territory by national vehicles for international transport.
e) Metro included.
f) Data refer to inland transport.
Source: SOeS (2015), *Comptes des transports en 2014;* OECD (2015), *OECD National Accounts Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933405912

As in most OECD countries, CO_2 emissions constitute the bulk of GHG emissions in France, accounting for 75% of total emissions in 2013; they are followed by methane (CH4) and nitrous oxide (N_2O), representing respectively 12% and 9% of the total, with the remainder coming from emissions of fluoride gases (HFC, PFC, SF_6). 72% of emissions are due to energy use, particularly in transportation and in the residential and tertiary sector, which account respectively for 27% and 20% of total GHG emissions apart from LULUCF. The other main contributors are agriculture (16%), manufacturing and construction (13%) and the energy industry (11%) (Figure 1.7).

Figure 1.7. **GHG emissions are falling**



a) Exclude emissions caused by land use, land use change and forestry (LULUCF).
Source: OECD (2014), *OECD Environment Statistics* (database); UNFCCC (2015), *2015 Submission by France to the United Nations Framework Convention on Climate Change*; UNFCCC (2014), *France's first biennial report to the United Nations Framework Convention on Climate change*; OECD (2015), *OECD National Accounts Statistics* (database).

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The manufacturing and construction industry has seen the sharpest drop in emissions (-23%) since 2000. This progress, attributable to greater energy efficiency in industrial processes as well as the replacement of oil and coal by less polluting energy sources, has been accelerated by the economic crisis (SOeS, 2014). Emissions linked to energy use in transportation dropped by 5% between 2000 and 2013, especially after the 2008 crisis. The introduction of lower-carbon vehicles has served to limit emissions from transportation, despite a slight increase in road traffic.

Under the European climate and energy package, France is committed to a 21% reduction in emissions covered by the European Union Emission Trading Scheme (EU ETS) between 2005 and 2020, and a 14% cut for those not covered by the EU ETS. Projections suggest that France is on track for achieving this objective (Ecologic Institute and Eclareon, 2014).

Emissions intensity

The GHG emissions intensity of the French economy, i.e. the ratio between GHG emissions and GDP, declined by 23% between 2000 and 2013, a pace faster than the OECD average. Carbon intensity (CO_2 emissions due to energy consumption per unit of GDP) also dropped by 25% over the period 2000-13, compared to the OECD average of -22%.

The GHG emissions intensity of France is among the lowest in the OECD, at 0.21 tonnes of CO_2 equivalent per 1000 USD of GDP (at 2010 prices and purchasing power parity), compared to the OECD average of 0.39 tonnes. This reflects the heavy reliance on nuclear power, which is low in carbon emissions compared with fossil fuels.

3.4. Atmospheric emissions and air quality

Principal plans and programmes

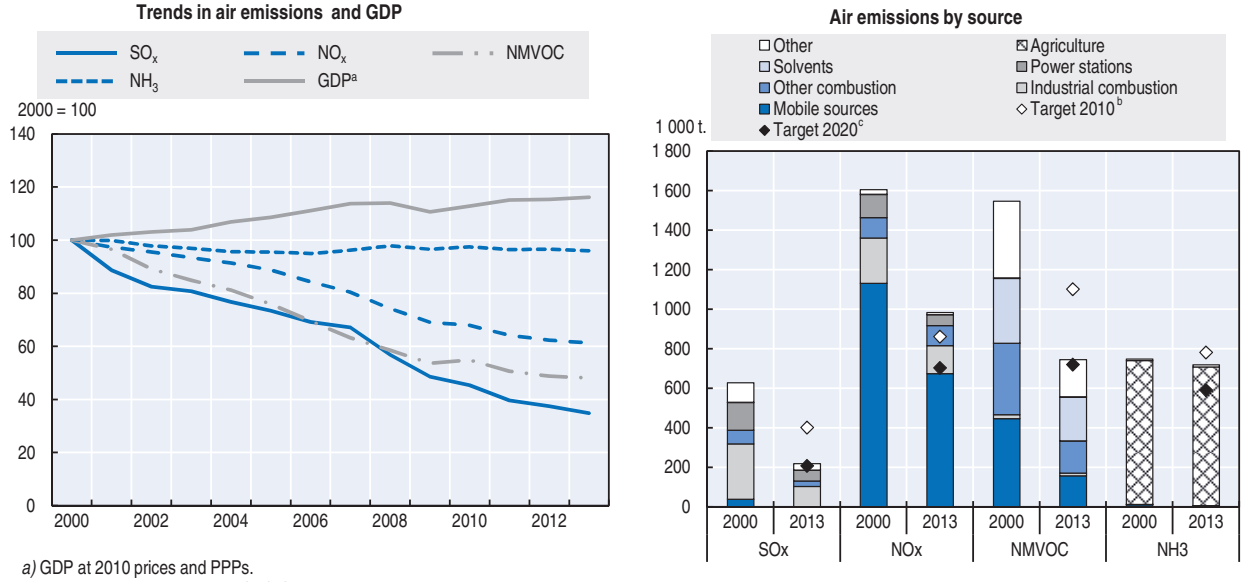
A number of plans for combating atmospheric pollution have been adopted at different levels of government (particulates plan 2010, emergency air quality plan 2013, national

environmental health plan 2004-08, 2009-13, 2015-19, regional environmental health plans, regional climate-air-energy schemes, plans to protect the atmosphere in major cities or in particularly polluted zones). They combine regulatory measures (for example technical prescriptions for combustion facilities), tax measures and incentives (such as the addition of substances to the general tax base for polluting activities, subsidies for modernisation of wood-burning devices) and provisions for policy co-ordination among local governments in the context of decentralisation laws (Chapter 2, Chapter 3, CGDD 2015b). The Energy Transition for Green Growth Act also contains provisions to enhance air quality. It includes the reduction of atmospheric pollution among the objectives of energy policy and calls for the revised national plan for reducing emissions of atmospheric pollutants to be published by June 2016.

Emissions profile

France has succeeded in decoupling emissions of the main atmospheric pollutants from economic growth (Figure 1.8). Its SO_x and NO_x emissions per unit of GDP are far below the average for the OECD. France has achieved its 2010 objectives under the EU Directive on national emission ceilings for certain atmospheric pollutants (2001/81/EC), with the exception of NO_x emissions, which exceeded the ceiling set for 2010 by 33% (SOeS, 2014).

Figure 1.8. **The objectives for reducing emissions of atmospheric pollutants have been met, except for NO_x**



a) GDP at 2010 prices and PPPs.
b) Targets set by Directive 2001/81/EC on national emissions ceilings for certain pollutants.
c) National target under the revised Gothenburg Protocol.
Source: EMEP (2015), *Officialy reported emission data* (database); OECD (2015), *OECD National Accounts Statistics* (database).

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The progress achieved since 2000 in reducing emissions can be explained largely by the enforcement of stricter regulations, the decline in fossil fuel consumption, energy savings, and deindustrialisation of the economy (Citepa, 2015).

Road transportation remains the principal source of NO_x emissions (54% of the total), despite a 43% drop since 2000 (Figure 1.8). The generalised use of catalytic converters, the tightening of vehicle emissions standards, and the renewal of the automobile fleet have

not been sufficient to offset the effects of growing traffic and the increasing share of diesel-powered vehicles in the vehicle fleet (62% in 2014) (SOeS, 2014) (Medde, 2015b).

NH_3 emissions dropped by only 4% over the period 2000-13. Agriculture, and livestock raising in particular, is the principal source of NH_3 emissions (98% of the total in 2013) (Figure 1.8). The fluctuations observed can be linked to changes in the size of the herd and the quantity of fertilisers used (Citepa, 2015).

There was a marked shift in the distribution of NMVOC emissions by source between 2000 and 2013. The relegation of road transport from first to third place was due primarily to the equipping of petrol-powered vehicles with catalytic converters, but also to the growing share of diesel-powered vehicles that emit less NMVOC. In 2013, the use of solvents was the biggest source of NMVOC emissions, followed by non-industrial combustion (in particular the burning of wood in small domestic devices) (Citepa, 2015) (Figure 1.8).

Fine particulate emissions have continued to decline since 2000. As of 2013, those emissions had already dropped by 26%, and France had therefore virtually achieved the goal (set by the Gothenburg Protocol) of reducing $PM_{2.5}$ emissions by 27% by 2020, from their 2005 level. Wood burning, mainly for domestic purposes, quarry operations, construction, ploughing and road transport are the principal sources of emissions (Citepa, 2015).

Air quality

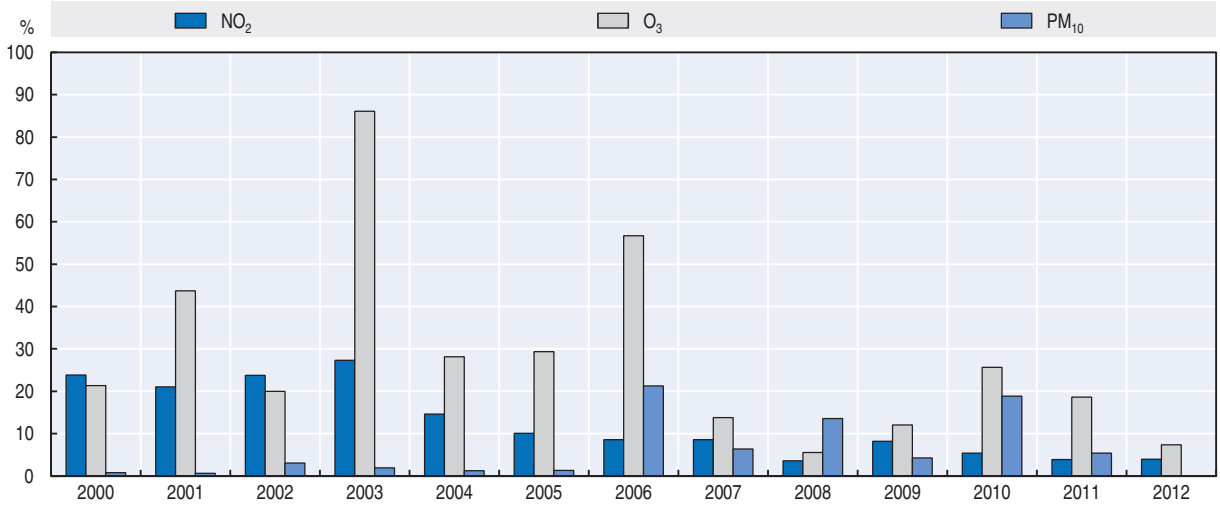
Since they came into effect, France has respected the limit values for the protection of human health set by the European directives (2008/50/EC and 2004/107/EC) for concentrations of SO_2, CO and lead. In 2014, most sampling points were also respecting the regulations for arsenic, cadmium and nickel content. However, 3% of sampling points were not respecting the regulations for benzo(a)pyrene (CGDD, 2015b).

In 2014, France was compliant with the threshold set by the European directive on concentrations of benzene, with the exception of an overrun at one industrial site. Those concentrations have been dropping since 2000, thanks to the limit placed on the benzene content of petrol (CGDD, 2015b).

Since European legislation came into effect in 2005, the maximum daily limits for PM_{10} have been regularly exceeded (Figure 1.9), most notably in 10 zones: Paris, Lyon, Grenoble, Marseille, Martinique, PACA-ZUR (Zone urbaine régionale), Rhône-Alpes-ZUR (Vallée de l'Arve), Nice, Toulon, and Douai-Béthune-Valenciennes. In 2011, the European Commission brought France before the Court of Justice for failing to respect EU legislation on air pollution and for not having taken sufficient measures to reduce such pollution. The Commission handed down a reasoned opinion on the subject in 2015. PM_{10} levels are higher on average in places close to vehicle traffic, and also in the winter and spring (SOeS, 2014). For $PM_{2.5}$, the fluctuations observed from one year to another are explained in part by meteorological conditions. Thanks to a mild winter in 2014, only one of 127 sampling sites exceeded the threshold for protection of human health set by the EU (CGDD, 2015b).

It is in urban areas, and particularly along the main highways, that NO_2 concentrations are highest. They declined on the whole over the period 2000-14 but remain twice as high in areas close to road traffic and in urban zones. The rising number of diesel vehicles and the evolution of diesel technology (certain diesel vehicles are equipped with particle filters that emit NO_2) explain in part why the European thresholds for the protection of human health have not been met (Figure 1.9). France is the target of European dispute proceedings for NO_2 (SOeS, 2014) (CGDD, 2015b).

Figure 1.9. **A declining percentage of the population is exposed to concentrations of atmospheric pollutants exceeding regulatory thresholds**



Source: EEA (2015), *AirBase* (database).

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As with NO_2 and fine particles, average annual concentrations of O_3 in the air vary with meteorological conditions. Although the situation has improved compared to early 2000, the European daily threshold is frequently exceeded, particularly in Île-de-France and in the PACA region (Figure 1.9) (CGDD, 2015b).

The many plans adopted to combat atmospheric pollution have not made it possible to respect regulatory thresholds. They are not very restrictive, they have no precise timetable for achieving their objectives, and they are not systematically assessed. Moreover, the lack of articulation between the documents established at the different territorial levels and the dispersion of responsibilities have impeded their implementation. For example, during the pollution spike in Paris in 2015, the alternate-day circulation authorisation requested by the Mayor of Paris was only granted by the Prefect one week later. Urban road tolls and restricted circulation zones where access is barred for the most polluting vehicles as called for in the Grenelle 2 Law were not established until 2015 (Box 1.1). The introduction in 2016 of the air quality certificate, which establishes a national identification standard for vehicles according to their pollution level, could facilitate enforcement of restricted circulation zones. However, the classification of older vehicles should be sufficiently refined to allow their circulation to be gradually restricted, as this would be more readily acceptable to the public. On the other hand, a coherent tax framework has yet to be adopted: the taxation of fuels and vehicles has favoured diesel, without considering the consequent harm in the form of air pollution (Chapter 3).

The OECD has estimated the health costs of air pollution (the cost of the 21 158 premature deaths linked to ambient air pollution by particulates and ozone in 2013) at close to EUR 54 billion or 2.5% of GDP (WHO/Europe and OECD, 2015). While a large part of this cost can be attributed to road transportation (notably to diesel vehicles), to residential heating, to industry and also to agriculture through NH_3 emissions, the precursor gas to secondary particulates, there are other important sources of air pollution as well (Ademe, 2015). Their contribution to the impacts on health deserves to be studied further.

Box 1.1. **Combating air pollution in Paris**

In 2014, more than 2.3 million residents in Ile-de-France were exposed to pollution that exceeded regulation levels for particulates and nitrogen dioxide. The Paris agglomeration and persons living near the main traffic arteries were the most affected. The city of Paris regularly experiences pollution levels that exceed the warning thresholds.

In 2015, the city of Paris adopted a plan to combat air pollution. It included:

- incentive measures: subsidies to purchase a bicycle, annual public transport passes, a reduction in subscription fees for the "Autolib" public electric car service in return for scrapping an old vehicle ; a reduction in the "Autolib" fees for young drivers ; grants for the construction of secure bicycle shelters, and the installation of recharge points for electric vehicles at Parisian apartment buildings; grants for the purchase of an electric or natural gas-powered vehicle for professionals who own old vehicles.
- The city of Paris is the first city in France to experiment with car-use restrictions. This measure will be applied to the entire perimeter of the capital, with the exception of the Paris ring road ("*boulevard périphérique*") and the woodland parks. Since 1 September 2015, vehicles of more than 3.5 tonnes and "class I star" (made prior to 2001) may not circulate in Paris between 8 AM and 8 PM. This ban will be extended progressively according to a pre-established schedule to other polluting vehicles by 2020.

Source: Airparif (2015), Surveillance et information sur la qualité de l'air à Paris en 2014; Paris Town Hall (2015), Ministry of the Interior (2015)

4. Transition to a resource-efficient economy

4.1. *Material consumption*

Since 2000 France's material productivity (defined as the amount of economic wealth generated per unit of material used) has risen by 31% (Figure 1.10). This increase can be attributed essentially to the economic crisis, which sparked a decline in domestic material consumption (DMC), in particular the use of construction materials, which account for nearly half (47%) of DMC, ahead of biomass used for food (25%) and fuels (17%) (Figure 1.10).

Infrastructure works on the "Grand Paris Express" project, as well as the construction of the housing related to that project (over the period 2019-30), could reverse this trend. They could also lead to a significant increase in inert waste deposits (Driee, 2015).

Ferrous and non-ferrous metal mining had virtually ceased in France at the beginning of this century. To meet its needs, France is therefore dependent on imports (SOeS, 2014).

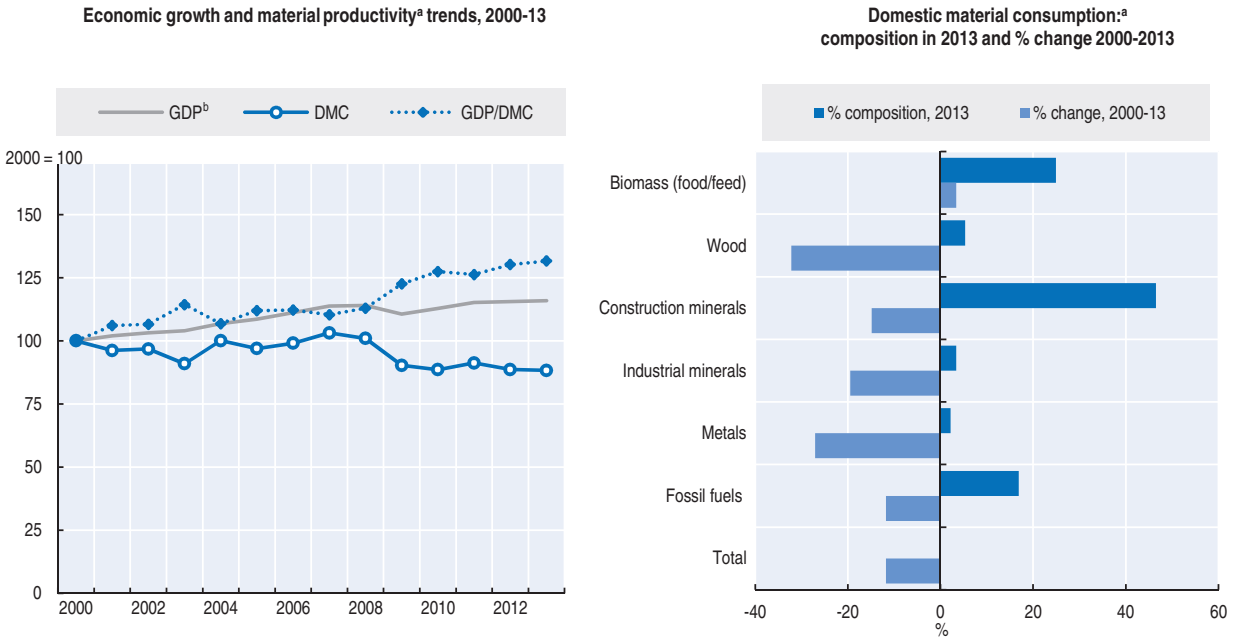
In 2010, DMC was 12 tonnes per capita. This figure takes into account only materials that were extracted, imported or exported in France. In raw material equivalent terms, i.e. taking into account indirect flows (materials used outside the territory), materials consumption was 15 tonnes per capita. Considering flows of unused materials as well, consumption rises to 26 tonnes per capita, or more than double the volume of apparent consumption (SOeS, 2014) (Figure 1.11).

4.2. *Waste management*

Principal plans and programmes

France was one of the first European countries to develop a national waste prevention plan: it did so in 2004, before the European Waste Framework Directive (2008/98/EC) made this mandatory. That plan was followed by the national plan to support household

Figure 1.10. **Resource productivity is rising**



a) Material productivity designates the amount of GDP generated per unit of materials used. It refers to the ratio of GDP to domestic material consumption (DMC), where DMC is the sum of domestic extraction of raw materials used by an economy and its physical trade balance. A rise in material productivity is equivalent to a decline in material intensity (i.e. DMC/GDP).
b) GDP at 2010 prices and PPPs.
Source: OECD (2015), *OECD Environment Statistics* (database); OECD (2015), *OECD National Accounts Statistics* (database); Eurostat (2015), *Material flow accounts* (database).

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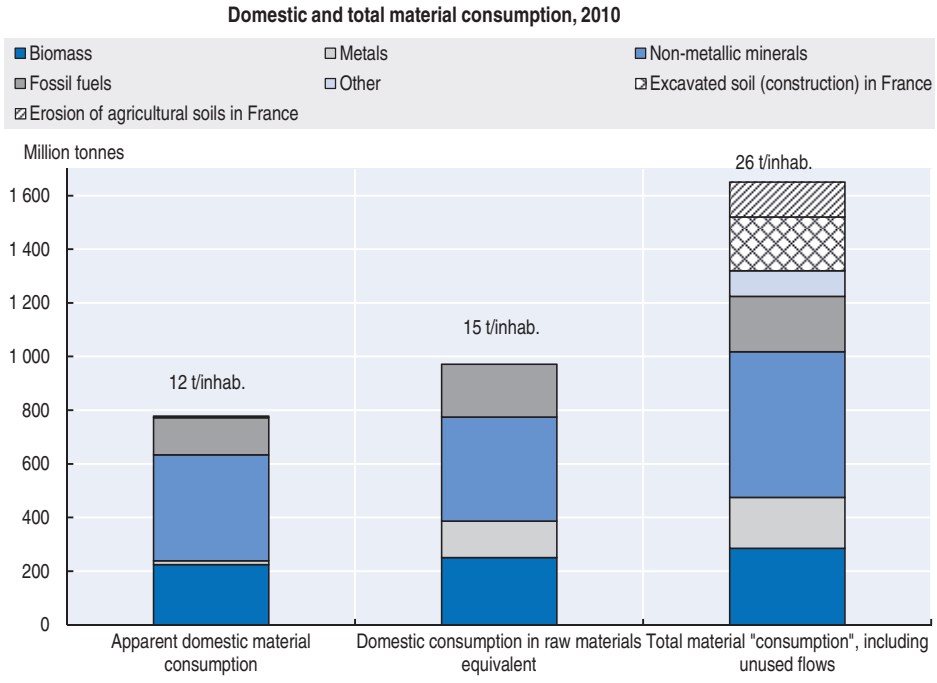
composting (2006) and the two Grenelle laws, the provisions of which were integrated into the waste action plan 2009-12 (Medde, 2014d). This last plan has fostered the implementation of territorial plans for waste prevention and management, as required by the Grenelle laws.

Following the 2013 environmental conference, which devoted a roundtable to the circular economy, a national waste prevention programme 2014-20 was drawn up, setting out objectives for decoupling and priorities for eco-design, prolonging product life, recycling, repair and reuse (Medde, 2014d). These efforts resulted in the inclusion of a section devoted to combating wastage and promoting the circular economy in the 2015 Energy Transition for Green Growth Act. It provides a five-year strategy for the circular economy, including a plan for programming the resources the economy will need and optimising their use. The law sets targets for: boosting material productivity by 30% between 2010 and 2020; reducing the quantities of household and similar wastes per capita by 10% between 2010 and 2020 and cutting the volumes of wastes from economic activities per unit of value produced, especially in the building and public works sector; reducing by half the volume of wastes dumped between 2010 and 2025 and achieving 65% material recovery by 2025. It prohibits the distribution of single-use plastic bags as of 1 January 2016.

Primary wastes

In 2012, France produced 339 million tonnes of primary waste[4], representing an increase of 17% from the level in 2004, while over the same period the waste produced by European countries as a whole fell by 3%. On a per capita basis, the volume of waste produced (including secondary waste[5]) stood at 5.3 tonnes in 2012, slightly above the European average (Figure 1.12).

Figure 1.11. **Materials consumption is twice as high when hidden flows are included**



Note: For flows expressed in raw material equivalent, volumes refer to the categories indicated (biomass, metals, etc.); for total consumption, each category covers apparent flows plus all associated hidden flows, including materials of different natures mobilised during the various economic steps (e.g. fuels associated with the importation of biomass) and unused materials (e.g. excavated soil during construction activities, agricultural soil erosion).
Source: SOeS (2014), *L'environnement en France*.

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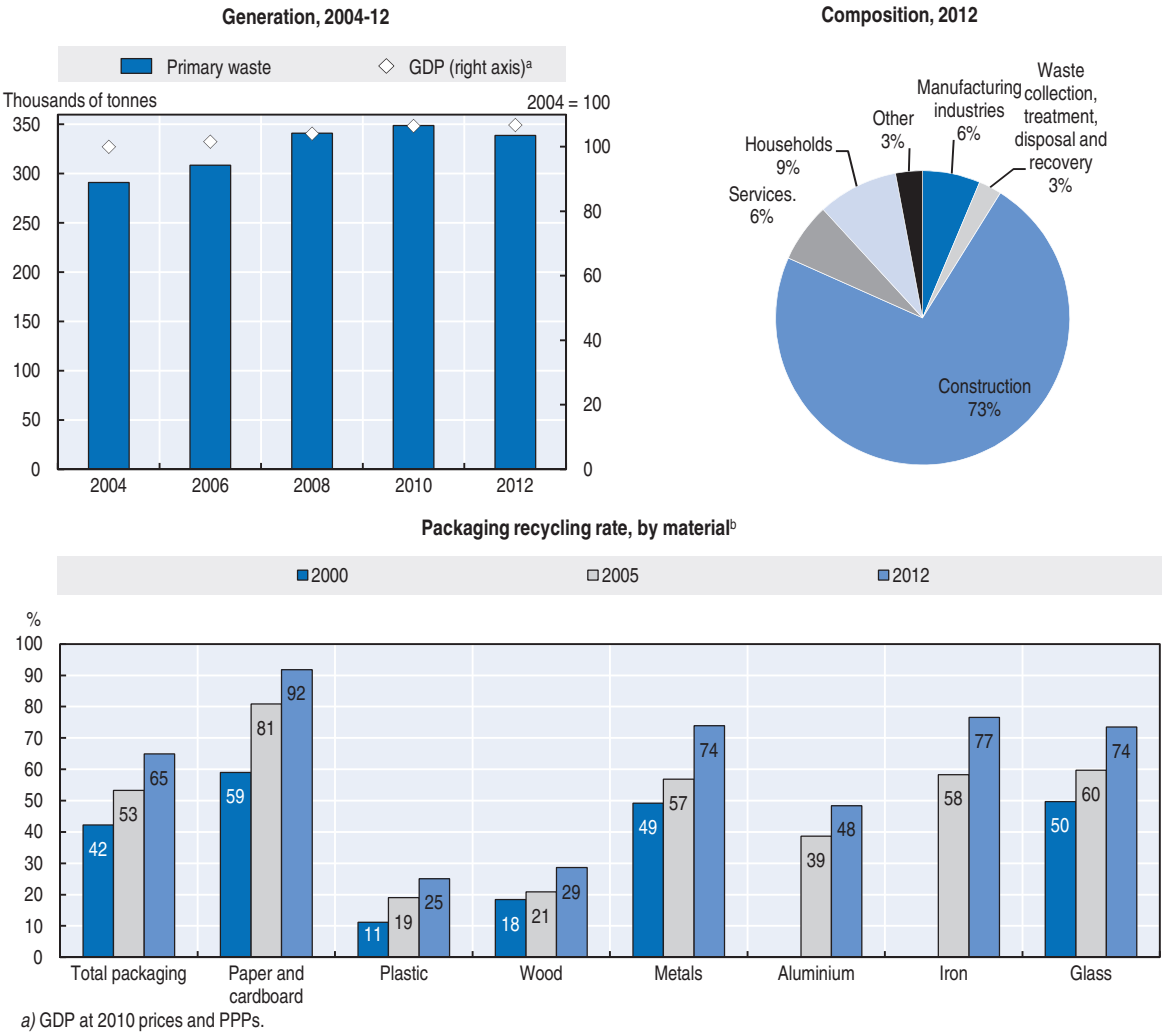
The bulk of waste is produced by the construction sector, followed by households, services and manufacturing industries (Figure 1.12). The production of primary waste rose by 20% between 2004 and 2010, and then declined by 3% between 2010 and 2012, reflecting the slowdown in the construction sector, which was hit particularly hard by the economic crisis. Apart from mining wastes, France generates 1.5 tonnes per capita of primary waste, below the European average (1.8 tonnes per capita).

In 2012, 64% of primary waste was recovered – either recycled, composted or incinerated with energy recovery – and that proportion was virtually unchanged from 2004. The recycling rate for packaging wastes in 2012 was 65%, and the total recovery rate was 75%, but there were sharp disparities depending on the materials in question: while 92% of paper and cardboard packaging collected was recycled, only 25% of plastic packaging and 29% of wood packaging was recycled. The rates for all packaging materials were however up from their level in 2000 (Figure 1.12).

In France 22 product groups are covered by Extended Producer Responsibility (EPR), more than in any other country. According to this principle, producers bear the responsibility (financial in particular) for managing their discarded products. Fourteen new product groups were added between 2006 and 2015, seven of them imposed by national regulation beyond European obligations,[6] and one based on a voluntary agreement[7] (Ademe, 2013).

Figure 1.12. **Primary waste volumes are rising**



a) GDP at 2010 prices and PPPs.
b) Percentage of collected materials sent for recycling.
Source: Eurostat (2015), *Generation of waste* (database); OECD (2015), *OECD National Accounts Statistics* (database); SOeS (2014), *L'environnement en France.*

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Municipal waste

France has decoupled its municipal waste generation from economic activity. This decoupling is only relative: the volume of municipal waste has risen (8%) less quickly than GDP (16%) since 2000 (Figure 1.13).

In 2014, France produced 510 kg of municipal waste per capita, above the European average (480 kg per capita). However, the volumes produced per capita have dropped since the economic crisis, with the slowing of private final consumption (OECD, 2015g).

In contrast to some northern European countries (Netherlands, Sweden, Austria, Germany), France has not banned the use of direct landfill for municipal waste. Therefore, despite a 35% decline between 2000 and 2014, stored municipal waste still accounted for 26% of the volumes handled in 2014. However, the volume of recovered municipal waste represented 73% of the quantities handled in 2014, compared with only 53% in 2000. This progress has been made possible by the opening of sorting and composting facilities

Figure 1.13. **Municipal waste production is slowing, while waste recovery is progressing slowly**

a) Private final consumption (PFC) at 2010 prices and PPPs.
b) GDP at 2010 prices and PPPs.
c) Prior to 2010 recycling amounts refer to volumes entering the facilities (after 2010 they refer to volumes leaving the facilities).
Source: OECD (2015), *OECD Environment Statistics* (database); OECD (2015) *OECD National Accounts Statistics* (database); OECD (2015), *OECD Economic Outlook No 98* (database); SOeS (2014): *L'environnement en France*.

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between 2000 and 2006, as well as the closure of landfill sites and the shutdown of numerous incinerator plants that were not recovering energy (Figure 1.13) (SOeS, 2014).

The objective of the 2009-12 waste action plans relating to the reclamation of household and similar wastes has been achieved, but it was not very ambitious: in 2014, 39% of municipal waste was recycled or composted, a rate well below those for Germany (65%), Austria (58%), Belgium (50%) or the Netherlands and Sweden (50%).

4.3. *Agriculture*

Agricultural inputs

France is the leading agricultural producer in the European Union. Its output has declined slightly since 2000. Excess nutrients (nitrogen and phosphorus) have also declined, both in absolute terms and per hectare of farmland. In 2010, the highest nitrogen surpluses were

to be found mainly in the intensive livestock raising zones of Western France, especially in Brittany (the Massif armoricain) (SOeS, 2014).

Over the same period, the phosphorus load fell by 50%, thanks in part to the generalised resort to soil analysis, carried out by the government in order to rationalise fertiliser use. The sharp price volatility of phosphates (prices soared by 700% in 2008, then collapsed during the crisis, and have been rising again since 2011) has also been a key factor behind this downward trend. Phosphate content is especially high in Brittany, due to intensive livestock raising, as well as in Nord-Pas-de-Calais and Alsace, where industrial slag was used on a massive scale in the past (SOeS, 2014).

Pesticides

The presence of pesticides in watercourses and in groundwater is a matter of concern. In 2011, pesticides were detected in 93% of watercourse analyses done in metropolitan France and in 85% of those conducted in Guadeloupe, Martinique and Reunion. This situation is virtually unchanged from the late 1990s. Such pollution is due primarily to the use of herbicides in metropolitan France and insecticides overseas (SOeS, 2014). In 2013, France ranked second among European countries, behind Spain, in terms of the quantities of active pesticide substances sold (Eurostat, 2014). In 2010, it stood eighth in the world ranking (FAO, 2014).

The pesticide content of groundwater is somewhat lower than in watercourses, but the situation has changed very little since 2000. All territories are affected by this pollution, and quality standards relating to pesticide concentrations were exceeded at 18% of sampling points in 2011 (SOeS, 2014). Pesticides are also a source of air and soil pollution for which current control measures are inadequate.

France is unlikely to meet the Ecophyto plan's target of a 50% cut in the consumption of phytosanitary products. Since its launch in 2008, the plan has not yielded the expected results: while pesticide sales have fallen, the global quantitative monitoring indicators of usage show no downward trend (MAAF, 2014). In particular, the "number of unit doses" (Nodu), which calculates the average number of treatments per hectare of farmland, rose by 29% between 2008 and 2014 (Figure 1.14). As a result, France has pushed back the achievement of this objective by separating it into two stages: a 25% reduction in consumption of phytosanitary products by 2020, on the strength of measures already in place for optimising production systems, and a 50% reduction by 2025, to be made possible by more significant changes to production systems, scientific and technological progress, crop diversification and conversion to organic farming (MAAF, 2014).

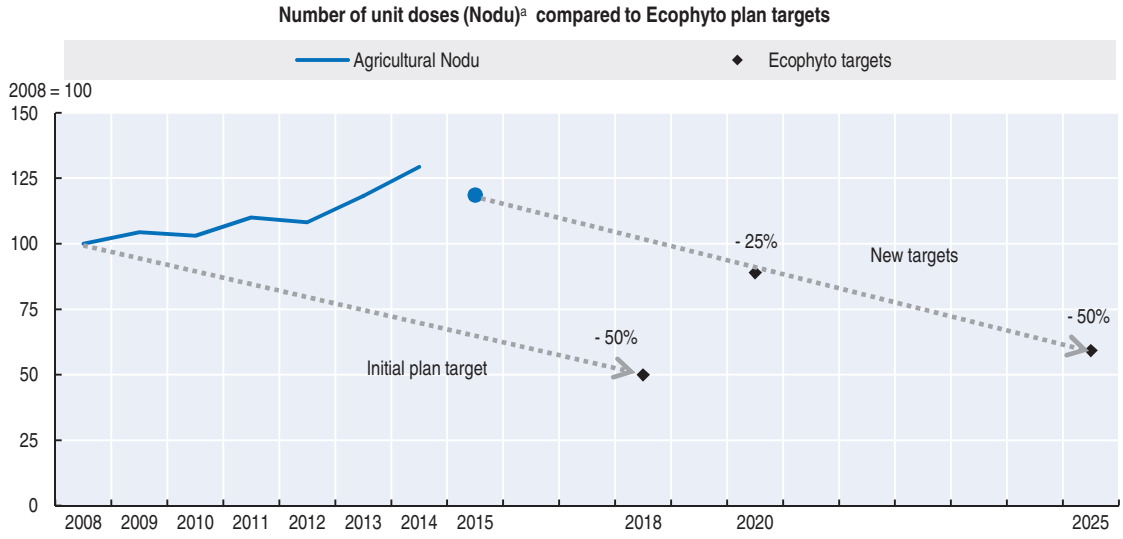
5. Managing the natural asset base

5.1. *Physical context and land use*

With a territory of 549 000 km^2, France is the largest country in the European Union, and it harbours a large variety of landscapes. It is bordered to the north and the west by the North Sea, the Manche or English Channel and the Atlantic Ocean and to the south by the Mediterranean, giving it some 5 500 km of coastline. The country has impressive mountain ranges along its eastern and southern flanks, and is traversed by broad fluvial plains. France also possesses a number of overseas territories, including many islands.

In 2012, agricultural lands (arable lands and croplands, plus meadows and pasture land) occupied 53% of metropolitan France, down by 9% from 2000. It is the meadows or grasslands that have lost the most surface area (-8%), while cultivated lands have declined

Figure 1.14. **Pesticide use is rising**



a) The number of unit doses relates the quantity of an active substance to a specific unit dose. 2015 is estimated as a 3-year average 2012-2014.
Source: SOeS, (2015), *Indicateurs de développement durable nationaux.*

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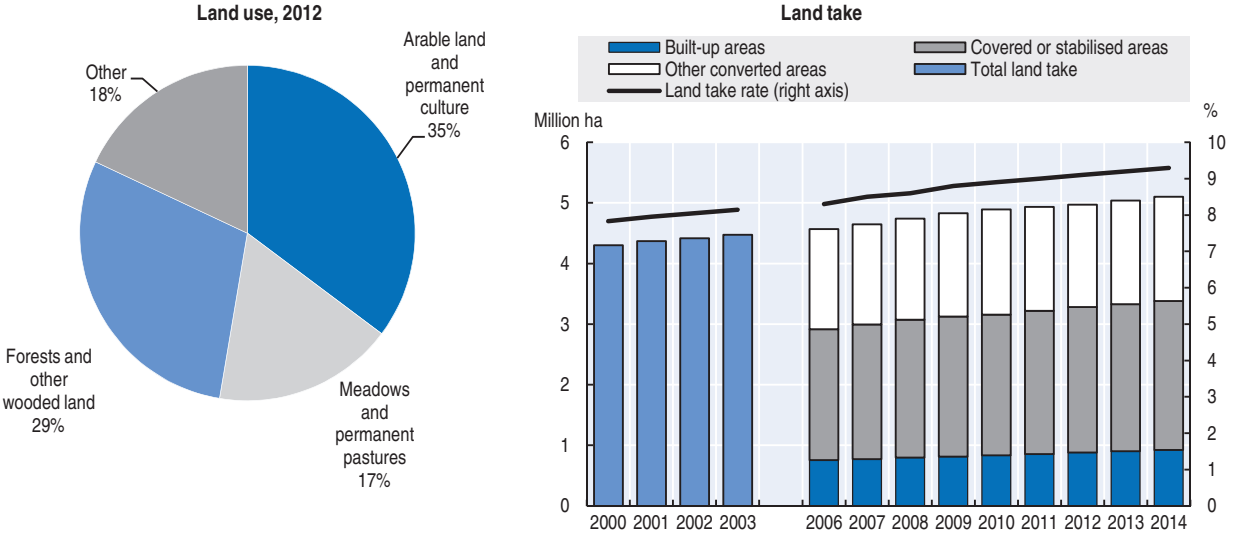
by only 1%. Over the same time period, forested areas has increased by 5%, and other types of surface by 3% (Figure 1.15).

Land take amounted to more than 9% of the territory in 2014, up by 19% from 2000, with a clear acceleration since 2006. Built-up land areas have expanded most rapidly, in particular those destined for economic activities (waste processing, commercial and service enterprises) as well as those allocated to public facilities, particularly for sporting activities. Paved or stabilised areas increased by 14% over the same period, reflecting in

Figure 1.15. **Land take is accelerating**



Source : FAO (2015), *FAOSTAT* (database); MAAF (2015), *Enquête "utilisation du territoire – Teruti-Lucas"* (database), Service de la statistique et de la prospective.

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particular the construction of highways and motorways, which account for 80% of this type of land (Figure 1.15) (SOeS, 2014).

Urbanisation has traditionally taken place around the periphery of cities and along the coastline. However, recent years have seen another, more diffuse trend, with the urbanisation of areas increasingly remote from large agglomerations and the coast, particularly along transportation routes and the country's frontiers (SOeS, 2014).

This urban sprawl tends to boost energy consumption and hence GHG emissions. It is estimated that 51% of households living on the periphery of urban zones have at least two cars, versus 20% of households living in the city centre. However, some studies have found that suburban households take fewer vacations and weekend trips than those living in central areas, and this would tend to balance their energy consumption (Medde, 2011).

Land take is happening primarily at the expense of farmland and woodland, and it has many impacts on the environment. For example, it prevents rainwater from penetrating into the soil and it increases runoff, thus provoking soil erosion while obstructing recharge of the water table. It also fragments habitats and ecosystems, thereby diminishing and even destroying local biodiversity (Medde, 2011).

5.2. Biodiversity and ecosystems

France is the second largest maritime state after the United States. With its overseas areas, it holds the distinction of having territories in the Atlantic, Indian, Pacific and Southern Oceans. As a result, the country harbours a great diversity of terrestrial and marine ecosystems. French territorial waters cover more than 10 million km^2, representing nearly 20 times the land area of metropolitan France (SOeS, 2014).

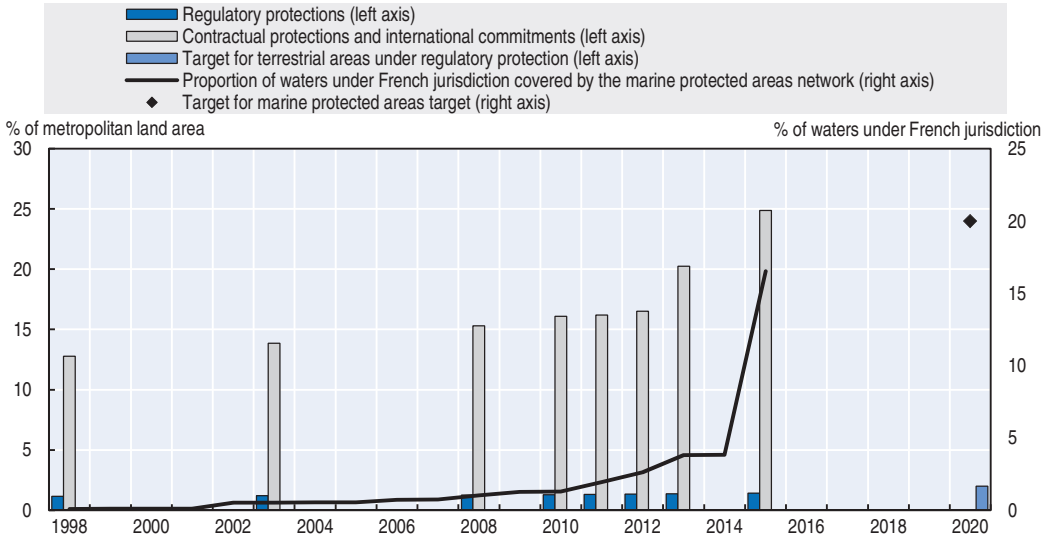
Protecting ecosystems and biodiversity is thus a major issue for France. Urbanisation and habitat fragmentation, intensive agriculture, forestry and mining operations, as well as invasive alien species and climate change all pose significant threats to the country's biodiversity (SOeS, 2014).

Protected areas

France has already achieved the objectives, defined in the context of the Convention on Biological Diversity, of protecting at least 17% of its land area and at least 10% of its territorial waters by 2020 (Figure 1.16). As of 2015, however, barely 0.7% of metropolitan France was covered by protected areas in categories I and II (the strictest protection levels) of the International Union for the Conservation of Nature (IUCN) classification, compared to the OECD average of 3%. The level of protection is considerably higher overseas (Guadeloupe, French Guiana, Martinique, Mayotte, Reunion, Saint Pierre and Miquelon, Saint Martin, Saint Barthélemy and the French Southern and Antarctic Lands), where category I and II protected areas cover 23% of the territory.

France relies primarily on two types of management for protected areas: the regulatory route and the contractual route. Human activity is banned or limited in the areas under regulatory protection, such as the core areas of national parks, natural reserves etc. (categories I to IV of the IUCN classification). Contractual protection (category V of the IUCN classification) seeks to reconcile preservation of the natural heritage and local development by involving the various users of the territory (community-controlled buffer zones or aires d'adhésion adjacent to the core area of national parks, regional natural parks [PNR] and marine natural parks) (SOeS, 2014).

Figure 1.16. **Protected areas are expanding in metropolitan France**



Source: MNHN-INPN (2015), *Espaces protégés* (database); SOeS (2014), *L'environnement en France*; French Agency for Marine Protected Areas (2015).

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In 2015 the area under regulatory protection was 45% greater than in 1998, and represented 1.4% of the metropolitan territory. However, France is far from reaching its objective of having 2% of its territory under regulatory protection by 2020, as proclaimed in the Grenelle I Law of 2009. Between 1998 and 2015, the surface area under contractual protection nearly doubled, to 25% of the territory (INPN, 2015). The 49 PNRs, which represent the majority of these areas (7 million hectares), constitute the first territorial ecological infrastructure (Figure 1.16).

Overseas (in Guadeloupe, French Guiana, Martinique, Mayotte, Reunion, Saint Pierre and Miquelon, Saint Martin, Saint Barthélemy and French Antarctica), the areas under regulatory and contractual protection both cover a virtually identical share of the territory (35%) (INPN, 2015).

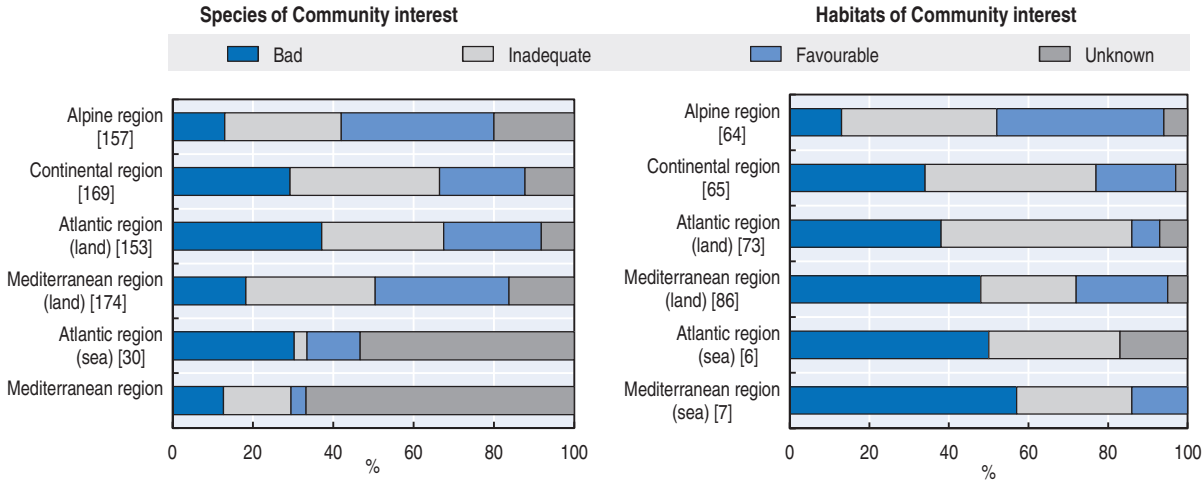
In 2015, the marine protected areas (including those overseas) covered 16.5% of waters under French jurisdiction. The recent increase reflects the creation of the Coral Sea Natural Park in New Caledonia (1.29 million km^2). The country has set itself a target of protecting 20% of waters under its jurisdiction by 2020 (Medde, 2014b).

Natura 2000 ecological network

The Natura 2000 network gives effect to the European "Habitats, Flora and Fauna" and "Birds" directives via the creation of special conservation zones (ZSC) and special protection zones (ZPS). The ZPS target the conservation of wild bird species listed in Annex 1 of the "Birds" Directive, as well as the protection of breeding, moulting and wintering areas and staging posts for migratory species not listed there. The ZSC target the conservation of habitat types and of animal and plant species listed in annexes I and II of the "Habitats" Directive (INPN, 2015). These sites, which in 2013 represented 12.6% of the metropolitan territory and 12.3% of waters under French jurisdiction, are managed under the contractual approach. For the most part, they are concentrated in regions along the eastern border of France and the Mediterranean coast, and in the Pyrenees.

Over the years 2007-12, more than half of the species of European Community interest evaluated revealed an unfavourable state of conservation, while the conservation status of 18% of the species (primarily marine species, lichens and certain invertebrates) was unknown. The Atlantic and continental biogeographical regions are the most affected: the conservation status of 70% of their fauna and flora is considered "unfavourable-inadequate" and "unfavourable-bad" (Figure 1.17). Only the flora of the Alps and the fauna of the Mediterranean are in a good state of conservation. In the absence of data and information on marine species it is not possible to make a full assessment of their conservation status (INPN, 2015).

Figure 1.17. **Most habitats and species of Community interest are not in a good state of conservation (2007-12)**



Note: Bracketed numbers indicate the number of assessments performed.
Source: SOeS (2014), *L'environnement en France*.

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Over the same period, three quarters of the habitats of Community interest evaluated presented an unfavourable situation, a finding similar to the previous assessment (Figure 1.17). It is the marine and coastal habitats, dunes, bogs and fens, as well as freshwater habitats that are in the worst shape, regardless of the region. The same holds for grasslands, only 13% of which have a "favourable" conservation status. This is explained primarily by agricultural abandonment and intensification, as well as by urbanisation (INPN, 2015).

Threatened species

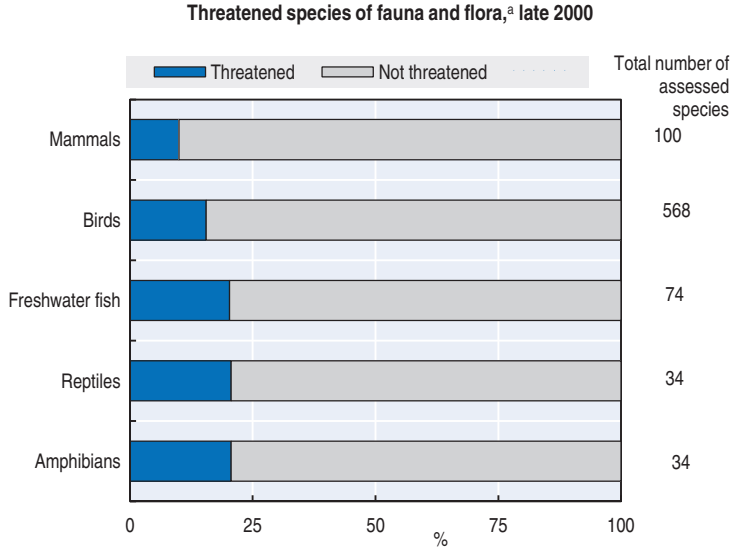
France is one of the 10 countries worldwide that are home to the greatest number of threatened species, as a result of the pressures exerted on biodiversity in the overseas areas as well as in the Mediterranean region, which is regarded as a biodiversity "hot spot" (SOeS, 2014).

In metropolitan France there are some 6 000 species of "higher plants", placing the country in fourth position in Europe. France is also home to the greatest number of bird species and vascular plant species in Europe, and ranks third in amphibian species (Figure 1.18). The country therefore has an important role to play in conserving the European heritage of fauna and flora (INPN, 2015).

In 2014, it was estimated that one species in five was threatened in metropolitan France. However, the level of knowledge on many species and their habitat is uneven and inadequate for taking stock of their status at the national level. Vertebrates alone have been the subject of monitoring for several decades now. The results show an improvement for some species, such as the otter, the beaver, the wolf and certain wintering water birds. It is estimated that 15% of indigenous vertebrates, including marine species, are under threat (endangered or vulnerable) – these rates vary from 8% for fish to 31% for amphibians. However, the status of marine fish is not known with certainty. Considering only freshwater or brackish-water fish, the rate is 51%. The number of specialist birds (habitat-specific) is also declining, while generalist birds (occupying a range of habitats) show a net increase. Not enough is known about invertebrates to evaluate their status precisely, but it is apparent that their habitats are suffering significant degradation (SOeS, 2015) (INPN, 2015).

With respect to the non-indigenous species evaluated, around 10% of mammals, 15% of birds and 21% of reptiles and amphibians are threatened: these rates are relatively low comparison to those for most OECD member countries (Figure 1.18).

Figure 1.18. **In metropolitan France, one species in five is threatened**



a) IUCN categories "critically endangered", "endangered" and "vulnerable" in % of assessed species.
Source: OECD (2015), *OECD Environment Statistics* (database).

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The overseas areas (including New Caledonia and French Polynesia, but excluding Adelie Land) give France an exceptional degree of biodiversity. They are estimated to harbour 96% of the vertebrate fauna and 97% of the vascular plants specific to France (SOEs, 2014). These territories also exhibit a high degree of endemism due to their insularity (INPN, 2015).

The available data are inadequate for taking thorough stock of the status of fauna and flora in the overseas areas. The French "red list" of threatened species indicates that 45% of the reptile species of Reunion are threatened; the equivalent rate for freshwater fish is 33%, and for vascular plants 30%. That list also shows that 33% of nesting bird species in Guadeloupe are threatened (MNHN, 2014). According to the international assessment conducted by IUCN in 2013 of the vulnerability status of biodiversity in the overseas areas, it is apparent that these are home to a significant number of threatened species.

Forests

With more than 16 million hectares of forest, France ranks third among European countries in terms of its forested area. In 2012, forests represented 29% of the French territory, up by 5% from 2000 (Figure 1.15). Yet this trend, linked to the increase in hardwood and mixed forest, masks a decline of around 30 000 ha per year in non-forest wooded areas, such as hedges, groves and tree rows. These scattered natural features, which are found in agricultural and urban settings, in fact play an essential role as natural habitats, but also as linkages between environments. On the other hand, the growth in forested areas at the expense of farmland (also referred to as "agricultural abandonment") has the effect of diminishing chalk grasslands, which are rich in orchids and invertebrates. Moreover, this loss of biodiversity is not being offset by any gain in forest biodiversity, as most forested areas are young and destined for exploitation (SOeS, 2014).

Three-quarters of the forest land in metropolitan France (12.2 million hectares) is privately owned. This includes 1.9 million hectares of plantations, representing 12% of the forested area, which are for the most part planted in conifers, while 67% of the French forest as a whole is comprised of hardwood species. The remaining 88% of forest cover consists of semi-natural, essentially mixed forest (IGN, 2014).

Of the total forest area in metropolitan France, only 1.3% is under strict biodiversity protection (categories I, II and IV of the IUCN classification). This proportion, far lower than that to be found in Scandinavia or North America, is due in part to French property ownership arrangements and also to the country's high population density, both of which make it difficult to create large contiguous reserves. On the other hand, nearly a quarter of the forested area is classed as "protected inhabited spaces", i.e. it falls under category V, corresponding essentially to the Regional Natural Parks (PNR). (IGN, 2014).

Although there has been an improvement in recent years, the defoliation rate (an indicator of tree vitality) has risen by 14% for hardwoods and by 17% for conifers, over the levels prevailing in the late 1990s. In other words, the health status of the tree species studied is deteriorating slowly, mainly because of climatic fluctuations (in particular the storms of Christmas 1999 and the drought of 2003) and the impact of human activities (Medde, 2014c).

The overseas areas, and French Guiana in particular, endow France with more than 8 million hectares of primary forests and forest ecosystems that shelter a rich biodiversity. Illegal gold mining is the biggest threat posed by human activity for the Guyanese forest. It results in the clearing of forest lands along small watercourses, the pollution of soils and surface waters by mercury and suspended particles, and a decline in fish and game stocks, in addition to indirect consequences for human health and the way of life for local inhabitants. In New Caledonia, where the forest is highly endemic, it is nickel mining that poses the greatest threat: it is responsible for the pollution of watercourses around mining sites, as well as of river waters flowing into the lagoon (Medde, 2014c).

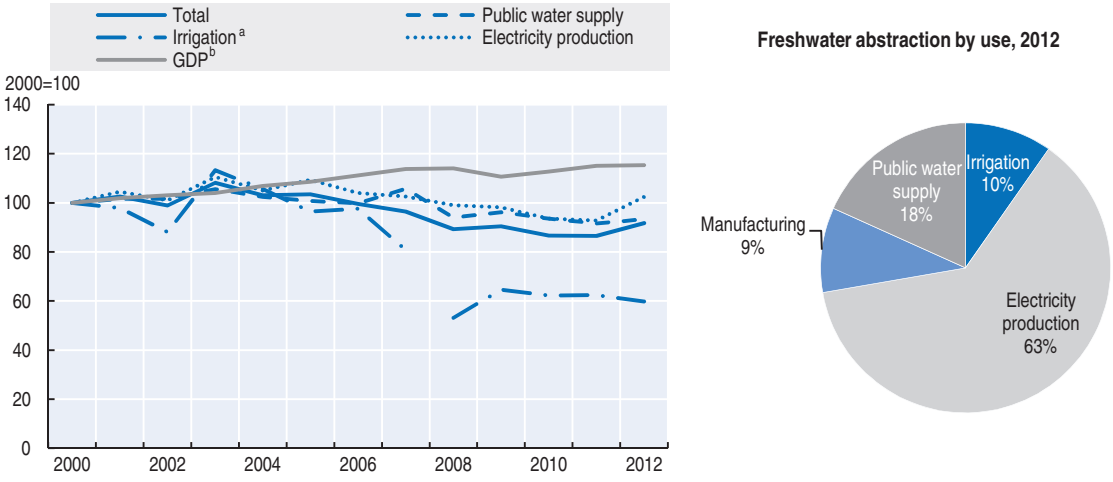
To address these environmental challenges, the government has instituted a departmental plan for mining guidance (schéma départemental d'orientation minière, SDOM) in French Guiana, which came into force at the end of 2011. It prohibits all mining activity in certain zones, and authorises or limits it in other zones. It also establishes a legal framework for gold mining, intended to take into account environmental externalities and to ensure the rehabilitation of degraded sites (Medde, 2014c).

5.3. *Water resource management*

Water resources

France has around 2 980 m^3 of renewable freshwater per capita, less than that of the majority of OECD countries. In 2012 it extracted around 30 billion m^3 of water, or 16% of its renewable resource, thus placing the country in a situation of moderate water stress. In relative terms, France extracted 472 m^3 of water per capita in 2012, down by 15% from 2000: this constitutes a level below the OECD Europe average (around 518 m^3/capita) and below the overall OECD average (829 m^3/capita) (Figure 1.19).

Figure 1.19. **Water abstraction is declining**



a) Break in time series in 2007 and 2008.
b) GDP at 2010 prices PPPs.
Source: OECD (2015), *OECD Environment Statistics* (database); OECD (2015), *OECD National Accounts Statistics* (database).

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With the exception of energy-producing industries, all users have reduced their water abstractions since 2000. After a peak due to the 2003 drought, total abstractions declined steadily until 2011, but they rose again in 2012 with the increase in abstractions for electricity production (Figure 1.19).

The drop in abstractions for production of drinking water is due in part to technological advances that have made household electric appliances and sanitation equipment more economical in their use of water, as well as to a shift in the habits of individuals, who are more sensitive to environmental concerns. The repair of leaks in the water distribution system has also helped in this regard, although there is much progress yet to be made in this area (SOeS, 2014).

Abstractions for irrigation are seasonal and vary with precipitation levels and the type of crop. In 2010 it was estimated that only 6% of farmland was irrigated, a figure virtually unchanged from 2000 (SOeS, 2014).

Water is still a resource under relative pressure, and it is important to preserve it. A study of surface waters covering the period 1968-2007 showed that the severity of low-water events was worsening and that the average annual flow was declining significantly, especially in the South. To address these concerns, France has implemented a benchmark system for the surveillance of low water flows (Réseau de référence pour la surveillance des étiages, RRSE).

Other studies have shown that the water table is dropping in certain areas. However, the report conducted under the Water Framework Directive indicates that, in 2013, 90% of the groundwater resource was in a "good quantitative state" (SOeS, 2014) (Onema, 2012).

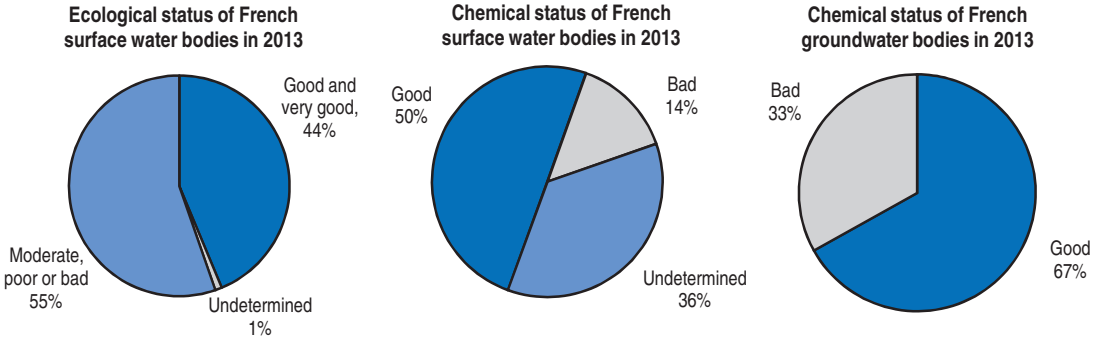
Water quality

In 2013 more than half of surface waters in France were in a poor ecological state, and for 36% the chemical state was unknown. The results are more encouraging for subterranean waters, where the chemical state was considered good for 67% of the bodies that were assessed (i.e. roughly 2/3 of the existing bodies). These ratings are however below the European average (80%).

The pollution of watercourses by organic and phosphorous materials, in particular phosphates and ammonium, has declined in the wake of stricter standards for detergents and the falling use of phosphate fertilisers (SOeS, 2014). Orthophosphates and nitrates are still important sources of watercourse pollution. The European Court of Justice found France in breach of the European directive on nitrates in 2013 and 2014, deeming its action programmes inadequate. Despite shifting agricultural practices, there is as yet no observable improvement in the concentrations of nitrates and pesticides in water (Medde, 2015).

Like the majority of European countries, France has requested a postponement (to 2021) of the target dates concerning the ecological status of its surface waters, deeming itself incapable of achieving the "good status" objective set for 2015 by the EU Water Framework Directive (WFD) (Figure 1.20). It is also among the six European countries that have asked for the most exemptions with respect to groundwater quality (SOeS, 2014).

Figure 1.20. **France will not achieve its water status objective in 2015**



Source: SOeS (2014), *L'environnement en France*.

To achieve its objectives, France has implemented master plans for water planning and management (Schémas directeurs d'aménagement et de gestion des eaux, SDAGE) in 12 major river basins, along with measurement programmes that are revised every six years and are managed in metropolitan France by the water agencies (Agences de l'eau) and in the overseas departments by the water offices (Offices de l'eau) (SOeS, 2014).

Water supply and sanitation

In 2013, 82% of the French population was connected to a public wastewater treatment network, and 18% to an independent sanitation system. While the proportion of the population connected to a treatment network has remained stable since the year 2000, the

percentage of residents connected to an independent treatment system has risen by 14% over the same period. In 2013, 33% of the population was connected to a secondary-type treatment system, and 22% to an "advanced" treatment system. The type of treatment to which 25% of the population is connected is unknown. This relates in particular to the rural population, connected to small purification stations that are not subject to systematic supervision and for which information is therefore incomplete (OECD, 2015h).

In order to comply with the European Urban Wastewater Treatment (UWWT) Directive, France has made major investments to bring up to standard its urban purification plants with a capacity exceeding 2000 population equivalent. At the end of 2013 it was estimated that 91% of those plants were compliant in terms of treatment, and 96% in terms of equipment (SOeS, 2014).

The situation in the overseas departments (DOM) is hampering France's efforts to achieve its objectives under the European water and wastewater directives. This is due in particular to the size of the river basins, to the fact that the "water offices" were only recently created, and to the scarcity of funding (low tax revenue potential) and technical capabilities available. Since 2013 the DOM have fallen well behind in complying with the UWWT directive, and are thus a priority for France. Upgrading the equipment is heavily dependent on inter-basin solidarity, given the sizable financial investments required. (Levraut et al., 2013).

In April 2015, the European Commission took France before the EU Court for failing to comply with the legislation on urban wastewater treatment. The EU cited some 17 agglomerations as not having waste water treatment up to EU standards. France was first warned in 2009 about this matter, which concerns areas with a population equivalent ranging between 2 000 and 15 000 (EC, 2015).

The average national rate of loss from the drinking water networks is estimated at around 30%, or 20% if sanitation networks are included. This rate could be as high as 80% in rural areas, where the networks are more seriously degraded. The Grenelle 2 Law sets an overall performance objective of 85%, leaving 15% for losses. The public water utilities will therefore have to improve their surveillance systems and establish an action plan for the end of 2015 (Levraut et al., 2013, Cours des comptes, 2015).

However, 99.5% of the French population has access to drinking water of very high quality. The bacteriological and physical-chemical conformity rates were 99.4% and 99.2% respectively in 2012. Around 65% of drinking water comes from subterranean sources and the remainder from surface water, with some regional disparities. The regions of Brittany, Ile-de-France and Midi-Pyrénées rely essentially on surface water while the Northeast is supplied primarily from groundwater (Onema, 2015).

Water governance

The system of integrated management by watershed basin with decentralised and participatory governance is the strong point of French water policy, recognised by all stakeholders as "a fundamental achievement that must be preserved" (Levraut et al., 2013). The national government prepares water policy in line with European directives, while planning and financial incentives are handled at the individual river basin level through "basin committees"[8] and the water agencies. The responsibility for project oversight as well as management of the resource and services falls essentially to the local authorities, within a regulatory framework set by the State. A great diversity of stakeholders, including users

and the local and regional authorities, is involved in the design and implementation of water policies (OECD, 2012, Cour des Comptes, 2013).

Nevertheless, the large number of stakeholders, the complexity of their interaction and the dispersal of responsibilities tend to undermine effective governance and policy implementation. At the national level, water policy is not sufficiently taken into account by sector policies (e.g. agriculture, urban development and energy) (Levraut et al., 2013). Sub-nationally, the decentralised government services at the watershed, regional and departmental levels suffer from a dispersion of co-ordination functions. At the local level France has more than 35 000 water and sanitation utilities, most of them too small to reap economies of scale (Cours des comptes, 2015). The consolidation of these utilities, as called for in the Notre Law, should improve their performance (Chapter 2).

Recommendations on air and waste management

Air management

- Adopt and implement the national plan to reduce emissions of atmospheric pollutants, coupled with a precise timetable in order to ensure compliance with standards for the protection of human health; clarify responsibilities between central and local government in order to implement plans to counter air pollution in large conglomerations and particularly polluted zones; promote the creation of restricted traffic zones and experiments with urban tolls; encourage the replacement of inefficient wood-burning domestic heating systems.
- Improve knowledge of the drivers of air pollution and its impacts on health.

Waste management

- Strengthen awareness of and information on preventing and recycling waste; develop indicators of material and waste flows and encourage businesses to use them in order to track progress in implementing the circular economy strategy and resource programming plan.

Notes

1. In 2013, unemployment (70%), crime (35%), the level of taxes (33%) and social inequalities (31%) were cited among the three main concern of French citizens, ahead of the environment (30%).
2. In order to meet the requirements of the Directive on energy end-use efficiency and energy services (2006/32/CE).
3. Repeals the directive (2006/32/CE).
4. Wastes resulting from the extraction and processing of raw materials, the consumption of finished products, and cleaning operations.
5. Wastes resulting from waste treatment operations (e.g. residues from incineration or composting).
6. Household graphic paper; clothing, household linen, footwear; potentially infectious needles used in medical self-treatment; household furnishings; professional furnishings; chemical products and specific diffuse wastes; gas bottles.
7. For mobile homes.
8. The river basin committees define the *Schémas Directeurs d'Aménagement et de Gestion des Eaux* (SDAGE), planning documents establishing the quantity and quality objectives the reach in each river basin, as well as the measures to be taken to ensure sustainable management of water resources.

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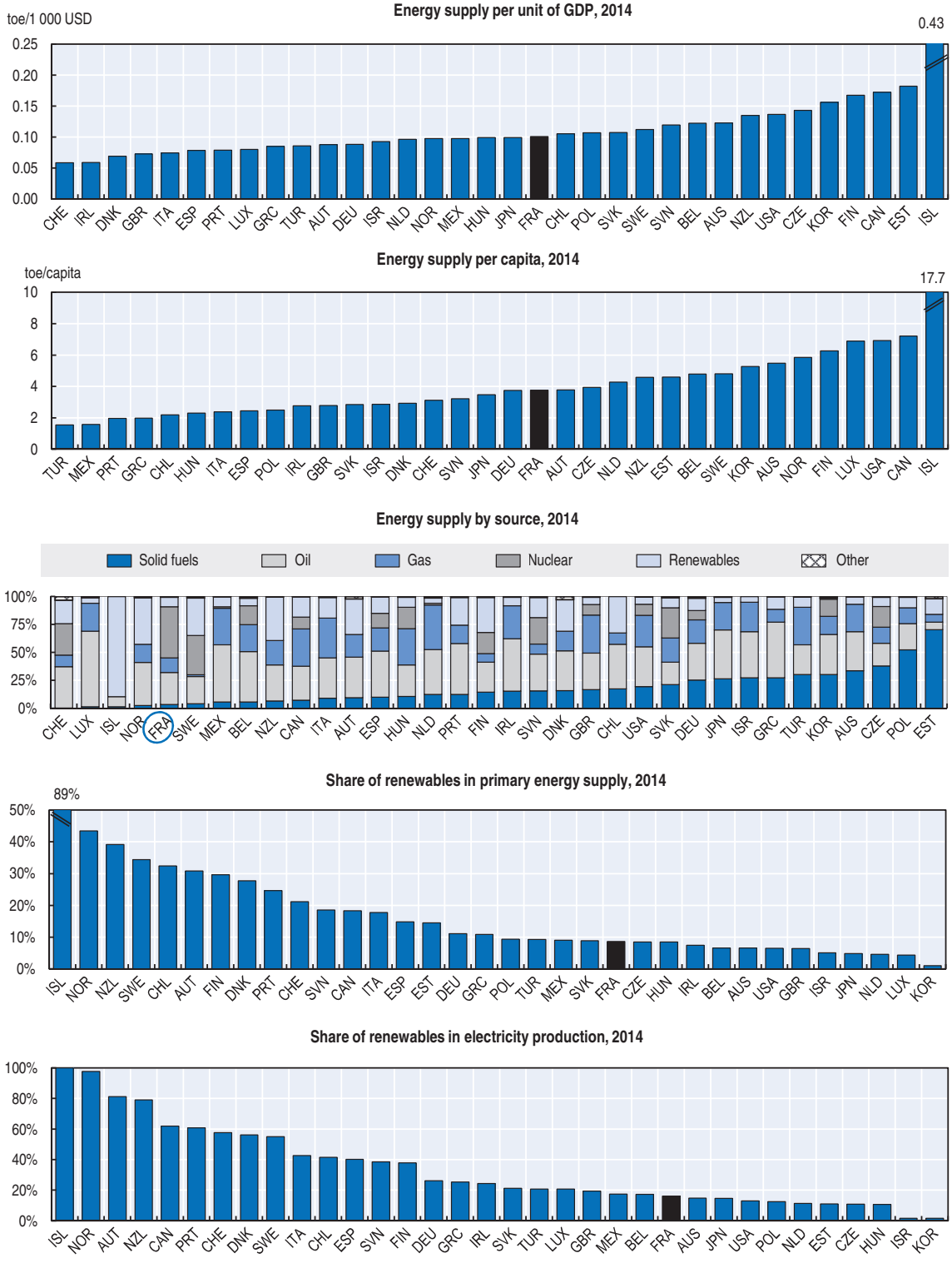
ANNEX 1.A

Energy and transport data

Figure 1.A1. **Energy structure and intensity**

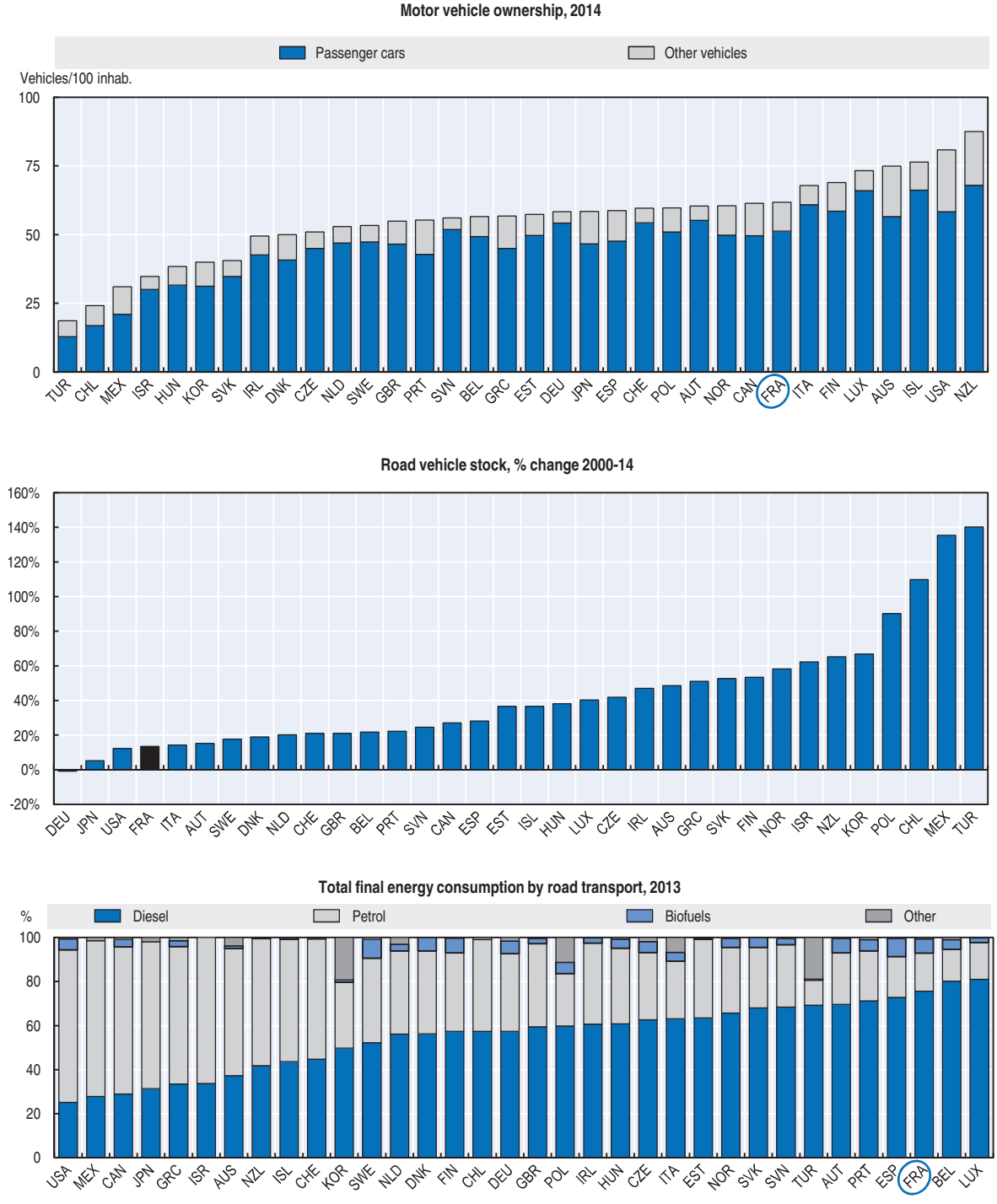


Notes: Data may include provisional figures and estimates. Total primary energy supply; the breakdown excludes electricity trade. GDP at 2010 prices and purchasing power parities.

Source: IEA (2015), *IEA World Energy Statistics and Balances* (database); OECD (2015), "Population projections, Historical population data and projections", *OECD Employment and Labour Market Statistics* (database); OECD (2015), *National Accounts Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406318

Figure 1.A2. **Road transport**



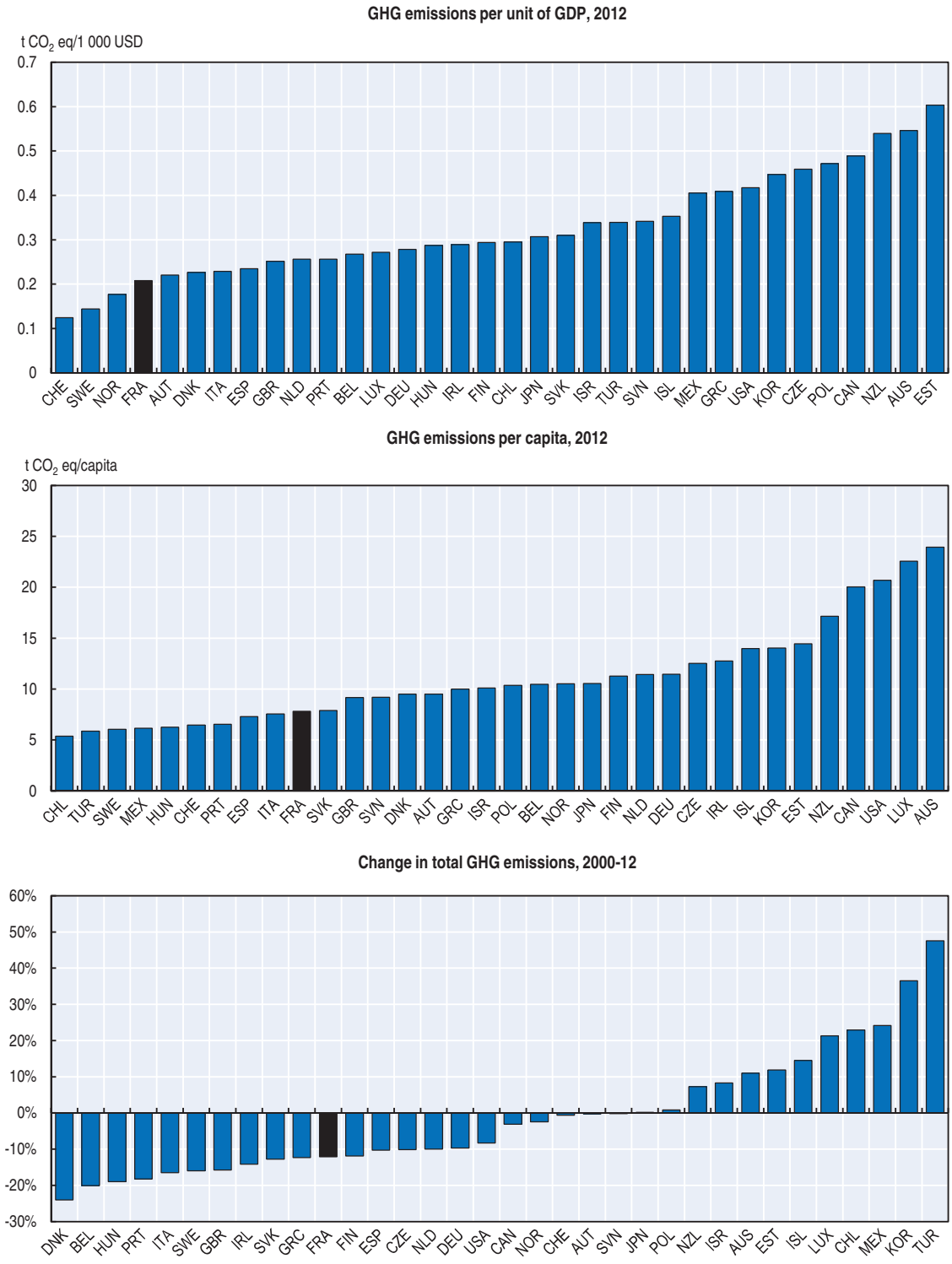
Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Motor vehicles with four or more wheels.
Source: Eurostat (2015), *Transport Statistics* (database); IEA (2015), *IEA World Energy Statistics and Balances* (database); North American Transportation Statistics (NATS) (2015), *Statistics Online Database*; UNECE (2015), "Transport", *UNECE Statistical Database*; national sources.

StatLink http://dx.doi.org/10.1787/888933406322

ANNEX 1.B

Climate change and atmospheric pollution data

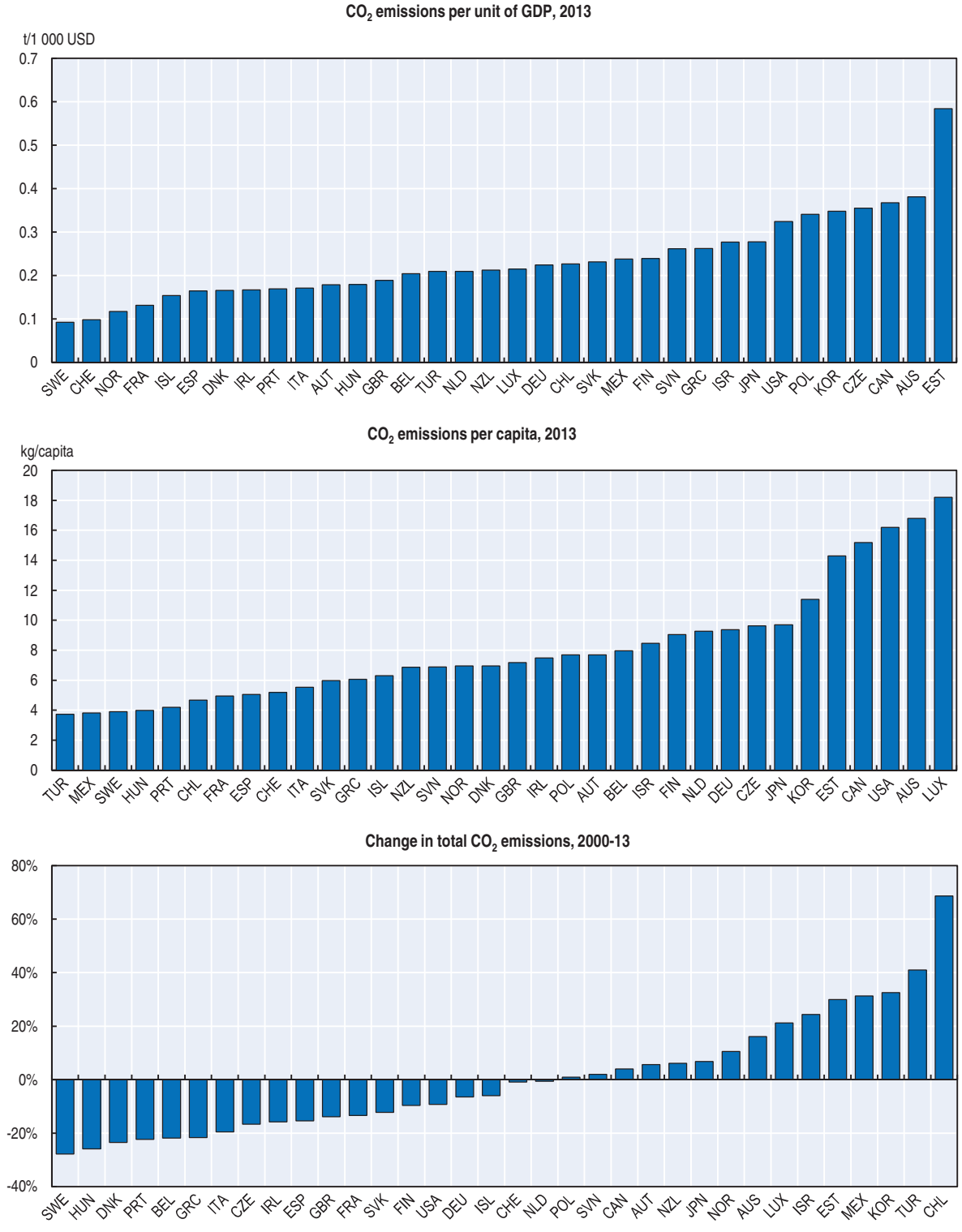
Figure 1.B1. **GHG emissions and intensities**



Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.
GHG emissions excluding emissions/removals from land use, land-use change and forestry. CHL: data refer to 2010. ISR : 2000 data exclude F-gases.
GDP at 2010 prices and purchasing power parities.
Source: OECD (2015), "Greenhouse gas emissions by source", *OECD Environment Statistics* (database); OECD (2015), "Labour Force Statistics: Population projections", *OECD Employment and Labour Market Statistics* (database); OECD (2015), *OECD National Accounts Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406339

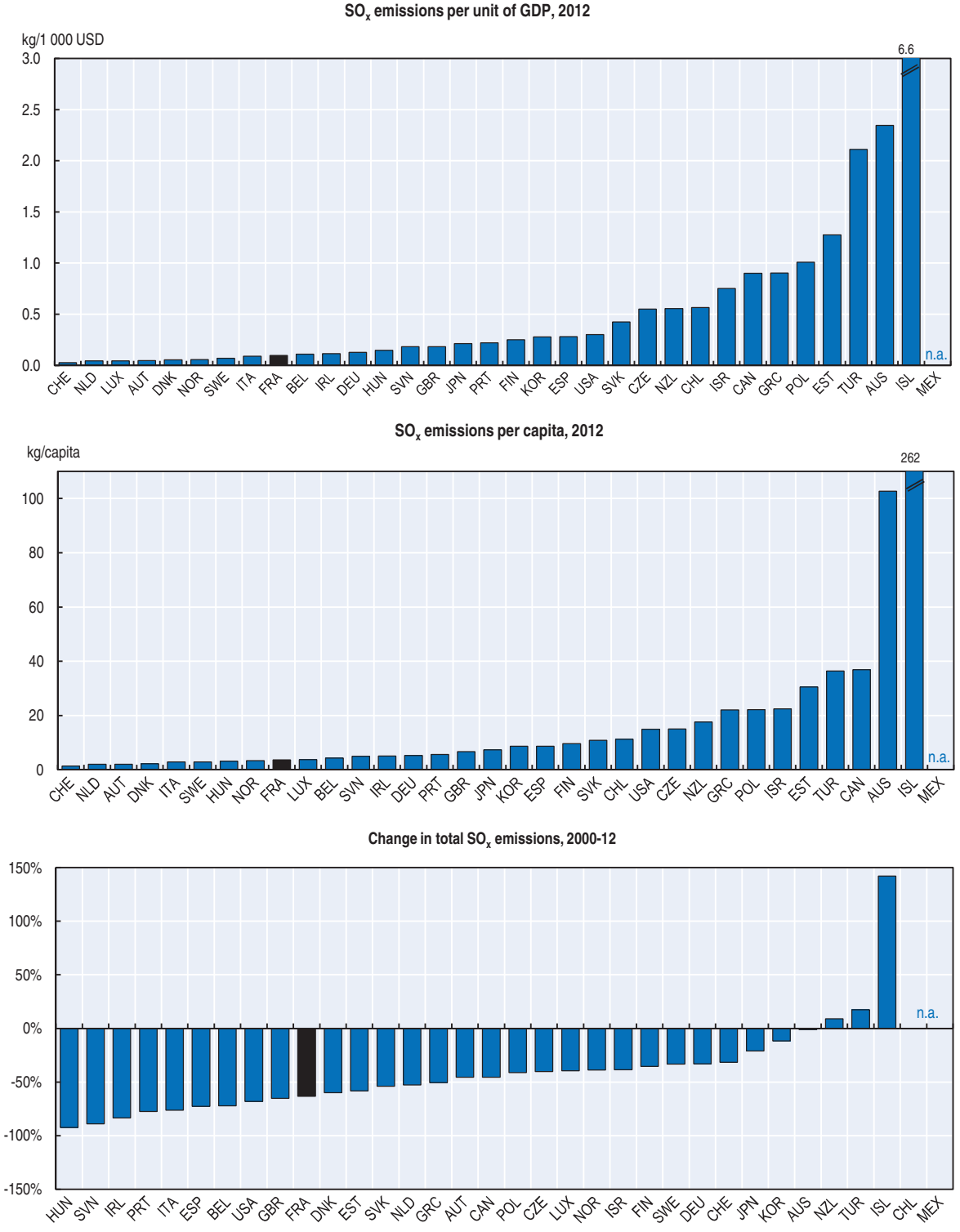
Figure 1.B2. CO_2 emissions and intensities



Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.
CO_2 emissions from energy use only; excluding international marine and aviation bunkers; sectoral approach. GDP at 2010 prices and purchasing power parities.
Source: IEA (2014), *IEA CO_2 Emissions from Fuel Combustion Statistics* (database); OECD (2015), "Labour Force Statistics: Population projections", *OECD Employment and Labour Market Statistics* (database); OECD (2015), *OECD National Accounts Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406347

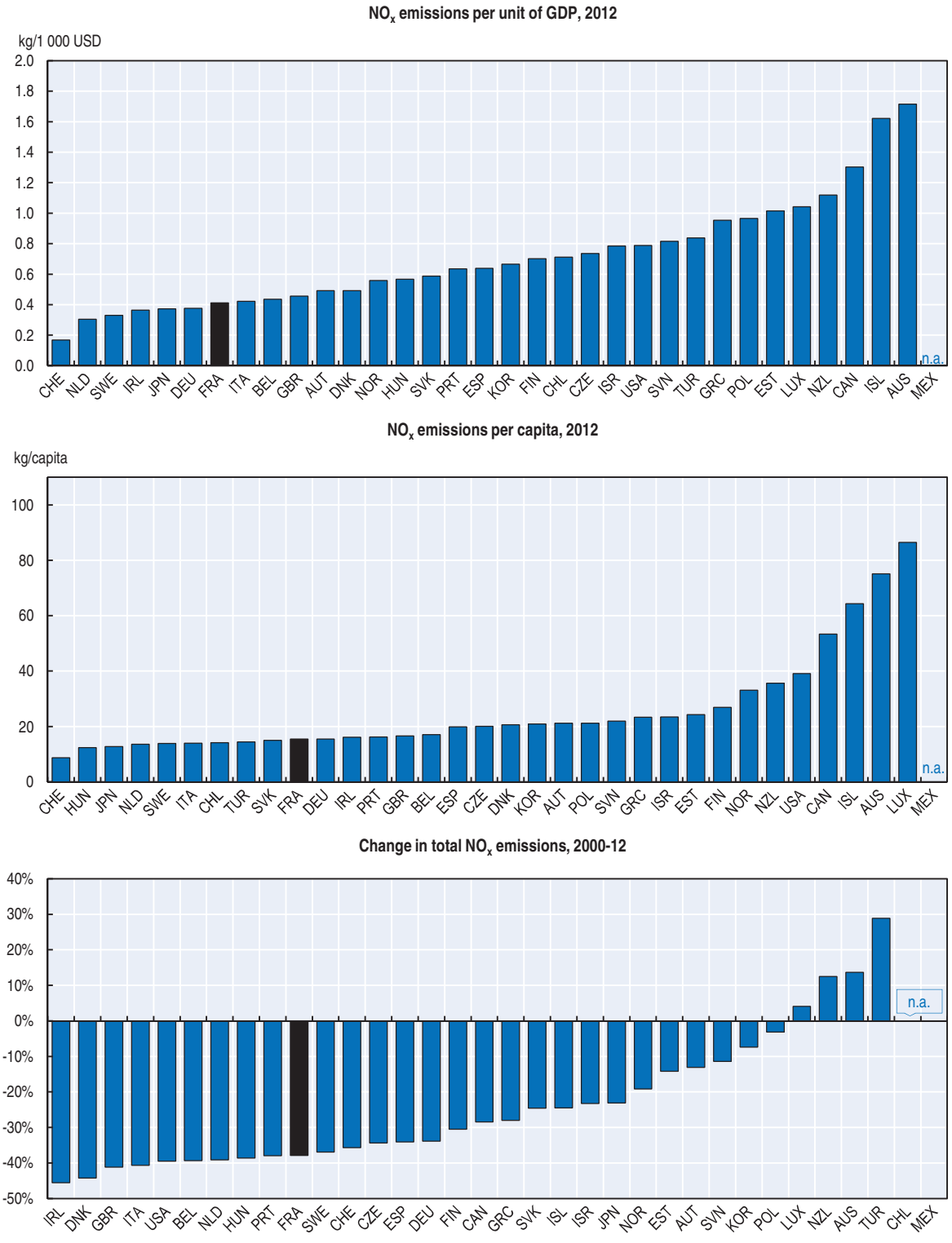
Figure 1.B3. SO_x emissions and intensities



Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.
GDP at 2010 prices and purchasing power parities. ISL: includes emissions from geothermal energy (80% of total emissions in 2012).
Source: OECD (2015), "Air emissions by source", *OECD Environment Statistics* (database); OECD (2015), "Labour Force Statistics: Population projections", *OECD Employment and Labour Market Statistics* (database); OECD (2015), *National Accounts Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406352

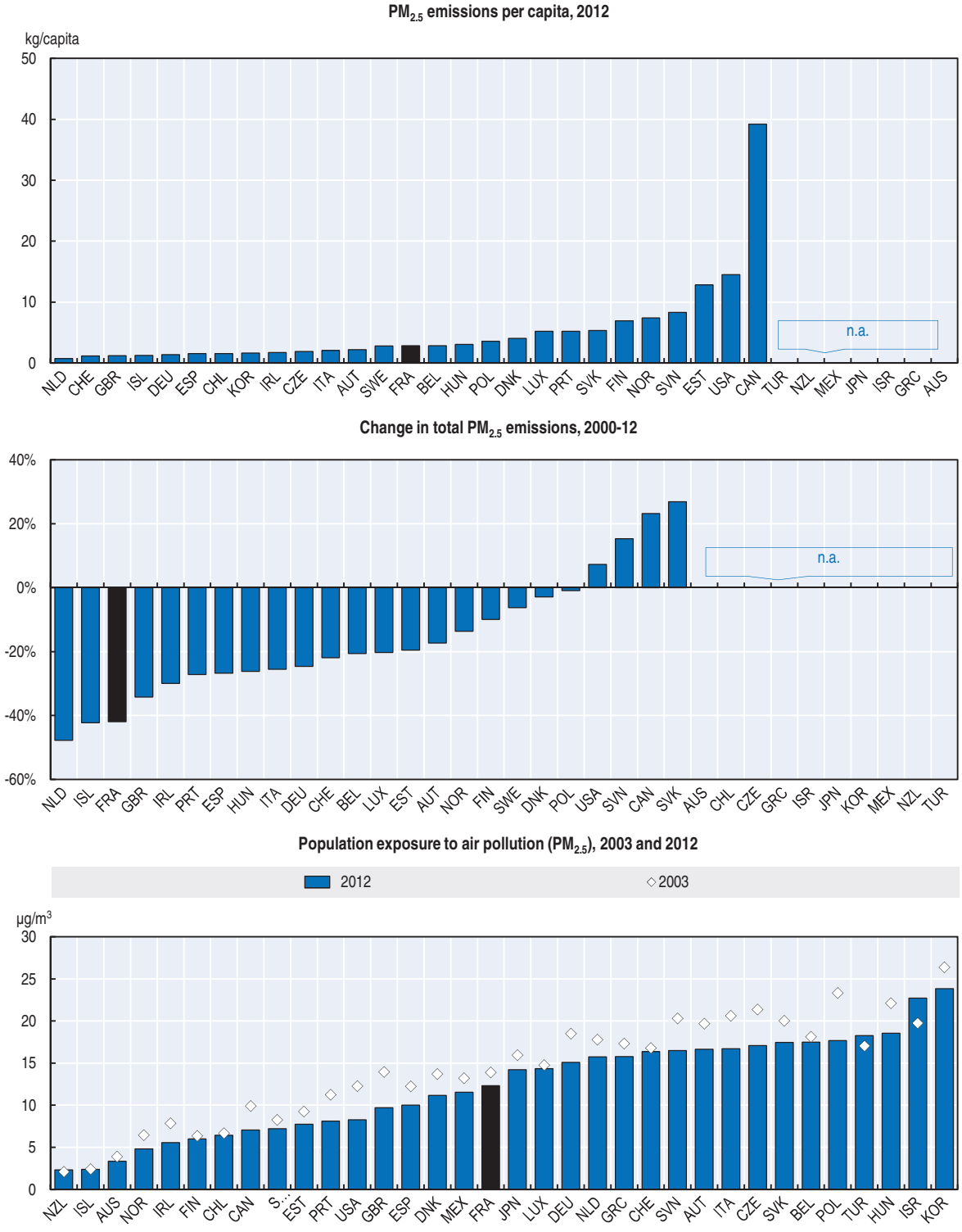
Figure 1.B4. NO_x emissions and intensities



Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.
GDP at 2010 prices and purchasing power parities. LUX: data exclude emissions from "fuel tourism".
Source: OECD (2015), "Air emissions by source", *OECD Environment Statistics* (database); OECD (2015), "Labour Force Statistics: Population projections", *OECD Employment and Labour Market Statistics* (database); OECD (2015), *National Accounts Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406362

Figure 1.B5. $PM_{2.5}$ emissions and exposure to pollution



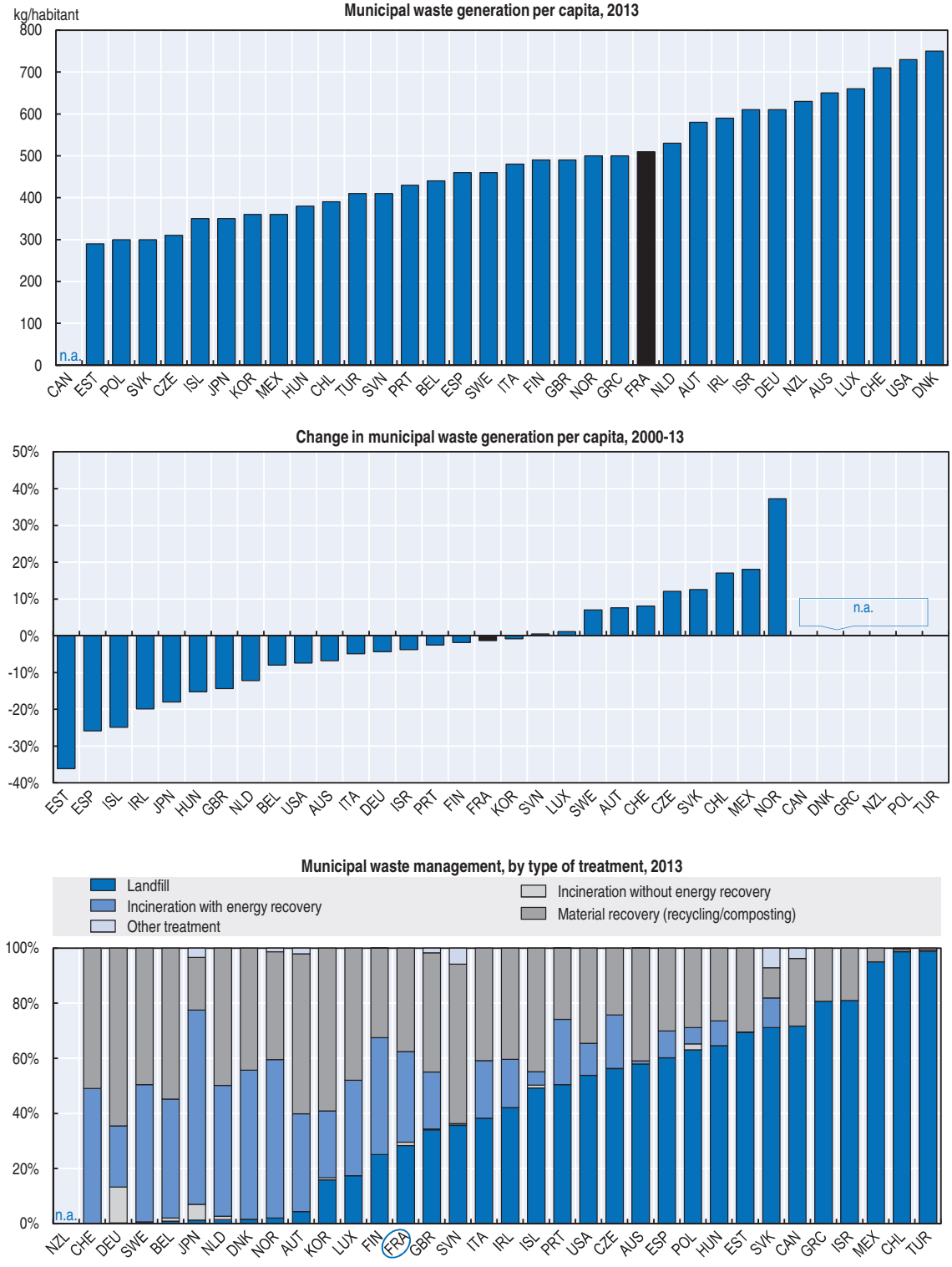
Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.
Population exposure to air pollution: estimates based on satellite imagery data; three-year average data.
Source: OECD (2015), "Air emissions by source", *OECD Environment Statistics* (database); OECD (2015), "Labour Force Statistics: Population projections", *OECD Employment and Labour Market Statistics* (database); OECD (2015), *OECD Regional Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406371

ANNEX 1.C

Waste and resource management data

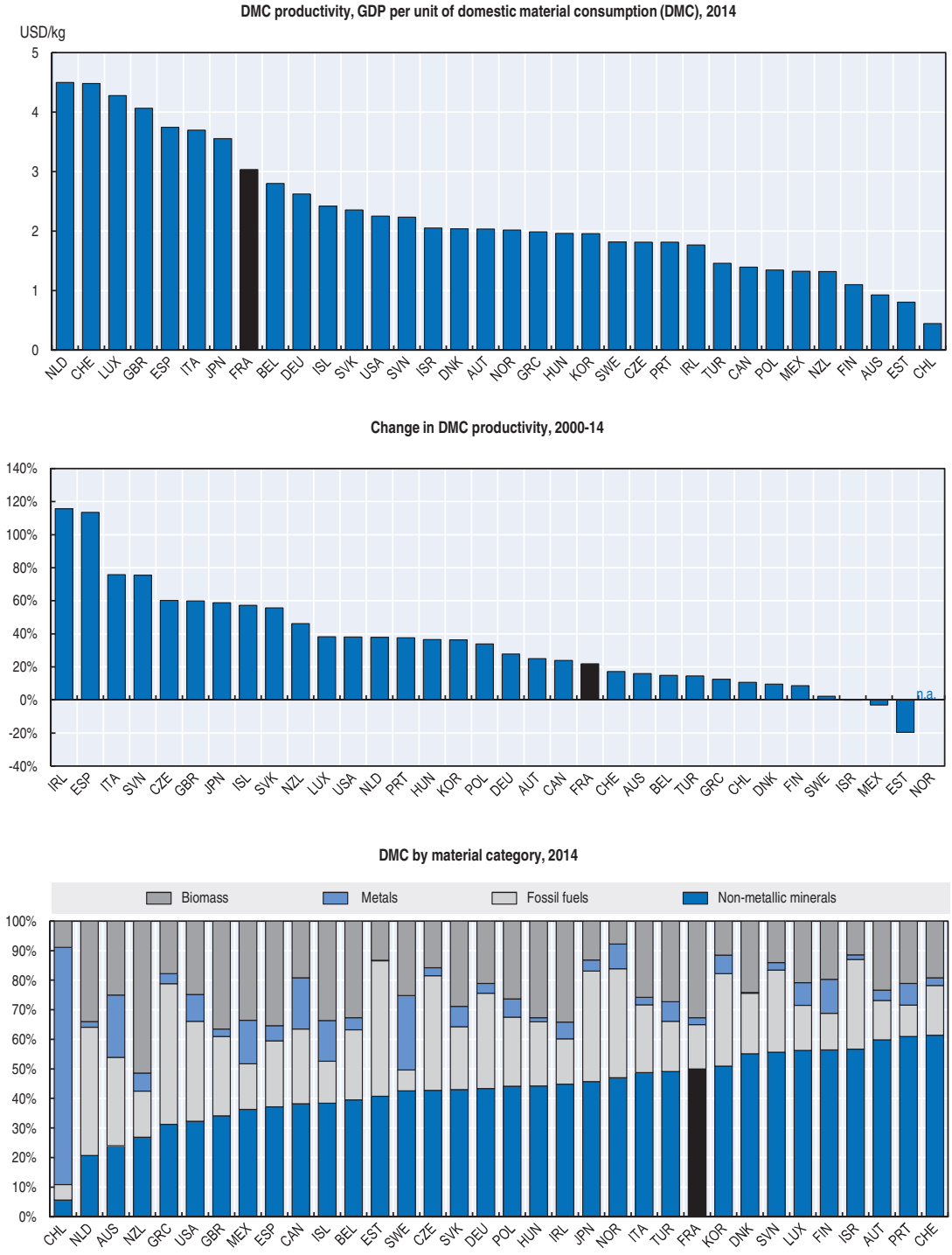
Figure 1.C1. **Waste production and management**



Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Amounts per capita are rounded.
Waste collected by or for municipalities. It includes household, bulky and commercial waste, and similar waste handled at the same facilities.
CAN: Includes construction and demolition waste.
Source: OECD (2015), "Municipal waste", *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406387

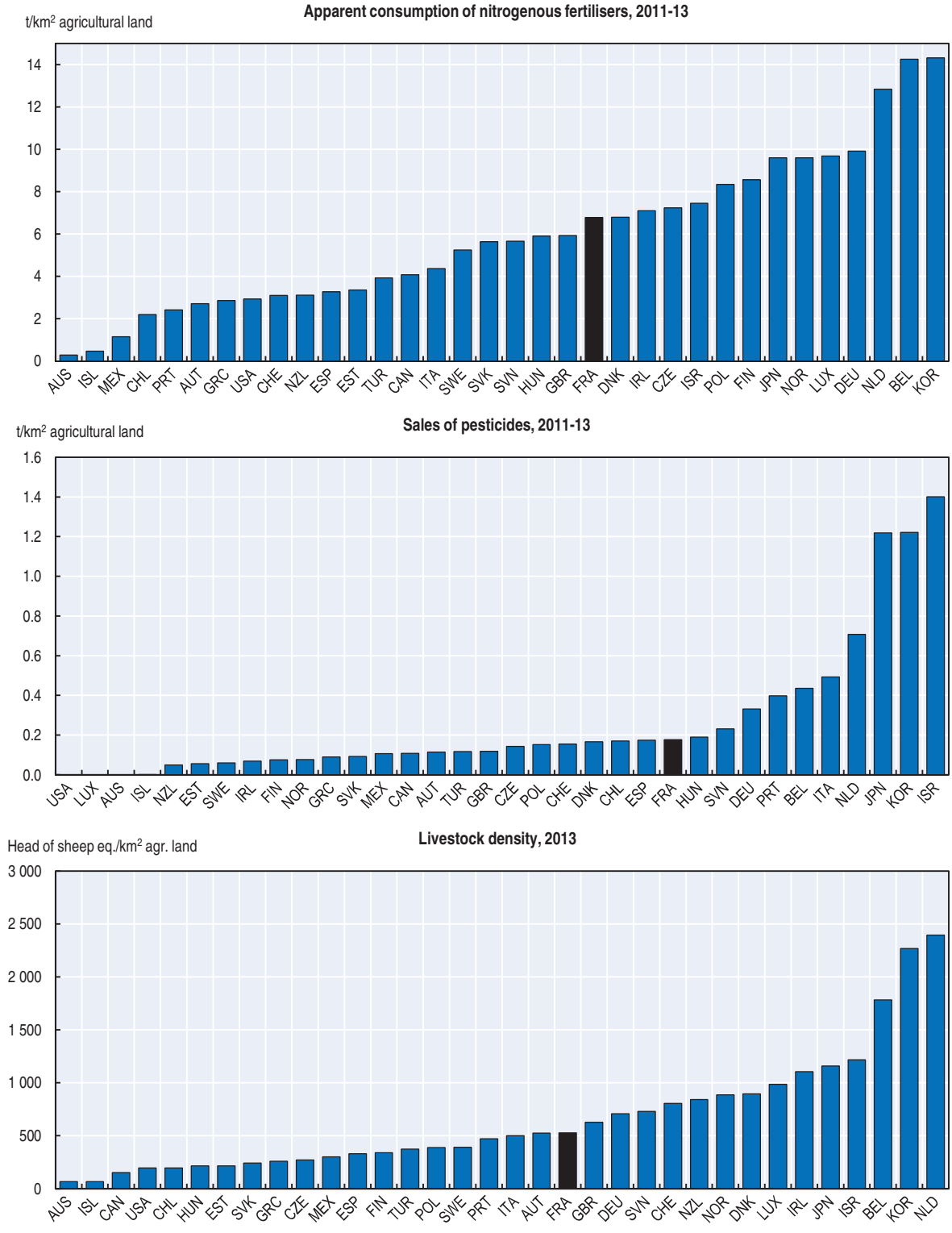
Figure 1.C2. **Material consumption and resource productivity**



Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.
Domestic material consumption (DMC) equals the sum of domestic extraction of raw materials used by an economy and their physical trade balance (imports minus exports of raw materials and manufactured products). DMC productivity designates the amount of GDP generated per unit of materials used and is calculated as the ratio of GDP to domestic material consumption (DMC). GDP at 2010 prices and purchasing power parities.
Non-metallic minerals: domestic extraction and trade of minerals used in industry and construction, plus trade of derived processed products; fossil energy carriers: coal, crude oil, natural gas, peat and traded-derived products; metals: domestic extraction of metal ores, plus trade of metal ores, metal concentrates, refined metals, products mainly made of metals, and scrap; biomass: domestic production from agriculture, forestry and fisheries, plus trade of raw and processed products from these sectors.
Source: OECD (2015), "Material resources", *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406395

Figure 1.C3. **Agricultural inputs and livestock density**



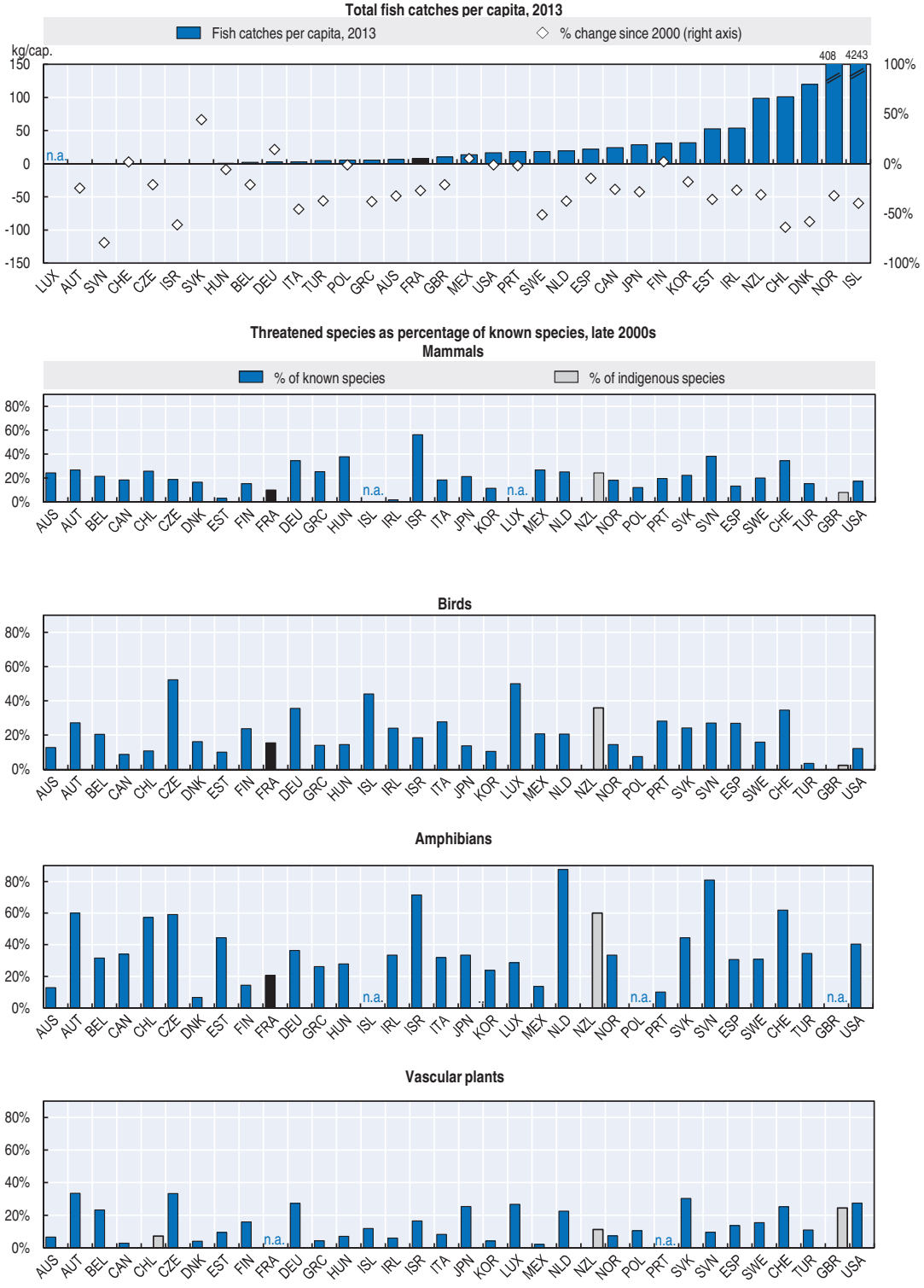
Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.
Source: FAO (2015), *FAOSTAT* (database); OECD (2015), "Environmental Performance of Agriculture", *OECD Agriculture Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406403

ANNEX 1.D

Biodiversity and water data

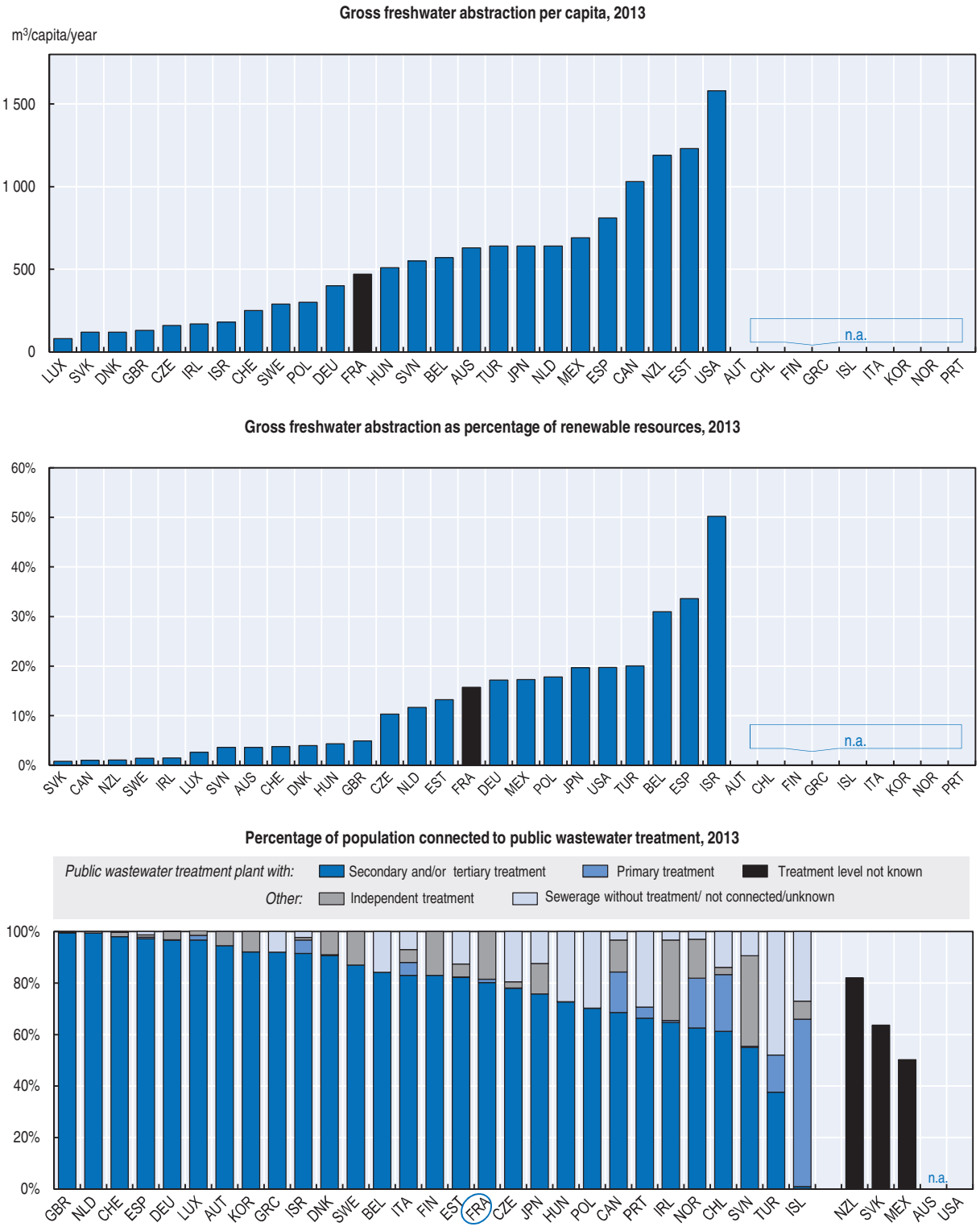
Figure 1.D1. **Fish catches and threatened species**



Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.
Total fish catches: volumes of fish catches in inland waters and marine areas. Excludes marine mammals, crocodiles and alligators, aquatic plants and miscellaneous aquatic products.
Threatened species: IUCN categories critically endangered, endangered and vulnerable in % of known species.
Sources: FAO (2015), *FAOSTAT* (database). OECD (2015), "Threatened species", *OECD Environment Statistics* (database)

StatLink http://dx.doi.org/10.1787/888933406411

Figure 1.D2. **Water abstraction and wastewater treatment**



Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. Freshwater abstraction: for some countries, data refer to water permits and not to actual abstractions).
Source: OECD (2015), "Water: Freshwater Abstractions", "Wastewater Treatment", OECD (2015), *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406423

PART I

Chapter 2

Environmental governance and management

This chapter presents the main French environmental initiatives and examines the framework governing environmental management. In particular, it analyses the co-ordination mechanisms at the different levels of government and the impact of the reform of territorial organisation. It reviews the policy assessment structures and their effects on the environment, as well as the measures covering regulatory simplification and compliance enforcement. It also looks at the promotion of environmental democracy through access to information, public participation in decision making and access to environmental justice.

1. Institutional framework for sustainable development and environmental management

1.1. *Institutional framework for sustainable development*

2015 marked a new stage in French environmental policy, with the enactment of the Energy Transition for Green Growth Act (Chapter 4), the adoption of the Paris Agreement by the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), the recognition of the Lima-Paris Action Agenda at COP21 and the debate on the draft law on biodiversity (Chapter 5). The previous milestone was the Grenelle Forum in 2007. This consultation process, and the two Acts adopted in its wake in 2009 and 2010,[1] reshaped French environmental policy through extensive legislation, ambitious targets, and institutionalised participatory governance. Despite being referred to as a "legal monster" (Petit, 2011), the Grenelle Laws have helped structure the environmental initiatives of business sectors and local authorities by deploying a raft of financial, regulatory and planning instruments. After the Grenelle Forum, the second National Strategy for Sustainable Development, for 2010-13, provided a common architecture structuring all players around a social project. It was nevertheless criticised for not containing a tool for assessing its implementation by private sector actors, and for a sectoral approach with a dilutive effect on priorities (MEDDE, 2013a). The national strategy of ecological transition towards sustainable development (SNTEDD) 2015-20 addresses these criticisms by adopting a new cross-cutting approach and using progress reports to formalise actors' initiatives. It is used as a basis for drafting the roadmap for the implementation of the Sustainable Development Goals adopted by the international community in 2015 under the 2030 Agenda for Sustainable Development.

Environmental legislation and policy in France is, as in all European Union (EU) countries, largely determined by European law, which governs for example water and waste water, air quality, waste and biodiversity. Even if France has, since 2007, systematically exceeded the average number of infringements of European environmental legislation (European Commission, 2014a), the overall number of cases has declined (European Commission, 2014a). The most common offences concern nitrate contamination of water, urban waste water treatment and air quality (Chapter 1).

1.2. *Institutions and environmental governance*

France's environmental strategies and policies are co-ordinated by the Ministry of the Environment, Energy and Marine Affairs (MEEM). It oversees several public-law entities specialised in various fields, and its actions are backed up at the regional and departmental level by specific directorates. The regions, départements and municipalities implement environmental policy at the local level. However, the low level of inter-municipal co-operation undermines the effectiveness of implementation at the municipal level. The NOTRE Act, under which the French administrative territory will be reorganised, is designed to strengthen this co-operation, thereby making the provision of environmental services more efficient.

The integrating of environmental issues can be seen in France's approach to its institutions. In 2007, the Ministry of Ecology and Sustainable development was merged with the Ministry of Transport, Infrastructure, Tourism and the Sea, and the Energy branch of the Ministry of Industry, to create the Ministry of Ecology, Sustainable development and Energy (MEDDE, renamed MEEM in 2016). MEEM oversees sustainable development, the environment and green technologies, energy transition and energy, the climate, the prevention of natural and technological risks, industrial safety, transports and transport infrastructures, infrastructure, the sea, with the exception of shipbuilding and ship-repair activities, and the fields of sea fishing and aquaculture. It comprises six theme-based directorates[2] and two horizontal structures: the General Commissariat for Sustainable Development (CGDD) and the General Secretariat.

MEEM's actions are rolled out in the regions by the regional departments for the environment, planning and housing (directions régionales de l'environnement, de l'aménagement et du lodgement – DREAL), created in 2009 by merging the regional directorates of the environment (DIREN), industry (DRIRE) and infrastructure (DRE) in an effort to streamline government agencies. The DREALs and the departmental directorates of territories (DDT), operating under the respective authority of the regional prefect, and the prefect of the département, ensure the continuity of the State in the territories.

MEEM also oversees specialised public-law entities which play an important role in environmental management, notably:[3]

- The six Water Agencies,[4] each one covering a river basin, which are tasked with preserving water ressources and fighting water pollution. They work with the DREALs on preparing the water development and management master plans (SDAGE).
- The French National Agency for Water and Aquatic Environments (ONEMA), created in 2007, uses its scientific and technical expertise to support the implementation of water policy. It manages the water information system, checks proper implementation of regulations, monitors water and waste water services and guarantees inter-basin financial solidarity.
- The Agency for Environment and Energy Management (ADEME), under the joint remit of MEEM and the Ministry of Education, offers expertise and financial support for projects related to energy transition and waste.
- The Centre for Studies and Expertise on Risks, Environment, Mobility, and Urban and Country planning (CEREMA) was created in 2014 by merging 11 existing technical centres. Operating under the joint authority of MEEM and the Ministry of Housing, Territorial Equality and Rural Affairs, it provides scientific and technical expertise for preparing and reviewing public development and sustainable development policies.
- The French Agency for Biodiversity (AFB) is provided for in draft legislation on biodiversity. It will unite under one roof ONEMA, the Technical Workshop for Natural Areas, the French Marine Protected Areas Agency and the French National Parks Agency (Chapter 5).

Regional authorities implement various policies and environmental management options at the local level:

- The regions manage the regional parks, prepare regional climate, air quality and energy plans (SRCAE), regional plans for the prevention and management of hazardous waste, regional schemes for planning and development, infrastructures and transport, and approve the contracting of State-region projects (Section 1.3).

- The départements are responsible for plans for the prevention and management of non-hazardous waste[5] and building waste, and are involved in water use and management plans.
- The municipalities prepare the main local urban planning documents, collect and process household waste, and provide water distribution and waste water treatment services. Under the NOTRE Act, they have also been responsible for the management of aquatic environments and flood prevention since 2015 (Chapter 5).

France's 36 000 municipalities are the smallest regional tier of government. They are responsible for managing household waste and water distribution and waste water treatment services. However, these individual municipal services are too small to generate economies of scale, leading to shortcomings in expertise, knowledge and quality (Cour des comptes, 2015). Inter-municipal co-operation in managing these services is one way of increasing the size of these services and addressing these issues. Inter-municipal co-operation has been well developed for waste management, but in 2012 there were still 35 000 public water distribution and waste water treatment utilities in France (ONSEA, 2015). The NOTRE Act aims to strengthen inter-municipal co-operation by scaling up inter-municipal bodies to a minimum of 15 000 inhabitants and transferring responsibility for water distribution and waste water treatment to them by 2020. This can be compared against the situation in 2012, when a drinking water service supplied on average 4 700 users, compared to 3 100 for a collective waste water treatment service and 2 900 for a non-collective waste water treatment service (ONSEA, 2015). This reform is expected to improve the efficiency of water distribution and waste water treatment services.

1.3. Co-ordination mechanisms

France has made progress in terms of co-ordination at the national level. The creation of MEDDE aligned environmental issues with energy, transport and infrastructure challenges, and the creation of CGDD in 2008 formalised inter-ministerial co-ordination on the subject. The "five-party governance" system established by the Grenelle Forum (Section 4.1) also created a process which brings together actors including the State and elected representatives to determine the future direction of environmental policies. However, there are still shortcomings in co-ordination between subnational authorities (regions, départements, municipalities). Despite launching a decentralisation process in 1982, the State remains very present in the regions through its decentralised services under the responsibility of the prefects. The linkage between State services and regional services is exceedingly complex, with numerous inconsistencies and duplications of competencies, and the State's management is insufficient (Cour des comptes, 2013a). There are also deficiencies in financial co-ordination between the State and the regions (Cour des comptes, 2014).

While the creation of a large environment ministry – MEDDE – in 2007 has given it considerable influence within the government, it has not resolved the problem of inter-ministerial co-operation with other, traditionally more dominant, ministries (MEDDE, 2013b). On the one hand, the decision to combine the environment with some relevant sectors, notably energy and infrastructure, but not others, such as health and agriculture, may have weakened links with the ministries responsible for the latter (MEDDE, 2013b). On the other hand, the merger of infrastructure and the environment means that arbitrage between the two sectors now takes place within the confines of the ministry, whereas previously it was carried out at the level of the Prime Minister (Bettina, 2010).[6] The result is less transparency

over this delicate balancing act and a tendency towards ensuring that infrastructure policies retain priority (Lepage, 2008). Lastly, the legitimacy of the environment ministry has been undermined in recent years by frequent restructuring. Some institutional stability, at least in the medium term, would be welcome (MEDDE, 2013b).

Inter-ministerial co-operation is also ensured by specific bodies. CGDD is the inter-ministerial delegate for sustainable development, which allows it to lead and co-ordinate administrations' sustainable development initiatives. As inter-ministerial delegate, CGDD chairs the committee of senior officials for sustainable development (HFDD), which meets every two months. Each minister appoints an HFDD to prepare their administration's contribution to the national strategy for sustainable development.

Despite these efforts to develop inter-ministerial co-operation, the State's regional organisation is still beset by significant coherence and co-ordination issues. This has affected overall governance, resulting in inefficient linkage between different administrative levels and a proliferation of strategies and objectives (Cour des comptes, 2013a; Kamal-Chaoui and Plouin, 2012). The State's regional reorganisation process is designed to streamline and clarify governance, including the environment (Box 2.1). There are two problems when it

Box 2.1. **The modernisation of regional organisation in France**

The reform launched in 2013 in France under the name Acte III de la décentralisation, is based around three Acts designed to clarify the multiple layers of French subnational administration (often referred to as a millefeuille) and to simplify planning documents, thereby helping to streamline environmental governance:

- The MAPAM Act on the modernisation of territorial public action and on the strengthening of cities *(loi de modernisation de l'action publique territoriale et d'affirmation des métropoles)* clarifies the powers of local authorities in areas where there are several layers of subnational intervention by creating "leaders" (*chefs de file*). In this way, the region is responsible for work on economic development, the organisation of public transport, and biodiversity. The départements oversee social initiatives, digital development and regional solidarity. Lastly, the municipalities and associations of municipalities, with powers over the organisation of urban transport, have additional powers oversustainable mobility (cycling, walking, car-pooling, car-sharing, freight transport and urban logistics).
- The Act on the delineation of the regions (*loi relative à la délimitation des regions)* is designed to generate economies of scale and foster standardisation by reducing the number of regions in mainland France to 13 as of 1 January 2016. The merging of regions does not lead to a reduction in their powers or resources.
- The NOTRE Act on the new territorial organisation of the French Republic (*loi portant nouvelle organisation territoriale de la République)* clarifies powers and simplifies land use planning systems. It confirms the abolition of the general competence clause for regions and départements, planned for 2010, which created an overlap in planning issues, and strengthens the role of regions in this area. In order to simplify planning documents at this level, the regions will prepare a regional plan for planning, sustainable development and equality between regions (*schéma régional d'aménagement, de développement durable et d'égalité des territoire - SRADDET*) containing medium- and long-term objectives in areas such as transport, energy, climate change, air pollution, biodiversity and waste management. The plans merge existing plans in these fields, such as the Regional climate, air quality and energy plans (SRCAE). Sub-regional planning documents, including

Box 2.1. **The modernisation of regional organisation in France** *(cont.)*

urban transport plans and charters of regional natural parks, will have to respect the guidelines fixed by the plans. Another example of streamlining is a regional plan for waste prevention and management which will merge three previous plans governing waste at departmental and regional level.

Source: French Republic (2014), *Loi n° 2014-58 du 27 janvier 2014 de modernisation de l'action publique territoriale et d'affirmation des métropoles*; French Republic (2015), *Loi n° 2015-29 du 16 janvier 2015 relative à la délimitation des régions, aux élections régionales et départementales et modifiant le calendrier électoral*; French Republic (2015) *Loi n° 2015-991 du 7 août 2015 portant nouvelle organisation territoriale de la République.*

comes to co-ordinating the different administrations. Firstly, the instructions given by the State to its decentralised services suffer from insufficient prioritisation of their content. Secondly, the links between the decentralised services and the regional services of the national agencies are not strong enough. In particular, the link between the territorial initiatives of ADEME's regional state services and the DREALs is not clear. ADEME and its regional directorates were created at a time when the ministry of the environment did not have its own decentralised services. As a result, ADEME's regional directorates worked closely with regional councils and, since then, have been considered by prefects as separate from the State's central services. The creation of the DREALs in 2009 provided the State with decentralised services under the authority of the prefects, raising the question of the coexistence, at the regional level, of the decentralised services of two national environmental bodies. Even if there is a partial difference between the missions of ADEME and the DREALs, the 2009 triennial agreement did not manage to clarify their respective roles and their organisation on the ground.

The co-ordination and distribution of funds between the State and local authorities could be improved (Cour des comptes, 2014; Kamal-Chaoui and Plouin, 2012). Planning contracts between the central and regional governments (CPER) are the main mechanisms for financial co-ordination. They also include contributions from other subnational authorities, and European funds (Kamal-Chaoui and Plouin, 2012). For 2007-13, ecology was ranked third in terms of the funding allocated for contracts, behind transport and higher education (Cour des comptes, 2014). The energy transition to green growth is the second-ranked priority for the current period (2015-2020) behind multimodal mobility (CGET, 2016). The CPER have been criticised on several occasions for their lack of strategic guidelines and clear objectives, which make the programmes difficult to understand (Cour des Comptes, 2014; OECD, 2006). The upstream intervention by the French Parliament to establish the CPER strategies for implementation may resolve this issue (Cour des comptes, 2014). In the ecology sector, the Cour des comptes noted some window-dressing, in that some projects would have been launched with or without a CPER, especially initiatives by Water Agencies, which raises questions as to the efficiency with which these resources are used. Nonetheless, MEDDE has acknowledged the usefulness of the framework created by the CPER in providing a regular platform for dialogue between the State and the regions (Cour des comptes, 2014). Outside the CPER, only limited financial resources are allocated to local authorities, thereby reducing their scope of action (Kamal-Chaoui and Plouin, 2012). Local authorities should receive financial support from the State under its decentralisation programme in order to help them accommodate their increased responsibilities.

2. Environmental assessment

There are a multitude of structures in France providing assessment of public policies. The overall quality of assessments is good, and the diversity of approaches is complementary (in terms of method, granularity, access to information and commitment of stakeholders). However, there is still a lack of co-ordination between the structures and no overall summary of their findings, which makes their main conclusions difficult to understand and exploit, and also leads to resources being wasted. There is also insufficient communication on the importance of assessment and on the results of the different assessments. There is a lack of awareness among the general public and politicians, meaning that proper account is not taken of the findings of assessments in policy making. In order to strengthen the position of assessment, it seems essential to further develop training, make better provision for assessment at the start of processes, and to provide the financial and human resources necessary for carrying out a good-quality assessment with results available before policies have to be decided (Mansouri-Guilani, 2015; Chauffaut, 2014).

Over the review period, France has carried out reforms to facilitate the transposition of European directives on the assessment of plans, programmes and projects. However, some aspects of these reforms remain poorly understood or have made processes more complex, and the differences between European directives and French law continue to create difficulties (AE, 2015). The link between strategic environmental assessments and impact assessments is not as clearly defined as in the other European Union countries (AE, 2015; Vernier, 2015). Recent public reports, and the Law for Growth, Activity and Equality of Opportunities (Law No. 2015-990 of 6 August 2015, known as the Macron Act), suggest ways of streamlining processes and strengthening public involvement (Duport, 2015; Vernier, 2015; CNTE, 2015).

2.1. Assessment institutions

There is no shortage of institutions in France carrying out evaluations of public policy. The Cour des comptes, created in 1807, is the main body assessing public action. Under the French Constitution, it was originally charged with ensuring the proper usage of public funds, before receiving a specific mandate foe assessment in 2008.[7] For the purposes of assessment, the French parliament has six permanent commissions per assembly, each with authority in a specific area, and it can also call for the mobilisation of a special commission to examine a particular text. For example, the Energy Transition for Green Growth Act was examined by a special commission. The National Assembly also plays a role in assessing public action. Its authority in terms of assessment was strengthened in 2009 with the creation of the Commission for the Assessment and Monitoring of Public Policies (CEC). The Economic, Social and Environmental Council (CESE), also at the level of the French assembly, has dual competencies covering the foresight and assessment of public policies (Mansouri-Guilani, 2015). France Stratégie, which reports to the Prime Minister, is another institution with an important role in assessing public initiatives. Within MEEM, the General Council for Environment and Sustainable Development (CGEDD), created in 2008, carries out expertise and consulting missions for the government, as well as acting as a general inspector of the effectiveness of the services implemented by MEEM. The ADEME also carries out evaluations of environmental issues. The other major actors in public assessment are researchers and academics, private consulting forms, and employers' and employees' organisations. Better co-ordination of these bodies is vital in order to streamline resources and send a clear message on the performance of public policies to the decision makers.

In 2013, in order to evaluate all of France's public policies, the Inter-ministerial Committee for the Modernisation of Public Policy, created in 2012 and placed under the authority of the Prime Minister, ordered an assessment of 40 public policies, including four concerning the environment.[8] In 2014, a new cycle was launched covering the assessment of 12 policies, including only one environmental policy.[9] The assessments are mainly carried out by the services of the ministries in question, which seek to involve the relevant parties. The publication of assessment reports must be followed by a list of decisions taken by the government to take into account the conclusions, thereby ensuring greater acknowledgement of the assessment.

2.2. Indicators for assessing environmental progress

France has made a concerted effort to integrate environmental issues into the national accounts and better incorporate them into the highest levels of government decision making. The report by the Commission on the Measurement of Economic Performance and Social Progress (2009) recommended using dashboards of indicators rather than a single summary indicator, giving more weight to sustainability indicators, and applying physical indicators for environmental themes. The national sustainable development strategy, and the French Marine Protected Areas Agency respect these recommendations as they both use dashboards for monitoring indicators. Moreover, under the Law providing for new wealth indicators to be taken into account in the framing of public policies (Law No. 2015-411 of 13 April 2015), the principal reforms undertaken, especially in the framework of the French budget Act, have to be evaluated according to indicators of inequality, quality of life and sustainable development.

France has been a forerunner in developing indicators derived from environmental accounting. Accordingly, the SOeS statistical service uses not only numerous annual series of environmentally-related data, such as expenditure on environmental protection and pollution emissions by business activity, but has also developed new indicators expressing carbon footprints, the consumption and productivity of materials, and water footprints (CGDD, 2011).

However, using indicators to monitor environmental policies is not an entirely satisfactory solution, as the follow-up of objectives set in laws is sometimes based on indicators of the means used rather than the results, which makes it difficult to assess their impact and effectiveness (Crosmarie, 2012). For example, one of the aims of the Grenelle II Law is to reduce energy consumption in existing buildings by at least 38% by 2020. However, the follow-up indicators focus on the number of eco-loans granted and the sustainable development tax credit rather than the energy savings generated by these measures. Moreover, some targets are fixed without ensuring sustainable financial support for their realisation. In 2011, for example, barely 10% of the energy performance plan for farms was fulfilled, despite it being due to end in 2013 under the terms of the Grenelle Law, and this was mainly due to a reduction by nearly two-thirds of the funds allocated to the plan between 2009 and 2011 (Cour des comptes, 2013b). This type of failing can be caused by setting too many objectives without ensuring that the necessary resources are available.

2.3. Strategic Environmental Assessments

In 2012, France issued two government decrees (No. 2012-616 and No. 2012-995) to improve the transposition into law of the EU's SEA (Strategic Environmental Assessment) Directive 2001/42/EC concerning the environmental assessment of some plans and

programmes, with mixed results. One defined 43 types of plans and programmes that should systematically undergo assessment, and 10 other types for case-by-case decisions by the relevant authority on whether to assess or not, with the aim of dispensing with the cumbersome process of an SEA should it not be deemed necessary. The other stipulated similar arrangements for urban planning documents. While these reforms clarify when an SEA should be carried out, the European Commission considers that there remain unjustified exemptions from the obligation to perform an assessment (European Commission, 2015). Introducing the case-by-case examination, moreover, has complicated the job of devolved government departments in the approval and transmission of urban planning documents, for example. In fact, the DREALs point out that those involved with urban planning documents are not very well aware of this reform, and the environmental authority is often approached late as a result, leading to extra bureaucracy, while project managers on plans and programmes with a positive impact on the environment, such as sanitation zoning, do not clearly understand the usefulness of the SEAs, suggesting a need for improved training and communication about these reforms (CGDD, 2014a).

Since 2009, the European Commission has been drawing attention to the lack of functional separation between environmental and decision-making authorities that is undermining the independence of SEAs in France (European Commission, 2015). That year saw the creation of the environmental authority, the CGEDD, which helped to implement the principle of independent assessment required under European law. But for plans and programmes belonging to local authorities, the prefect of the département or region holds both environmental and administrative responsibility. Although the European Court of Justice recognises that organic separation is not essential to ensure the assessment's independence (Seaport judgment of 20 October 2011), the French Council of State, when asked by an environmental non-governmental organisation (NGO) to rule on the legality of decree No. 2012-616, made the same criticism as the European Commission, observing that France does not ensure the functional independence of the environmental authority responsible for expressing an opinion on plans and programmes (Council of State, 2015; Gossement, 2015). This decision could have serious repercussions: plans and programmes in 30 of the 43 categories that should undergo systematic assessment and in four of the 10 categories examined case by case could be declared illegal. This step could jeopardise the protection of the environment provided by these plans and programmes, however, and create a legal vacuum. The Council of State has therefore applied to the European Court of Justice for its opinion on how best to proceed (Gossement, 2015). The publication of a decree ensuring the independence of the environmental authority has now become urgent.

2.4. Environmental impact assessments

In 2011, France reformed its environmental impact assessments (EIA) in order to strengthen this tool and increase its effectiveness (decree No. 2011-2019). The definition of the scope of its application was changed from financial criteria of the project's size to sector-specific categories with technical thresholds. The decree also stipulated the mandatory presentation of alternative solutions as well as measures for the mitigation and compensation of negative environmental impact. The monitoring of the implementation of these measures has also become obligatory, with tighter links to the permitting process. However, Directive 2011/92/EU concerning the assessment of the environmental impact of some public and private projects and its amendment in 2014 (2014/52/EU) have yet to be enacted, which will happen under the Macron Act. The introduction of a safety net that

would automatically trigger an EIA if the environment is particularly fragile, even below the stipulated thresholds, is one of the suggestions that would allow France to meet its EU obligations (Vernier, 2015).

The introduction of case-by-case examination in 2010 may have complicated the assessment of plans and programmes (section 2.3), but in the case of projects it also improved the quality of submissions by contractors and engineers. The reform also encouraged a more pragmatic approach to the role of the EIA by the DREALs' environmental assessment units. This simplification has therefore led to a reduction in EIAs and a relaxing of requirements (CGDD, 2014a).

Despite this progress, the effectiveness of EIAs could be improved still further by adopting the single project EIA and moving closer to the spirit of the EU Directives. The French approach of carrying out an EIA per procedure currently results in projects having several EIAs, adding to cost and complexity: every assessment takes between six months and a year and can cost up to half a million euros. This also breaks the project up, depriving the contractor, environmental authority and the public of a comprehensive view of the whole and of its potential impacts (Duport, 2015; Vernier, 2015). The CGEDD's environmental authority has also noted difficulties arising from the gap between the EU legal texts and their enactment into French law (AE, 2015). The French concept "programme de travaux", for example, has no equivalent in the EU Directive, which led the working group on the modernisation of environment law set up in 2015 to suggest it be abandoned in favour of the definitions used in the EU Directive (Vernier, 2015).

Co-ordinating the EIAs and the SEAs is also problematic. It can, for example, render the environmental assessment unsatisfactory. If a programme is subject to an SEA, it is not always necessary to examine every project included with an EIA, and if this is the case, the measures necessary to prevent environmental impacts can be poorly defined, with impacts not being taken into account (AE, 2015). The experience of other EU Member States shows that there is substantial room to improve co-ordination and consistency (AE, 2015). The CGDD has also identified poor co-ordination between planning and environment law, with the result that some planning documents have to be assessed twice (CGDD, 2014a). The Macron Act has optimised the government's co-ordination of EIAs and SEAs.

3. Regulation, compliance and enforcement

3.1. Environmental permitting

Regulated community

Classified installations[10] are divided into three categories in accordance with the principal regulatory regimes they are subject to: those requiring a permit, those that may obtain a simplified registration – both are issued by the prefect – and those that must submit a declaration to the prefect before starting operations. Non-classified installations – those which are below the regulatory thresholds for declaration requirements – are not regulated environmentally by the MEEM. They are subject to local rules defined by municipalities. Non-point pollution sources are regulated by MEEM by environmental media, and the Ministry's separate directorate is responsible for transport issues.

At the end of 2013, there were about 500 000 "classified" installations in France, including 450 000 declared installations, 3 120 installations subject to registration, and 41 400 facilities comprising at least one installation subject to permitting. The latter comprise 6 500 facilities that are subject to the EU's Industrial Emissions Directive (2010/75/EU),

including 3 200 livestock farms, 14 400 non-IED farms and 4 000 quarries. There are around 1 200 high-risk industrial installations regulated by the so-called Seveso III Directive of the EU (2012/18/EU).

Permitted installations

In France, permitting has been integrated across the environmental media since the adoption and subsequent implementation of the 1976 Law on Classified Installations, 20 years ahead of the EU Integrated Pollution Prevention and Control Directive (IPPC, 2008/1/EC). A permit is issued by the prefect in a form of an order (arrêté) based on a proposal from an inspection service and is valid for an unlimited time period (except for quarries and landfills). However, permits must be reviewed every 10 years, and the operator must notify the prefect of any significant operational changes which may require submission of a new permit application.

A permit application must contain an environmental impact assessment (étude d'impact) and a hazard study (étude des dangers). The latter focuses on the risks the installation would pose in case of an accident and justifies proposed mitigation measures.

A permit is prepared by an inspector following a consultation process with statutory stakeholders, the public and NGOs (a public inquiry through comments or public hearings).

Registered installations

In 2009, France introduced a new environmental regulatory regime – registration (essentially, a simplified permitting regime) – for installations that present risk significant enough to justify its prior evaluation but that can be addressed through standardised regulatory requirements. The implementation of this regime is in line with the trend of risk-based diversification of regulatory requirements that is evident in many OECD Member countries. It applies to specific activity sectors (e.g. warehouses, petrol stations, drycleaners, small distilleries), with activity volume thresholds stipulated where necessary. The list of eligible sectors, mostly composed of SMEs, is bound to be expanded in the future.

The introduction of the registration regime was the result of a gap between the administrative formality of a declaration and the extremely rigorous process of authorisation (permitting). The registration still requires the submission of an application and a simplified public consultation, but it has reduced the number of required technical studies associated with the application, increased the predictability of the requirements (sector-specific technical regulations are being gradually developed) and reduced the application processing time (to a maximum of seven months compared to one year for a full authorisation). Importantly, an application for registration does not require an environmental impact assessment (EIA).

At the end of 2014, 35% of installations previously covered by permitting requirements were supposed to be transferred to the registration regime. As of early 2015, this figure stood at 28%. The target, now postponed until 2017, was not attained due to the challenges of identifying categories of installations appropriate for a simplified permitting regime and the slow development of new sector-specific technical requirements.

Declared installations

Declared installations are subject to general binding rules that are laid out in standardised ministerial orders (arrêtés-types). These requirements are attached to the

formal acknowledgement of receipt of a declaration which is sent by the prefect to the operator. In some cases, they may be made more stringent by an order of the prefect to reflect local conditions. However, the inspection services do not usually have an opportunity to review a declaration or recommend to reject it. There is a supplementary regulatory regime of "declaration with control", which includes regular inspections of some installations.

Regulatory integration and reduction of the administrative burden

The 2014-2017 Strategic Inspection Programme (MEDDE, 2014) establishes as one of its principal priorities the simplification of administrative procedures. In May 2014, several regions in France (including Champagne-Ardenne, Franche-Comté, Rhône-Alpes and l'Île-de-France) started a three-year experiment with a single environmental protection permit. It integrates the traditional environmental permit with the construction permit, the land clearance permit, the energy permit, and the protected species waiver, etc. Since August 2015, the Macron Act allows the government to use an ordinance to extend the single permit to the entire country.

The Strategic Inspection Programme envisages other measures of regulatory simplification in accordance with the principle of proportionate regulation. In particular, a further transfer of regulated installations from the permitting to the registration regime to reach by the end of 2017 the above-mentioned 35% target for the number of "transferred" installations. A particular emphasis is being placed on the development of standard, sector-specific technical regulations as well as on the shortening of the permit determination procedure.

3.2. Environmental inspections

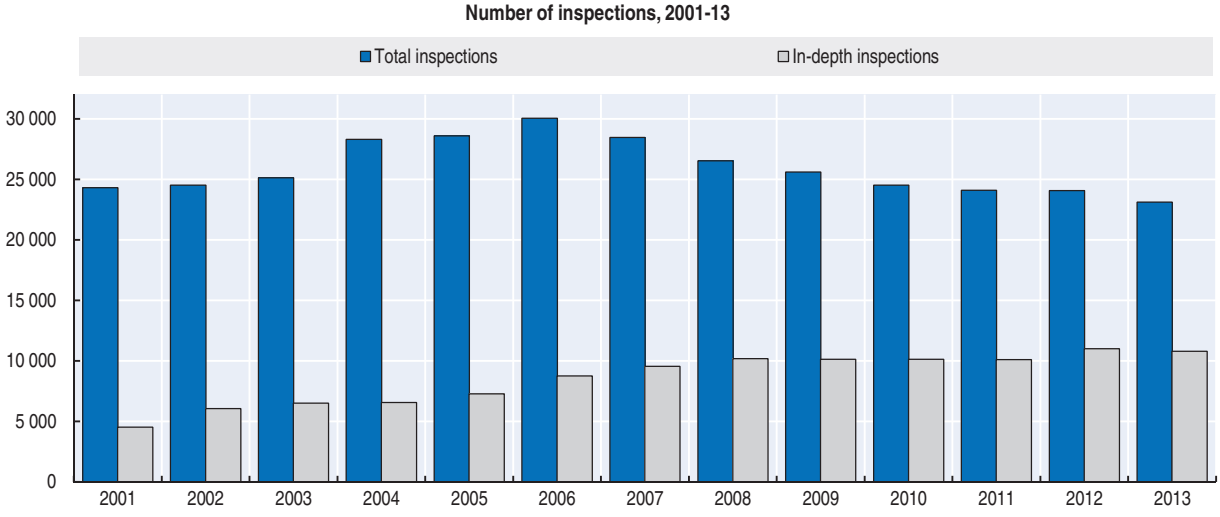
Compliance monitoring instruments

The French inspection services distinguish announced (at least 48 hours in advance) and unannounced; targeted and general; rapid, routine and in-depth; and planned and complaint/accident-triggered inspections. Inspections are usually conducted by a generalist field inspector, although in some DREALs he/she is often accompanied by a specialist from the regional office. While the total annual number of site visits has decreased by 23% since 2006, the number of in-depth inspections has increased (Figure 2.1). This is likely due to the redistribution of compliance monitoring resources towards more complex and environmentally risky installations.

There is a clear trend towards quasi-total standardisation of methods and tools for inspectors' activities. The DGPR issues a Methodology of Inspection Visits which covers the preparation of a site visit, activities during the visit, and the reporting phase, and provides key document templates. Every inspector is issued a handbook containing all essential procedural guidance, document templates, and supporting information. In addition, most inspection services have issued their own procedures for inspection visits and response to accidents.

The inspection services use several activity-based (output) indicators for their performance measurement, but generally (with the exception of the indicator of the number of accidents) do not measure outcomes in terms of the knowledge and behaviour of the regulated community. As a result, compliance monitoring strategies are not sufficiently linked to results on the ground.

Figure 2.1. **The number of in-depth inspections has increased**



Source: Medde (2015), Inspection des installations classées (website).

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Targeting of compliance monitoring activities

The inspection regime covers all permitted and registered installations. Declared installations are not systematically included in inspection planning and are not inspected unless there is an accident or a complaint. However, they may be affected by targeted inspection campaigns initiated by MEEM. Unannounced inspections constitute 10% of the annual total of inspections of permitted installations – they are used mostly to take samples and verify the accuracy of self-monitoring data. Each inspection service develops a multi-annual inspection programme and an annual inspection plan and submits it to the DGPR for approval (Box 2.2).

Box 2.2. **Risk-based inspection planning and targeting**

The average inspection frequency for permitted facilities is currently about once in four years. "National priority" facilities (there are about 2 000) are inspected at least once a year. They include:

- "High threshold" Seveso installations;
- Waste storage, treatment and disposal installations with capacity above 20 000 tonnes per year for hazardous waste and 40 000 tonnes per year for municipal solid waste;
- Installations with significant pollution releases (most of them are IED installations);
- Installations which carry out spreading of waste or effluent-origin material (e.g. sludge) on agricultural land.

There is also an annually updated list of about 8 000 "high-stake" (or regional priority) facilities which are inspected once every three years, including all those subject to European legislation, in particular IED facilities that are not part of the national priority list. "High-stake" facilities are determined regionally based on national criteria. All other permitted installations should be inspected at least once every seven years.

Box 2.2. **Risk-based inspection planning and targeting** *(cont.)*

In addition to the national requirements for inspections, there is a set of risk-based criteria which must be taken into account in the annual inspection programme. The risk-based criteria are essentially related to the importance (complexity of operations and sensitivity of the surrounding environment) and the compliance record of an installation. The existence of an environmental management system and proactive response to local community complaints are considered to be attenuating factors whereas the occurrence of major accidents over the previous four years is an aggravating factor. The national guidance on inspection planning provides specific recommendations on using these criteria.

Source: Medde (2015), *Inspection des installations classées* (web site), *www.installationsclassees.developpement-durable.gouv.fr*.

The 2015 evaluation report on compliance assurance practices pointed out only partial consideration of risk in inspection planning and the lack of attention to management and operational factors. In an effort to address this gap, the strategic investment plan for 2014-17 envisages further refining of the targeting criteria to take account of an installation's location, vulnerability of the surrounding environment, and the operator's compliance record.

3.3. Enforcement tools

MEEM/DGPR has developed guidance for non-compliance response actions to be initiated by the relevant inspection services. It makes the non-compliance response commensurate to the operator's compliance record. For example, where a generally compliant operator may get compliance prescriptions taking into account the operator's financial abilities and have its permit conditions modified, an operator with a history of minor violations may face administrative sanctions, and a recalcitrant violator may be temporarily shut down and face criminal charges.

Administrative enforcement

Administrative actions are taken by the prefect and are independent of any possible criminal enforcement actions that may be taken by a prosecutor. Initially, on recommendation of an inspection service, the prefect serves upon the offender a compliance notice (mise en demeure) specifying measures to take and a deadline. The compliance notice is not a sanction, but it forms a legal basis for using formal enforcement tools (Box 2.3).

Box 2.3. **Administrative enforcement tools**

Compliance with formal notices is verified by an inspection service. If the operator does not return to compliance within the timeframe indicated in the compliance notice, the prefect may use, successively or simultaneously, the following administrative enforcement tools:

- *Order of a deposit (consignation)* of a sum of money with a public accounting office as a guarantee against completion of the prescribed corrective action. The amount to be deposited is equal to, or slightly exceeds, the estimate of costs of the corrective action (there is no particular guidance on how to estimate these costs). The deposit is reimbursed (often in stages) upon verification of compliance or, in exceptional cases, applied toward the cost of corrective action if the latter is undertaken by the state.

Box 2.3. **Administrative enforcement tools** *(cont.)*

Guarantee deposits are the most used administrative sanction, even though the procedure for using them is rather long and complex.

- *Corrective action order* allowing the state to undertake specific measures prescribed by the inspection service at the operator's expense. This type of action is used very rarely, in cases where the operator fails to take action under the deposit procedure, as the state is reluctant to take responsibility for the corrective action.
- *Order of temporary closure of the installation* or suspension of its permit and measures to prevent further environmental degradation during the suspension period.

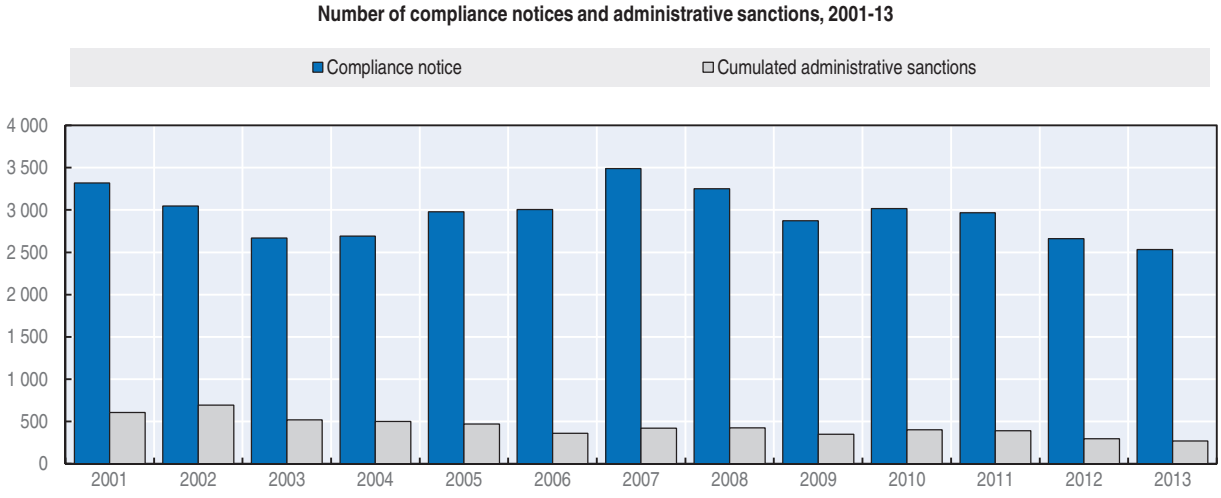
A prefect may order *definitive closure* of an installation operating without a required permit or declaration or if the permit application is rejected. A permit may also be revoked in the interest of public safety or if the operator refuses to follow prescribed corrective actions. If the operator refuses to obey a temporary or definitive closure order, the prefect may order to have the installation sealed.

Ordinance No. 2012-34 of 11 January 2012 streamlined the procedure for the implementation of administrative sanctions and reinforced the use of fixed per-offence and daily administrative fines. Such fines, previously applicable to waste-related violations only, can now be imposed for any minor offence. However, procedures and guidance for their use by inspection services have not yet been developed.

Source: Medde (2015), *Inspection des installations classées* (web site), *www.installationsclassees.developpement-durable.gouv.fr*.

In recent years, there has been a declining trend in the number of formal administrative enforcement actions (Figure 2.2), which may be explained by the decrease of the number of inspections (Figure 2.1). A little over 10% of all inspections result in the issuance of a compliance notice, a figure that has not changed over the last decade, which shows that the rate of discovery of offences has not improved. This indicates a potential for improving the targeting of inspections based on the compliance record of regulated installations.

Figure 2.2. **Approximately 10% of all inspections result in the issuance of a compliance notice**



Source: Medde (2015), Inspection des installations classées (website).

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Compliance files for national priority facilities are available on the Internet. In addition, the online ARIA (Analysis, Research and Information on Accidents) database contains information about over 30 000 industrial accidents.

Criminal enforcement

Minor offences (such as non-compliance with a formal notice, failure to notify the prefect of a significant change in operations or to submit a declaration) are dealt with by tribunaux de police which can impose a fine per offence or a daily fine. Misdemeanours are punishable by higher fines (up to EUR 750 000 for legal entities) or even imprisonment for physical persons. A judge may also ban the operator from running the installation either temporarily (for up to five years) or permanently. No violation is considered a crime under French environmental statutes.

Although the stringency of criminal penalties has increased over the years and the number of prosecution submissions is growing, actual criminal penalties are seldom applied. The prosecutor decides whether to file the case in court (and is only required to pursue the case if it involves civil responsibility vis-à-vis a private party). Despite the fact that the Ministry of Justice delivered guidance to prosecutors and courts on the "Directions of Penalty Policies in Environmental Matters" in 2005, environmental cases are still low priority for prosecutors.

3.4. Environmental liability

Before 2008, the French legislation addressed only "traditional" civil liability, i.e. damage to human health or private economic interests. This liability is generally fault-based if the responsible party is a physical person, and strict (irrespective of fault) with regard to legal entities.[11] A civil judge can also order reimbursement of government costs incurred in response to a violation (e.g. in response to an accident).

In 2008, an Environmental Liability law was adopted to transpose the EU Environmental Liability Directive (2004/35/EC). It addresses damage to water, biological species and natural habitats, and land, if its contamination threatens human health. All "classified" installations are subject to strict liability for damage to the environment. A court can issue an injunction for the remediation of environmental damage within a set timeframe either by the operator or by the government agency at the operator's expense. However, the Environmental Liability Law does not specify procedures or methodologies for environmental remediation, making it difficult to apply its provisions in practice.

In February 2015, the Ministry of Justice announced its intention to present a draft law to strengthen the environmental damage remediation provisions of the Civil Code. In particular, this draft law would give precedence to "in-kind" environmental remediation (i.e. the restoration of the damaged ecosystem) by the responsible party, allowing monetary compensation only if such remediation is impossible. It would define the procedure for remediating environmental damage using specific methodologies (e.g. the equivalency analysis). It would also give courts a right to impose civil fines if the damage was intentional and resulted in an economic benefit for the responsible party (Hopquin, 2015). This reform would be a huge step forward in shifting the system of environmental liability towards preserving ecosystems.

3.5. *Promotion of compliance and green practices*

Information dissemination to the regulated community

The DGPR does not have a formal compliance assistance programme but encourages the inspection services to regularly provide information on forthcoming requirements and inspection activities to the regulated community through different types of meetings. However, there is only a very limited audience for this form of communication.

It is primarily business associations which disseminate information on environmental regulatory requirements. For example, the Enviroveille "regulatory watch" fee-based subscription service, which is managed by the French Chamber of Commerce and Industry (CCI France), sends regular e-mail updates and maintains a dedicated website on relevant legislative developments and new applicable regulatory requirements.

Environmental management systems and sector-specific green certifications

Since the last environmental review of France, the number of French companies with environmental management systems (EMSs) certified according to the ISO 14001 standard has risen dramatically: the number of certificates issued annually rose from 3 300 in 2005 to over 7 900 in 2013 (Figure 2.3). The main driver for this growth has been domestic and international market demand, although the regulatory incentive in the form of a reduced frequency of inspections might also have had its effect.

Figure 2.3. **A sharp increase in the number of ISO 14001 EMS certificates**

Source: ISO (2015), *ISO Survey 2013* (database).

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France has been one of the champions in promoting simplified EMSs to SMEs. CCI France has designed, with substantial technical, methodological and financial assistance from the public Agency for Environment and Energy Management (ADEME), two "EMS-light" schemes that allow SMEs to get recognition for less ambitious, but still valuable improvements in their environmental management. The "1.2.3 Environnement" programme (Box 2.4) is designed to facilitate step-by-step ISO 14001 certification. EnVol is special environmental management programme for small businesses (with less than 50 employees) that do not aspire to fully fledged ISO 14001 certification but would like to get recognition for their basic EMS, which roughly corresponds to the first level of "1.2.3 Environnement".

Box 2.4. **Simplified EMS in France: 1.2.3. Environnement**

1.2.3. Environnement provides SMEs with a possibility to acquire three levels of an EMS. CCI France, in partnership with several French companies and public organisations, and supported by the French Ministry of the Environment and ADEME, use 1.2.3 Environnement to assist enterprises in implementing an EMS. Similarly to other simplified EMSs, this scheme allows an enterprise to choose to comply with a level it desires.

415 companies have been involved in the implementation of 1.2.3 Environnement since 2007. The regional CCI provide a consultant dedicated to helping SMEs in the establishment of an 1.2.3 Environnement scheme. Additionally, business associations and NGOs are helping the enterprise throughout the process. At least seven companies in France, accredited by ACFCI, are offering this certification. The applying enterprises are certified with one of the three levels after an external audit by one of these certification bodies is conducted. The certification is valid for a three-year period with an annual verification audit.

Source: French Chamber of Commerce and Industry (2015), 123 Environnement (web site), *www.cci.fr/web/123environnement*.

Business greening programmes in France usually benefit from support from more than one funding source, which provides for their greater sustainability. For example, the regional Performance Bretagne Environnement Plus (PBE+) programme in France has been funded jointly by the Regional Council, the central government, business organisations and individual large companies (Peugeot Citroën, EDF and Gaz de France), and a grant from the European Commission. This has allowed it to provide environmental information, guidance and technical assistance to businesses since 1994 (Chambre de commerce et d'industrie de Bretagne, 2015).

Government authorities work jointly with trade bodies to produce "green standards" for the sector as well as guidelines on how businesses, mainly SMEs, may "earn" the right to display appropriate signs (stickers, posters, etc.) to highlight their environmental practices to their customers.

France has been running such a programme for print shops since 1998. Created by a regional Chamber of Trade and Crafts and later rolled out nationwide, the Imprim'Vert label has been awarded to over 1 950 print shops that adhere to a set of good environmental practices such as not using toxic products and secure storage and appropriate disposal of waste (Imprim'Vert, 2015). However, environmental compliance is not among the label award criteria.

Voluntary economic sector initiatives

In 2008, following the Grenelle Forum, a framework was put in place for voluntary covenants (conventions d'engagement volontaire) – partnerships between industrial sectors and the government to promote and disseminate green practices. Such covenants, building on best practices in other OECD Member countries such as the Netherlands, can be either thematic (focusing on resource efficiency, waste minimisation, climate change mitigation, etc.) or multi-thematic. They are initiated by trade associations, include ambitious quantitative targets agreed with the environment ministry, and cover a period of 3-5 years with possible extension. The environment ministry is both a signatory and a promoter of the commitments under the covenant. In addition, ADEME is often also a party to the covenant, providing technical expertise and sometimes financing for specific projects.

To-date, 26 covenants (16 multi-thematic and 10 thematic) have been signed with a large number of economic sectors, including transport, public works, hospitals, pharmaceuticals, telecommunications, retail commerce, sports, etc. Under each covenant, an annual statement is issued to the public to show progress in achieving the targets. For example, the air transport sector has reported a 710 000 tonnes reduction in its CO_2 emissions and the food retail sector has announced the doubling of the offer of organic products (CGDD, 2014b). Since 2008, over 1 200 companies involved in road transport (passengers and goods) have joined the "Objectif CO_2 – The Transport Companies Pledge" initiative on a voluntary basis in order to reduce fuel consumption and related CO_2 emissions through four areas of action (vehicles, fuel, drivers, logisitics). Since 2015, freight transport has been involved through the "FRET21 – The Shippers Pledge" programme, and a national framework for urban logistics charters has also been created.

4. Promoting environmental democracy

4.1. *Public Participation*

The most iconic demonstration of environmental democracy at work was the Grenelle Forum in 2007. While public involvement in the environmental field was not completely unprecedented in France, which had ratified the Aarhus Convention on access to information, public participation in decision-making and access to justice in environmental matters in 2002, Grenelle turned it into an act of political significance. It founded the model of governance by five stakeholders, involving the government, elected representatives, business employers, unions and NGOs in working groups in order to take account of all points of view, and this system of participatory governance was carried over into the annual environmental conferences started in 2012, which take stock of progress towards environmental objectives and set out priorities for the year to come.

By involving all stakeholders affected, this five-part governance systems lends greater credibility to the commitments made and the effectiveness of action taken, and shields them from the pendulum-swings of two-party politics. The process remains limited in the implementation phase, however, and its effectiveness is undermined by the parties' unequal ability to take part in all discussions, especially the most technical. During the second round of the Grenelle Forum, for example, in around thirty operational committees dealing with more precise issues, the government and employers represented 70% of those taking part, compared to 14% and 2% for NGOs and unions respectively (Boy, 2010).

Multi-stakeholder dialogue was officialised in 2010 with the creation of the national committee for sustainable development and the environment Grenelle (comité national du développement durable et du Grenelle environnement-CNDDGE), in charge of tracking the Grenelle commitments and stepping up social and environmental dialogue. This body was replaced in 2012 by the National Council for the Ecological Transition (Conseil national de la transition écologique-CNTE), which added a group of legislators to the five stakeholder groups. The CNTE is a collegiate discussion forum chaired by the Minister for Ecology, whose opinions structure France's environmental policy. It has several shortcomings, however: it is not inter-ministerial, for one thing, and its influence therefore depends directly on that of the Minister. There is also some uncertainty over the representativeness of its members, since the presence of environmental organisations is not sufficient to ensure representation of civil society (Gossement, 2013).

Outside the design of public policy, France has also attempted to increase public participation in decisions concerning the impact of plans, programmes and projects on the environment. Its biggest step forward was the adoption of the Public Participation Act in 2012 (Law No. 2012-1460), which implements Article 7 of the Environment Charter. The transparency of the participation process was increased and access simplified by organising public participation over the Internet. Draft decisions with cover notes are posted online, and people are invited to make their observations, which are then summarised by the national public debate commission (Commission nationale du débat publi-CNDP). The summary is also posted on the website. Other measures include the posting of the case-by-case examination form and the publication of the environmental authority's opinion papers on its website.

Public participation remains inadequate, however, as shown by the furious protests against major projects such as the Sivens dam and the airport at Notre Dame des Landes. A paper by the CNTE observed that despite strong demand to take part in decision-making, people did not avail themselves of the procedures for doing so (CNTE, 2015). This behaviour could be partly explained by a widespread feeling of inevitability, arising from the fact that public consultation over plans, programmes and projects takes place too late, when the projects can no longer be abandoned and only marginal changes can be approved (AE, 2015; Duport, 2015).

Additional consultation must therefore take place at an earlier stage to improve environmental dialogue (Duport, 2015), while preventing excessive bureaucracy (CNTE, 2015). In 2015, the CNTE suggested two separate systems for upstream participation: one for plans and programmes likely to affect the environment; the other for major transport and energy infrastructure projects. The former are already subject to the Environment Code (Code de l'Environnement) and environmental assessment, while the latter must apply to the CNDP. These systems would also include a right of initiative – an alert mechanism – for a legitimate public representative to use in the event of a problem (CNTE, 2015).

The Macron Act also aims to improve the public participation procedure for projects, plans and programmes, introducing it earlier in the assessment process, and making it more transparent and flexible. This flexibility is designed to allow the relevant authorities to establish the terms of public information and participation according to the nature of the plan or project and its level of advancement, and to use new information and communication technologies. The text also aims to simplify public participation by, for example, employing a single public participation procedure for several projects, plans or programmes. The same law, however, entitles the government to reform environment law by decree, to accelerate investigation and decision-making for planning projects, for example.[12] The use of ordinances for this purpose excludes parliament from deliberations, which may seem paradoxical in the context of provisions concerning democratic participation, but serves to highlight the importance and difficulty of reconciling streamlined procedures with environmental democracy.

4.2. Access to environmental information

Access to environmental information is of high quality in France: it relies both on the dissemination of information by the ministry's SOeS department, and on the many online data portals made available to the public in recent years. The quality of environmental information and access to it are rooted in French law: in 2005, the right to access environmental information was written into the Environment Charter included in the Constitution, and

France has also enacted the two relevant EU Directives (2003/4/EC; 2007/2/EC). In their own view, however, the French consider themselves to be less well informed of environmental issues than their European neighbours.

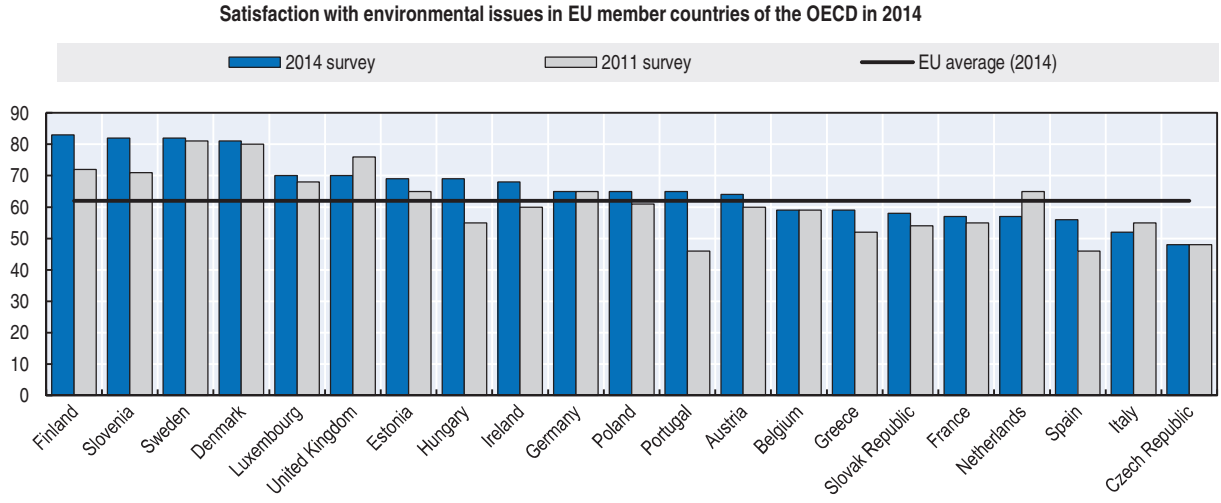
The SOeS plays a crucial role in the dissemination of environmental information. Since 1994, it has published a four-yearly report on the state of the environment in France. All figures and ad-hoc reports that it produces are published on its website, which recorded 700 000 hits and over two million page views in 2015. It also gathers and analyses environmental statistics. Originally an independent environmental body known as the Institut français de l'environnement, it became a government agency with national jurisdiction in 2004, reporting directly to the ministry in charge of the environment, before being merged into the CGDD in 2008. These decisions were criticised for their potential to weaken the body's independence and its role of assessing environmental policy (Sueur, 2007). Despite its importance, moreover, the SOeS is under severe pressure over human resources, which could threaten the quality of its work: any given subject is assigned to a single expert, who would be very hard to replace.

In addition to the SOeS website, France has a number of other online portals delivering environmental information to the public, the most significant of which is Tout sur l'environnement ("everything about the environment"), which meets the requirements of the Aarhus Convention and the Grenelle Forum. It was launched in 2009, and at the end of 2015, it had 132 800 listings produced by 185 public contributors on the state of the environment, environmental pressures, action taken to protect it and current regulations. In 2015, it recorded 142 000 hits and 380 000 page views, and traffic is growing at around 10% per year. The other online portals available to the public are Geoidd for maps; Eider for thematic series and tables; the portals of the different environmental observatories, such as that for biodiversity and for natural risks; a portal for water; another for agriculture. Since 2011, France has been examining the possibility of open data through its Etalab programme, which pushed the country up to third place from twelfth between 2013 and 2014 in the Open Data Index. Three of the ten criteria used to establish this world ranking concern the environment.

Despite the availability of this information, the 2012 Eurobarometer found that just 57% of the French felt they were well informed about the environment, which put France below the EU average of 62% (European Commission, 2014c), although the trend is positive, with the country gaining two percentage points since the 2011 Eurobarometer (see Figure 2.4).

Public dissatisfaction in France over the level of environmental information can be explained by the lack of information about concrete, everyday environmental action – in contrast to the abundance of online data portals – especially information provided to consumers about the environmental impact of production and the use of products, and about how they are recycled. Waste sorting advice and product information are inconsistent and unclear (UFC Que Choisir, 2015). The Triman logo introduced on 1 January 2015 as a means of simplification has proved complex and limited: not all products are concerned by the logo; it is not compulsory to display it on packaging, and nor is there any penalty for failing to display it (Gossement, 2014). As to the environmental characteristics of products, there are hundreds of different labels of varying quality and reliability. There is therefore an urgent need to rationalise and improve the quality of information on the market.

Figure 2.4. **The French feel less well informed about environmental issues than the average OECD EU member country**



Note: Percentage of respondents having replied "well" to the question: "In general, do you consider that you are very well, fairly well, fairly badly or very badly informed about environmental issues?", survey carried out between April and May 2014.
Source: European Commission (2014), "Attitudes of European citizens towards the environment"; *Special Eurobarometer 416*.

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4.3. Environmental education

In France, environmental education is based on firm legal foundations, but the country is facing problems translating this ambition to everyday teaching in educational establishments. As early as 2004, the Ministry of Education launched a process to roll out sustainable development education, backed by a 2007 circular and the Grenelle II Law in 2010 providing for the integration of sustainable development into all school subjects. Education about the environment and sustainable development was also included in the Education Code in 2013. Despite this, French students were less informed about environmental issues in 2006 than their peers in the OECD (OECD, 2008), and a 2014 assessment found that environmental education in middle school remained occasional and unequal (ADEME, 2014).

In 2006, students were insufficiently aware of environmental issues. A survey of 15-year-olds carried out by the OECD's PISA programme for tracking student skills found that the proportion of students claiming to be informed about environmental risks at school was, in all cases, below the average for OECD Member countries. France even recorded the lowest figure in the OECD for energy shortages and nuclear waste (OECD, 2008).

In 2004, the Ministry of Education launched a process to roll out sustainable development education in three phases. The first (2004-07) aimed to embed sustainable development in the curriculum for science, history, geography and maths. The second phase (2007-11) was themed "establishments adopting sustainable development" (établissements en démarche de développement durable – E3D), designed by the government to guide and encourage schools to take part in the transition. At the same time, the French environmental education body of-FEEE (office français de la Fondation pour l'éducation à l'environnement en Europe) launched its Éco-École (green school) programme. These two incentive programmes encourage schools to develop environmental education drives alongside various partners (associations, local authorities, businesses, families) and culminate in the award of a label to those establishments fulfilling their criteria. In 2013, 1 800 French schools had joined the

Éco-École programme and by mid-2014 3 250 had started the E3D process. The third and final phase (2011-15) focuses on governance and co-ordination, setting up committees for sustainable development education in the establishments to co-ordinate teaching.

Despite these efforts, France has not made adequate progress in environmental education. An ADEME report in 2014 observed that sustainable development was not yet incorporated into all subjects systematically, blaming insufficient teacher training and the strict French tradition of subject-based teaching. Teenage respondents, moreover, were not particularly interested in sustainable development, and felt that the schoolroom was out of step with real life (local government and business policies, the consumer society) (ADEME, 2014). Achieving the ambitions for environmental education that have been enshrined in law will take professional support for teaching staff and the transformation of the scholastic institution itself.

The issue of environmental education is increasingly attracting the attention of the executive: it was listed among five priorities at the 2013 environmental conference and, also in 2013, the Prime Minister asked the Economic, Social and Environmental Council (Conseil économique social et environnemental – CESE) to give its opinion on the subject (Dubourg and Dulin, 2013). The CESE recommended systematising environmental education and sustainable development projects and initiatives in educational establishments, field trips at primary and secondary levels, and research into how students' understanding of sustainable development issues is assessed.

In addition to the issue of schools, there is the question of educating all people about sustainable development throughout their lives, as workers, consumers and private individuals. The CESE suggests that this continuous learning can be achieved by building the environment into continuous training and by improving the quality of information on the social and environmental impacts of products and the publication of a directory of initiatives that blend environmental education and public participation (by, for example, linking the themes of natural and cultural heritage during the European Heritage Days). A section on education about the environment and sustainable development should also be included in all public policy plans and the CNTE could set up a special committee on the subject. Although it remains to be seen whether and how these recommendations will be implemented, the information campaigns about climate change ahead of COP21 in Paris seem to have borne fruit: according to a report by the Pew Research Center, 56% of the French considered climate change to be a very serious issue, the third-highest rate of the 14 OECD Member countries examined (Stokes et al., 2015).

4.4. Access to justice

In France, people can access environmental justice either privately, or through an environmental organisation. But the channels set up under the Aarhus Convention to ensure that everybody can apply to a court do not always work very well. Referrals are weighed down by red tape and a lack of inter-ministerial organisation, and access to the courts is sometimes too costly for those without additional support.

For people who have been refused access to administrative documents, including documents of an environmental nature, the first port of call is the Board of Access to Administrative Documents (Commission d'accès aux documents administratifs-CADA), an independent administrative authority. The CADA issues an opinion to both parties which will be acted upon in 77.8% of cases. In 2012, it recorded 4 569 requests for opinions,

just 6.5% of which concerned the environment (compared to 6% in 2009) and 16.8 % city planning (compared to 15.4% in 2009) (UNECE, 2014).

People who feel that their rights have not been respected by a public body can apply to the independent Defender of Rights (Défenseur des droits), which replaced the French mediator in 2011. If the claim is upheld, the Defender of Rights issues recommendations to the body at fault to resolve the conflict, but has no power of constraint over the administration. Despite the low level of cases, the processing of applications to the Defender of Rights by MEDDE was found to be inadequate (Soulié and Piney, 2014). The Ministry is slow to respond to requests from the Defender of Rights because it is not sufficiently well-organised for this purpose. To correct these shortcomings and improve the dissemination of information, the CGEDD suggests creating a single contact point for the exchange of information between the Defender of Rights and MEEM. Biannual meetings should also help improve the processing of cases.

In 2000, the Environment Code set out the avenues open to associations for the protection of the environment seeking legal redress. They can challenge any administrative decision affecting the environment and in some cases exercise the rights accorded to civil claimants. Following a ruling by the Court of Appeal in 2006 they were able to act on behalf of collective interests falling within their corporate purpose (Cour de cassation, 2006). Private individuals may also instruct associations directly. A 2012 order by the General Court of the European Union set a precedent allowing NGOs greater access to press for the re-examination of environmental rulings handed down by the Commission (Gossement, 2012). The public authorities generally contribute half of the funding of environmental associations (National Assembly, 2011), which indirectly assists public access to environmental courts.

As early as 1991, France had created a support system designed to reduce the financial barriers to legal action. This legal aid took the form of "jurisdictional aid" for access to the courts and "aid for access to law" for legal consultations. But access to justice remains very costly for people without access to this aid, especially if the case goes to appeal (UNECE, 2014).

Recommendations on environmental governance and management

- Simplify planning documents relating to the environment and adopt a more global and integrated approach to environmental issues.
- Strengthen and simplify environmental evaluation by:
  - introducing more results-based indicators in public policy evaluation;
  - promoting a single EIA per project;
  - continuing to clarify the relationship between EIA and SEA.
- Continue to reform the environmental permitting system by extending the range of sectors eligible for registration and further rationalise the relevant procedural and substantive rules.
- Improve the targeting of inspections on the basis of the compliance history of regulated installations; introduce performance indicators to measure non-compliance for both individual installations and the regulated community as a whole; strengthen administrative enforcement measures by introducing administrative fines proportionate to the economic advantages of non-compliance; consider making minor infringements punishable by administrative measures.

Recommendations on environmental governance and management *(cont.)*

- Strengthen the legal framework for environmental liability by defining procedures and standards obliging responsible parties to remedy the environmental damage they cause.
- Simplify public participation in the preparation of plans, programmes and projects by making it easier to involve the public at an earlier stage, by creating a procedure for participation on a project-by-project basis and by modernising the opportunities for participation (e.g. via the Internet); bolster public information and communication on environmental costs (externalities and environmental protection expenditure).
- Strengthen teacher training on sustainable development issues.

Notes

1. Law No. 2009-967 of 3 August 2009 programming the implementation of the Grenelle Law for the environment; Law No. 2010-788 of 12 July 2010 detailing the national commitment to the environment.
2. Five General Directorates: i) Energy and Climate; ii) Infrastructure, Transport and the Sea; iii) Planning, Housing and Nature; iv) Prevention of Risks; v) Civil Aviation; and a Directorate for Sea Fisheries and Aquaculture.
3. The following are also under the authority of MEDDE: Météo France, the National Agency for Hunting and Wildlife (ONCFS) (Chapter 5), the National Parks, the National Institute for Environmental Technology and Hazards (INERIS), the Coastal and Lake Shore Conservation Authority (CELRL), and the Marine Protected Areas Agency (AAMP).
4. And four water boards in Reunion, Guadeloupe, Martinique and French Guiana.
5. Expect for the Île-de-France region, which needs to provide a regional plan.
6. Laville Bettina calls it a sustainable State within the State, as all the powers of arbitration are concentrated in just one ministerial cabinet.
7. The constitutional law of July 2008 allows Parliament to ask the Cour des comptes to assess public policies. The Law of 3 February 2011 extends this right to the Presidents of the National Assembly and the Senate.
8. Water policy, environmental police, agricultural development policy and maritime policy.
9. Waste management by local authorities.
10. In France, the word *installation* has a different definition from the English word *installation* as used in the United Kingdom, for example. It describes a technical unit of an establishment, even if on occasion several technical units receive a single authorisation applying to all of them (which corresponds to the term *installation* as used in the UK).
11. There is a clause that exonerates the operator from strict liability (without fault) if the activity has not been changed since the petitioner moved to the vicinity of the installation.
12. An ordinance is a measure taken by the government that comes into force on publication. At the same time, a bill must be brought before parliament. The ordinance is signed into law if the bill is passed and otherwise retains the status of regulation.

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PART I

Chapter 3

Towards green growth

This chapter assesses the progress made by France in integrating environmental considerations into the economy and promoting green growth. It analyses the use made of taxation and other pricing instruments to achieve environmental targets, and advances in eliminating environmentally harmful subsidies. This chapter also examines spending on environmental protection, investment in sustainable modes of transport, and the promotion of green growth and eco-innovation activities as sources of growth and employment. The final section analyses the international dimension of France's environmental policy, in particular the inclusion of environmental issues in development co-operation programmes and government support of export credits.

1. Introduction

France has the fifth largest economy of OECD countries. It has withstood the economic crisis rather better than the OECD average but growth has been slower since then: 0.8% on average between 2010 and 2014 compared with an OECD average of 1.6% (see Chapter 1). Unemployment has risen steadily since 2008 and exceeded 10% in 2013, higher than the OECD average of 7% but lower than the eurozone average of 11.6%. France has a structural budget deficit, notably on account of very high public spending which, at 57% of GDP, is among the highest in the OECD (OECD, 2015a).

In order to revive the economy and put France's public finances in order, the government has taken steps to reduce regulatory barriers to competition, improve the labour market and tax structure and simplify the local government system. The main recent initiatives to reduce the cost of employment are the competitiveness and employment tax credit (CICE), introduced in 2013, and the Responsibility and Solidarity Pact, introduced in 2014. In addition to the EUR 20 billion of tax relief generated by the CICE from 2014, the Pact is expected to bring additional tax relief worth EUR 20 billion over three years (Ministry of Finance and Public Accounts, 2014a; France Stratégie, 2014). In order to finance the Responsibility and Solidarity Pact, the government intends to save EUR 50 billion over three years. It aims to bring the structural deficit below 3% of GDP in 2017 and below 0.5% by 2019 (Ministry of Finance and Public Accounts, 2014a).

2. Action framework for sustainable development and green growth

The Environmental Charter incorporated into the Constitution in 2005 clearly emphasised the need to integrate environmental, economic and social policy goals (OECD, 2005). Whereas the first National Sustainable Development Strategy 2003-08 targeted public authorities first and foremost with the aim of integrating sustainable development into sectoral policies, the second, spanning the period 2010-13, reflected a wider national engagement involving employers, employees and associations as well as all levels of government.

The 2007 Grenelle Forum created a genuine awareness of environmental issues. A large-scale exercise in public consultation, it ensured that environmental concerns would be given greater consideration in the economy (see Chapter 2). The work of the Stiglitz-Sen-Fitoussi Commission (2009) on the measurement of economic performance and social progress, the Quinet Commission (2009) on the tutelary value of carbon and Bernard Chevassus-au-Louis on the monetarisation of services delivered by ecosystems and the value of biodiversity (CAS, 2009; Chapter 5) improved techniques for measuring the extent to which environmental externalities are integrated into the economy.

In the wake of the economic crisis, growing priority has been given to green growth and support for strategic industries capable of fostering growth and job creation by encouraging more rational use of resources. The 2015 Energy Transition for Green Growth Act states that energy policy should "favour the emergence of a competitive and job-rich economy by mobilising all industries, especially those associated with green growth,

defined as a form of economic development that is environment-friendly, frugal and efficient in its use of energy, carbon and resources and socially inclusive, and that supports the potential for innovation and guarantees business competitiveness" (Chapter 4). The Act, and the bill for the restoration of biodiversity, nature and landscapes currently going through parliament, are part of the National Strategy for Ecological Transition to Sustainable Development 2015-2020, which aims to ensure the coherence of government action to meet the fourfold challenge of climate change, the accelerated loss of biodiversity, diminishing resources and the proliferation of health risks.

3. Towards greener taxation

3.1. Overview

Fiscal pressure has increased considerably since 2009, exceeding 45% of GDP in 2014 and ranking France second among OECD members (OECD, 2015b). The French tax system is highly complex and contains a large number of deductions, credits and exemptions. High social security contributions mean that the tax structure weighs heavily on labour and employers, factors which do not create conditions favourable to investment and innovation. Local authority tax revenues rose from 10% in 2000 to 13% in 2013, slightly higher than the OECD average of 12%.

Considerable progress has been made in environmental taxation. In 2015, alongside the COP21 climate conference, the French President, with several other heads of state, the World Bank, the IMF, the OECD, business leaders and civil society partners from all over the world, launched a Carbon Pricing Leadership Coalition; the French government gave itself five years to bring the taxation of diesel and petrol into line. A carbon component was incorporated into fossil fuel taxation in 2014 and the 2015 Supplementary Budget Act[1] confirmed that it would gradually rise until 2017. The scope of the general tax on polluting activities has been extended and certain rates have been increased. The annual tax on company vehicles has been modified to take account of CO_2 and other pollutants emitted by vehicles, and the reduced rate of VAT on fertilisers and pesticides has been eliminated. This progress is due in particular to the work of the Environmental Taxation Committee set up in 2012 (Box 3.1).

However, environmental taxation remains relatively light, tax rates do not reflect the cost of environmental damage and the many instances of preferential tax treatment, especially for diesel, continue to send contradictory price signals. In relation to the Grenelle objectives, the introduction of the climate-energy contribution[2] marks an important step forward which needs to be locked in and strengthened. In contrast, the scrapping of the HGV ecotax[3] clearly contradicts the polluter-pays principle, failing to cover the external cost, including the environmental cost, of using road infrastructure.

Over the period 2000-14, environment-related tax revenue fell as a proportion of both GDP and the total tax take. It amounted to EUR 42 billion in 2014, representing 2.0% of GDP and 4.4% of total tax revenue, compared with 2.2% and 5.2% respectively in 2000. These are among the lowest ratios in OECD Europe (Annex 3.A1). By volume, revenue fell until 2009 and has risen since then, returning in 2014 to a slightly higher level than in 2000 (Figure 3.1). Over the period as a whole, the rise in electricity-related revenue offset the fall in revenue from fuel taxation. The share of transport-related taxes (excluding fuel) is relatively low in comparison with other OECD Europe countries, even though the number of vehicles in France is higher (Annex 3.A1).

Box 3.1. **The Environmental Taxation Committee**

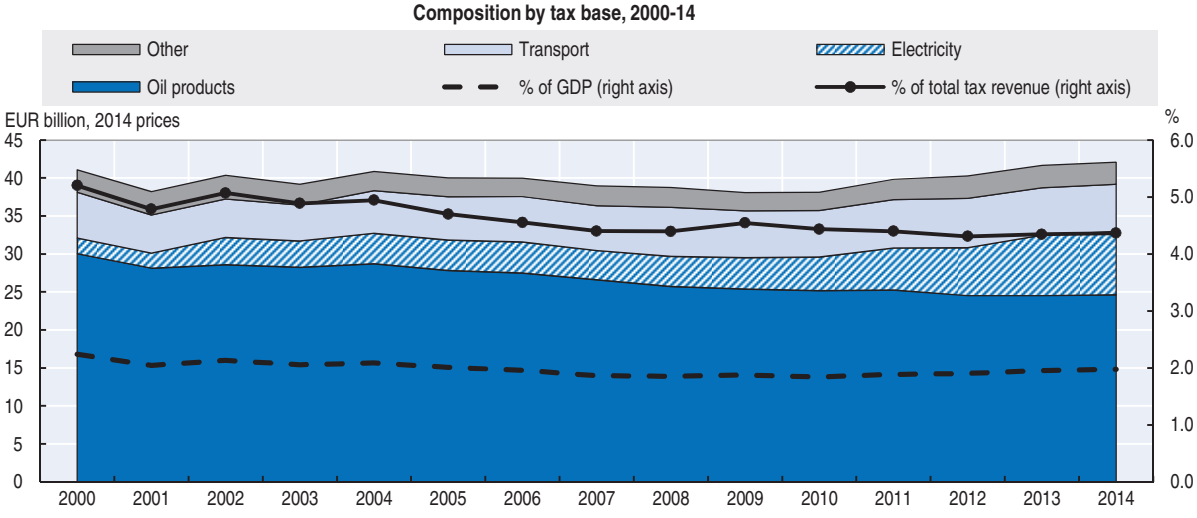
Following the 2005 *Environmental Performance Review* of France, which recommended the establishment of a green tax commission, the Ministry of the Economy, Finance and Industry and the Ministry of Ecology and Sustainable Development set up a working group to consider improving the use of economic instruments in French environmental protection policy. The ensuing Landau report inspired the 2009 Grenelle I Act, which contains extensive measures for greener taxation and led to the establishment of the Environmental Taxation Committee in 2012.

The committee, made up of members of parliament, consumer and environmental protection groups, trade unions, business federations and local politicians, issued seven opinions promoting greener taxation without increasing overall fiscal pressure. They related to the taxation of waste and the financing of the circular economy, the protection of water resources and biodiversity, the introduction of a carbon base in French taxation, the compensation of households with regard to energy taxation, the reduction of artificialisation of land, the reduction of the tax difference between diesel and petrol and the taxation of coolants.

In 2015, after its chairman resigned following the scrapping of the ecotax, the committee was renamed the Green Economy Committee and given an extended remit spanning all economic instruments for green growth. The Committee has issued a number of opinions on the labelling of the investment funds for ecological transition, the taxation and the artificialisation of land, economic instruments related to the use of pesticides, and the development of payments for environmental services.

Source: Landau (2007), *Les instruments économiques du développement durable*, Report of the working group chaired by Jean-Pierre Landau, July 2007; CGDD (2009), *Performances environnementales de la France, Mise en œuvre 2005-09 des recommandations de l'OCDE, www.developpement-durable.gouv.fr/IMG/pdf/Rapport_d_avancement.pdf; http://www.developpement-durable.gouv.fr/Le-comite-pour-l-economie-verte.html.*

Figure 3.1. **The environmental tax burden in the economy is declining**



Source: OECD (2015), *OECD Database on Instruments Used for Environmental Policy and Natural Resources Management.*

StatLink http://dx.doi.org/10.1787/888933406096

Taxing employment heavily but polluting activities lightly, combined with high unemployment and a large budget deficit, are all arguments in favour of green tax reform. Increasing environmental taxes, especially vehicle and diesel taxes, and reducing environmentally harmful subsidies could generate up to EUR 48 billion (1.9% of GDP) in tax revenue in 2025, which would make it possible to ease the tax burden on employment (European Commission, 2013; European Commission, 2015; Hogg et al., 2014). Some of the revenue could be used to compensate the most vulnerable people and sectors in order to make such measures more socially acceptable.

3.2. Taxes on energy products

In France as in all OECD countries, the bulk of environmental tax revenue derives from energy products. They accounted for 78% of revenue in 2014, more than the OECD average of 69%. Revenue from taxes on petroleum products have fallen significantly since 2000 due to lower consumption, lower real tax rates and a shift from petrol to diesel vehicles, diesel being more lightly taxed. As road fuel tax rates are not indexed to inflation, both their incentive power and revenues have diminished (Figures 3.1, 3.2). Hogg et al. (2014) estimated the resulting loss at EUR 1.3 billion per year for petrol and EUR 1.6 billion for diesel. In contrast, revenue from electricity taxes has increased as a result of rising consumption and higher tax, especially the tax contribution to public service charges for electricity, designed to finance support for renewable energies (Chapter 4). Revenue from electricity taxes accounted for 25% of energy excise revenue in 2014, compared with 6% in 2000.

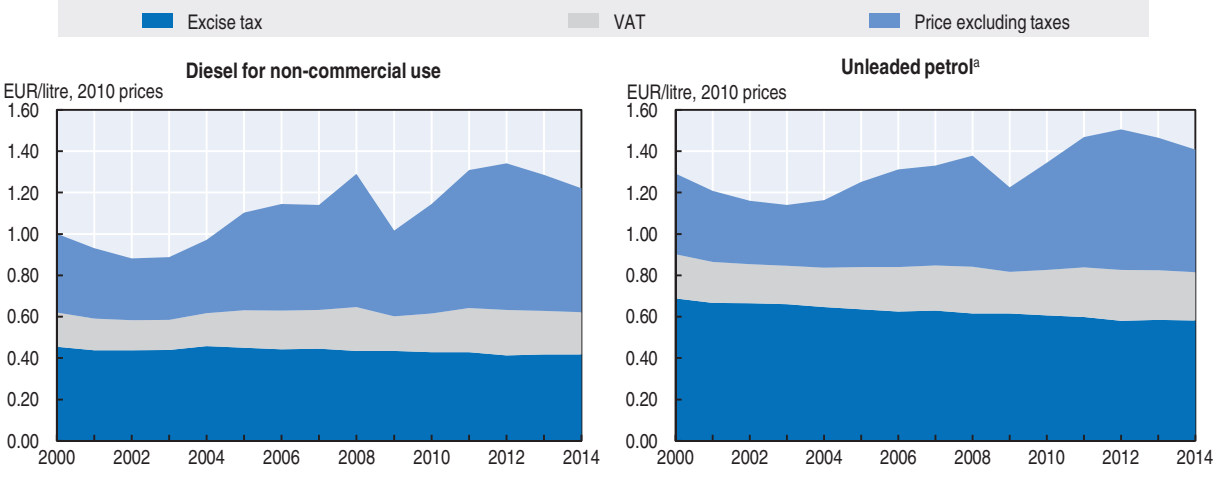
In 2013, the implicit tax rate on energy[4] was slightly higher than the European average (Eurostat, 2015). However, it reflected considerable variations according to types of fuel and users. Energy taxation at present only partially reflects environmental externalities, especially those related to climate change and atmospheric pollution (OECD, 2015c). After unsuccessful attempts in 2000 and 2009,[5] the 2014 Budget Act introduced a climate-energy contribution into taxes on energy products in order to take account of the impact on the greenhouse effect of emissions caused by burning them. Businesses covered by the EU Emissions Trading Scheme (EU ETS) are exempt from domestic consumption taxes in order to prevent dual taxation. The new climate-energy component in domestic consumption tax rates, proportionate to the carbon content of the product concerned, was set at EUR 7 per tonne of CO_2 in 2014, rising to EUR 14.5 in 2015, EUR 22 in 2016 and EUR 30.5 in 2017. It was introduced at a constant rate: for 2014, part of the existing tax was deemed the carbon component. The climate-energy contribution could generate revenue of EUR 4 billion in 2016 and lead to a saving of 3 million tonnes of CO_2 in road transport and building over the period to 2017 (Ministry of Finance and Public Accounts, 2013).

The climate-energy contribution marks an important step towards the harmonisation of carbon prices. However, the effective average rate of carbon taxation remains relatively low and there are many exceptions which limit its scope (Section 4.1). To lock in the contribution and reach a level compatible with French and European commitments on reducing greenhouse gas emissions, the Energy Transition Act aims for a value of EUR 56 per tonne of carbon in 2020 and EUR 100 in 2030 (Quinet, 2009). The value of EUR 30.5 set in the 2015 Supplementary Budget Act is consistent with that goal. Future Budget Acts will have to follow suit. As in other OECD countries, proposals to increase energy taxes have been disputed on competitiveness grounds and because of their potentially regressive effect. However, research by Arlinghaus (2015) has not shown that carbon taxes have any significant effect on competitiveness. In addition, recent studies relativise the regressive

aspect of environmental taxation by taking account of agents' entire lifecycle (Sterner, 2012) or general equilibrium effects (Dissou and Siddiqui, 2014).

As in most other OECD countries, road fuel taxation clearly favours diesel, which is unjustified from an environmental standpoint since diesel has a higher carbon content and emits more local pollutants (fine particles, NO_2) than petrol (Harding, 2014a) (Figures 3.2). Diesel vehicles also benefit from preferential tax treatment (Sections 4.1, 4.2). These advantages have had a significant effect on the vehicle fleet, where the proportion of private diesel cars jumped from 35% in 2000 to 62% in 2014 (Chapter 1). France has more than doubled its diesel imports in order to meet demand, reducing its energy autonomy. The health impact of air pollution, of which transport is one of the main sources, has been estimated at over EUR 50 billion, or 2.5% of GDP (Chapter 1). The 2015 Budget and Supplementary Budget Acts reduced the tax differential between diesel and petrol by nearly six cents per litre between 2014 and 2017. Nonetheless, in 2015 the difference (15.6 cents) remained greater than the EU average. While the gradual rise in the carbon component of domestic consumption taxes introduced by the Energy Transition Act should help to narrow the gap, the government's recent commitment to achieve alignment sooner should be encouraged and continued. The diesel/petrol catch-up scenarios prepared by the Environmental Taxation Committee show positive overall socio-economic outcomes over the period 2014-30 as well as environmental gains in terms of CO_2 and local pollution of EUR 1 to 1.9 billion in relation to the 2013 benchmark (CFE, 2013a).

Figure 3.2. **Road fuel taxation favours diesel**



a) Unleaded premium (95 RON).
Source: EIA (2015), *IEA Energy Prices and Taxes Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406100

3.3. Transport taxes and charges

Transport tax revenue in 2014 represented 15% of all proceeds from environmental taxes, the same proportion as in 2000 and relatively small compared with other OECD countries (Annex 3.A1). Revenue by volume has barely increased since 2000, with the increase in vehicle licensing charges having offset the decrease in revenue from the company vehicle tax.

Vehicle registration

Various taxes are payable on vehicle registration, assessed according to engine rating and, since 2006, the vehicle's CO_2 emissions. The regional vehicle registration tax generates the largest share of revenue from transport taxes (one third). The amount of the tax depends on the vehicle's engine rating according to a ratio set by each region. A majority of them exempt or apply a reduced rate to "clean" vehicles (i.e. those which run on liquefied petroleum gas [LPG] or compressed natural gas [CNG], hybrid or electric vehicles and vehicles which use E85 super ethanol).

The bonus-malus scheme

The bonus-malus scheme introduced in 2008 combines a subsidy for purchases of new private vehicles with low CO_2 emissions and a tax[6] on the vehicles which consume most energy. Introduced by the Grenelle I Act, it is intended to achieve the EU target for reducing vehicle CO_2 emissions, stimulate technological innovation among carmakers and accelerate renewal of the vehicle fleet. There is an additional bonus when a vehicle more than 15 years old is scrapped on acquisition of a new one. As part of the economic stimulus plan (Section 5.1), the additional bonus was replaced in 2009 and 2010 by a scrapping premium. Initially created for a five-year period, the bonus-malus was extended as part of the 2012 plan to support the automobile industry (Cour des Comptes, 2015a).

The scheme helped to reduce average emissions of new vehicles registered in France from 149 g CO_2/km in 2007 to 114 g CO_2/km in 2014, significantly lower than the European average of 122 g CO_2/km (ADEME, 2015a). According to the General Commissariat for Sustainable Development (CGDD), it had a positive effect in terms of CO_2 emissions avoided over the period 2008-12, even taking account of additional traffic related to the lower cost of vehicle use and the increase in the number of private vehicles (the rebound effect) (CGDD, 2013a). By favouring diesel vehicles, however, the bonus-malus scheme has had a negative effect on emissions of local pollutants (NO_x and fine particles).

Vehicle purchase taxes can help to change the composition of the vehicle fleet, even if they are less effective from an environmental standpoint than taxing fuel or emissions because they are not linked to vehicle use. In contrast, the bonus encourages vehicle use and thus subsidises a negative externality. Between 2008 and 2011, the bonus-malus scheme generated an aggregate deficit, and hence a net subsidy, of EUR 1.46 billion (Cour des Comptes, 2015a). The bonus-malus scheme has been tightened: only 3% of vehicle sales qualified for the bonus in 2014, compared with 50% in 2010, and 17% for the malus, compared with 9% in 2010 (ADEME, 2015a). The scheme generated a surplus in 2014 for the first time, and since 2015 only electric or hybrid vehicles emitting a maximum of 110 g CO_2/km qualify for the bonus. Although electric vehicles have advantages in terms of reducing air pollution, their lifecycle environmental impact, especially including power generation and the manufacture of batteries, does not justify a EUR 10 000[7] subsidy for buying one. A comparative lifecycle analysis of conventional and electric vehicles has shown that the latter outperform the former in environmental terms only after 100 000 km (ADEME, 2013).

Company vehicle tax

97% of company vehicles are vans and 80% use diesel, diesel vehicles being more advantageous to run because of lower fuel prices and tax breaks (Section 4.1). For companies with their headquarters in France, an annual tax[8] is levied on the ownership or

lease of private vehicles in addition to registration taxes. The tax has been made greener over the last decade: since 2006, for recent vehicles,[9] the rate has depended on their CO_2 emissions. Older vehicles are taxed according to their engine rating. As more widespread use of vehicles with lower CO_2 emissions has resulted in a significant fall in revenue (allocated to social security organisations), the company vehicle tax rate was raised in 2011. Since 2014, the rate has also depended on the vehicle's atmospheric pollutant emissions, linked to the type of engine and the year of manufacture. It is a welcome move because company vehicles account for a growing share of new registrations, representing 32% of van and car registrations in 2014 (OVE, 2015). The tightening of taxes on vehicle purchases and ownership, together with the introduction of stricter emission standards, have led to a recent fall in diesel vehicle registrations of in favour of petrol.

The HGV ecotax

The introduction of the ecotax was postponed several times then finally abandoned in 2014 following protests. The "national tax on goods vehicles" was to have been levied on French and foreign HGVs over 3.5 tonnes using France's 15 000-kilometre network of main and secondary roads.[10] The rate per kilometre[11] was set by vehicle category on a sliding scale according to European emissions standards as defined in the Eurovignette directive (Directive 2011/76/EU).

Following the introduction of road tolls in Germany in 2005, France was faced with a transfer of HGV traffic in border areas. The 2009 Budget Act contained provisions for an experimental HGV tax in Alsace, to be subsequently extended nationwide.[12] However, the tax was never applied. The Grenelle Forum took up the principle of a mileage tax, which parliament passed almost unanimously as part of the Grenelle I Act. Under these provisions, an ecotax was to be levied on HGVs from 2011 to take account of the cost of using the national non-toll and secondary road network liable to experience a transfer of traffic. The purpose of the tax was to finance transport infrastructure.

The abandonment of the ecotax contradicts the user-pays and polluter-pays principles. By setting a price on the use of non-toll roads, the ecotax would have made HGVs contribute to the expense of such infrastructure and the costs caused by emissions of greenhouse gases and atmospheric pollutants. In doing so, it would have favoured more rational road use, discouraged empty journeys and encouraged modal shift. As well as foregoing annual tax revenue worth EUR 870 million,[13] leaving a question mark over planned spending on transport infrastructure, the government had to pay EUR 800 million in compensation to the company responsible for collecting the ecotax (Cour des Comptes, 2014a, 2015b; Section 5.4). Although a national ecotax is unlikely to reappear on the political agenda any time soon, experiments on a regional basis (as originally planned) could encourage wider acceptance.

Aviation

In 2006, France introduced a tax on airline tickets to finance global health programmes, levied on passengers according to their destination and class of travel. It is in addition to the civil aviation tax, introduced in 1999 and payable by air transport companies according to the destination of the flight. The tax is disputed on the grounds that it penalises the national airline.

From the standpoint of overall CO_2 emissions, the inclusion of air travel in the EU ETS does not argue in favour of increasing the taxation of flights within Europe, because if the carbon surcharge arising from the tax levied on companies subject to quotas causes them

to reduce their emissions, it increases the rights to produce of other sources in the system by an equivalent amount. A tax on flights outside Europe could better internalise the environmental damage caused by aviation while awaiting the establishment of a global system currently envisaged by the International Civil Aviation Organisation. However, instituting such a tax would mean giving prior consideration to the potential effects on competitiveness in the international context of the air transport industry.

3.4. Other environmental taxes and charges

Waste

The polluter-pays principle is not prevalent enough in municipal waste management; in addition, the way the service is financed does little to encourage the minimisation of waste (Cour des Comptes, 2014b). About 90% of the population is liable to the municipal waste collection tax, which is based on the developed property tax and not directly linked to the real cost of the service provided. Municipalities and inter-municipal co-operation bodies have been allowed to include an incentive in the waste collection tax since 2012. By 2014, only two had done so. A special charge payable by businesses which use the service is generally associated with the tax but is rarely levied in practice, with the result that households pay for the collection of waste treated as municipal waste generated by economic activities.

Incentive pricing (taxes and charges) concerned only 5% of the population in 2014, even though under the Grenelle I Act it was supposed to have been introduced across the board by then. Implementation was doubtless held back by the administrative burden of creating and maintaining a database of users, issuing bills and collecting payments (CGDD, 2015a). In a majority of cases, local authorities which replaced the waste collection tax with a waste collection charge, comprising a fixed part and a variable part linked to the amount of waste produced, generally evaluated by counting collections, noticed a decrease in tonnage (ADEME, 2015b). Under the 2015 Energy Transition Act, 15 million inhabitants should benefit from incentive pricing by 2020 and 25 million by 2025.

Taxes on landfill sites and waste incinerators are too low to channel waste flows away from disposal. Although there was a shift from landfill to incineration after the 2009 reform, the difference in the rate of the respective general taxes on polluting activities does not bridge the gap between the cost of the two methods, thus running counter to the priorities of waste policy, which favour energy recovery over disposal (CGDD, 2013b). The 2009 Budget Act changed the taxation of facilities processing household and similar waste, raising the tax on landfill sites and introducing a tax on incineration (CGDD, 2013b) with the aim of increasing the cost of disposal in order to encourage recycling. However, facilities with better energy and environmental performances were granted rate reductions. Although this measure improved performance, it reduced the effective cost of waste disposal and undermined the incentive effect of the tax. Increasing the landfill tax and reducing or scrapping unjustified rate changes, as recommended by the Environmental Taxation Committee, would encourage waste prevention and recycling (CFE, 2014a).

Water

In water management, the polluter-pays and user-pays principles are applied through a system of charges levied by water agencies on domestic users, local authorities, industries, farmers and fishers. The revenue is allocated to preserving each basin's water resources according to the "water pays for water" principle (CGDD, 2012). In most cases there is a statutory ceiling within which each basin authority sets its own rate according to

local priorities and quality objectives. Seven charges have been levied since the 2006 Water Act came into force in 2008, relating to water pollution, the modernisation of collection networks, diffuse pollution, abstraction, storage in low-water times, barriers on watercourses and protection of the aquatic environment.

Although the system is effective in terms of covering the cost of water supply and sanitation services, it complies imperfectly with the polluter-pays principle because externalities arising from agricultural and economic activities are borne by consumers (CGDD, 2012; Levraut et al., 2013). In the Rhône-Mediterranean basin, for example, the abstraction charge for irrigation represented only 3% of total abstraction charges in 2013 despite the fact that irrigation accounted for 70% of surface water abstraction (Cour des Comptes, 2015c). The abstraction charge is increased in areas with high hydric stress levels but the Water Act exempts irrigators from the extra charge when they group together in collective water management bodies, even though there is no evidence that such bodies have any effect on the amount of water abstracted.

The Water Act replaced the pollution tax on pesticides with a diffuse pollution charge, paid by distributors rather than manufacturers and importers in order to make it more perceptible to farmers (CGDD, 2012). As a result of the change, the charges paid by farmers increased fivefold between 2007 and 2013 (Cour des Comptes, 2015c). However, their overall contribution to water agency funding remains small (6% of charges in 2013) and much lower than the health and environmental costs they generate. Additional household expenditure generated by the effects of nitrogen-based agricultural pollution and pesticides on drinking water and sanitation services has been estimated at between EUR 1 and 1.5 billion, with EUR 640 to 1,140 million being passed on in water bills, representing 7 to 12% of such bills on average nationwide (CGDD, 2011). The diffuse pollution charge represents on average only 5-6% of the sale price of plant protection products, reducing its incentive effect: pesticide use increased by 29% between 2008 and 2014 (Chapter 1). Furthermore, the diffuse pollution tax is not levied on mineral fertilisers, in contradiction with the aims of the Nitrates and Water Framework Directives (Cour des Comptes, 2015c).

Some of the revenue from the diffuse pollution charge is used to finance the Ecophyto plan to reduce the use of pesticides (Chapter 1), though the funding has not come up to expectations. The extension of the charge in 2014 to all Category 2 active substances classified as carcinogenic, mutagenic and reprotoxic will increase annual funding from EUR 41 million to EUR 71 million from 2016 (MAAF-MEDDE, 2015). However, as demand for plant protection products is not very responsive to prices, an increase in the charge, though necessary, will not be sufficient to change farmers' behaviour unless it is accompanied by training, the promotion of best practice and the development of alternatives (Box 5.9; Dutartre et al., 2014; Butault et al., 2011). That is why the 2014 Farming, Food and Forestry Act introduced an experimental scheme involving savings certificates for plant protection products which will be rolled out in mainland France in 2016. Under the scheme, distributors must encourage farmers to adopt practices identified and quantified as leading to lower pesticide use in order to receive savings certificates. After a five-year trial phase, these certificates must prove a 20% reduction in use in relation to the initial benchmark. Distributors will be penalised if they do not fulfil their obligations, either by introducing recognised measures or by acquiring certificates from other members of the scheme. The effectiveness of the Ecophyto plan, revised in 2015, will also depend on the coherence of other public policies affecting the use of inputs, especially the Common Agricultural Policy and French agro-environmental policy (Chapter 5).

Charges paid by industry fell by 15% on average between 2007 and 2013 (Cour des Comptes, 2015c). Since the Water Act came into force, the industrial pollution tax has been calculated on the basis of discharges into watercourses after treatment. One consequence has been to exempt certain industrial sites liable to the domestic pollution charge. For domestic pollution, in contrast, there is no reduction in the charge if wastewater is decontaminated before being discharged into the environment (Levraut et al., 2013). The Water Act also smoothed the annual base on which the industrial pollution charge is levied, thus exempting businesses whose activity is seasonal. By setting a five-year ceiling on increases in the non-domestic pollution charge, the Water Act also reduced its incentive effect (Cour des Comptes, 2015c).

The charge for barriers on watercourses is very small (EUR 150 per metre) and is subject to unjustified exemptions, such as the 5-metre exemption (five times the height even the strongest fish can pass) and the exemption for hydropower structures, even though they have the greatest impacts (Levraut et al., 2013).

4. Eliminating environmentally harmful subsidies

France, like other OECD countries, has introduced a number of subsidies that are potentially harmful to the environment, in the form of direct support or preferential tax treatment accorded to particular sectors (OECD, 2015d). The Grenelle I Act provided that a report evaluating the environmental impact of public budgetary or fiscal assistance would be drawn up and that such support would be gradually reviewed in order to ensure that it did not encourage damage to the environment. Several more reports have followed, including one from the Environmental Taxation Committee, as part of a more general effort to evaluate France's many tax loopholes[14] (Perthuis, 2013; CGDD, 2013c; CAS, 2012; Guillaume, 2011). Although these reports shed light on environmentally harmful subsidies, they do not provide a comprehensive analysis and are not always followed by action (Cour des Comptes, 2013). Since 2010, all budget measures must be accompanied by a prior evaluation of their economic, financial, social and environmental effects. It is a laudable initiative but the environmental impact assessment is not always properly substantiated.[15]

France recently eliminated a number of environmentally harmful subsidies, such as certain exemptions from domestic consumption tax on fuels and the reduced rate of VAT on fertiliser and plant protection products (see also Chapter 5). However, many other subsidies continue to harm the environment and biodiversity, in particular by encouraging the use of diesel to the detriment of air quality or by encouraging urban sprawl without taking account of the harm caused by the artificialisation of land.

4.1. *Tax breaks for energy products*

Since state aid for Charbonnages de France, a publicly owned coal producer, was removed in 2007, support measures for fossil fuels have mainly consisted of tax expenditures[16] related to consumption (OECD, 2013a, OECD, 2015d). These expenditures were estimated at EUR 6.2 billion[17] in 2015, equivalent to 20% of energy tax revenues and 0.3 % of GDP[18] (Table 3.1; Ministry of Finance and Public Accounts, 2014b). Overall, two thirds are related to the exemption of fuels used for transport (mainly commercial air transport and road haulage) from domestic consumption tax, the other one third being related to sectoral uses (non-road diesel fuel used by construction and agricultural plant).

Table 3.1. **Main energy-related tax expenditures**
(EUR million)

Tax expenditure	2011	2015
Total	**6 562**	**6 186**
Transport	3 991	4 036
Exemptions from domestic consumption tax on fuel		
Commercial air transport (international flights)[a]	2 448	2 825
Commercial air transport (domestic flights)	552	..
Reimbursement of a portion of domestic consumption tax on diesel used for road haulage (HGVs over 7.5t)		
Exemptions from domestic consumption tax on oil products used by boats	278	265
Exemptions from domestic consumption tax on agrofuels[b]	270	120
Other (incl. reduced rate of domestic consumption tax on LPG)	123	266
Sectoral uses	2 219	2 013
Reduced rate of domestic consumption tax on non-road diesel (plant, farming)	2 080	1 790
Partial reimbursement of domestic consumption tax on energy products used (farming)	130	110
Other	9	113
Households	259	1
Exemptions from domestic consumption tax on natural gas used by households and for heating networks	253	0
Other	6	1
Intermediate consumption by energy producers	93	136
Exemption from domestic consumption tax on oil products used in refineries	80	135
Other	13	1

a) The annex to the 2015 budget bill does not give a breakdown between international and domestic flights.
b) Removed in 2016.
Source: CGDD (2013), *La fiscalité environnementale en France : un état des lieux*; Ministry of Finance and Public Accounts (2014b), "Annexe au projet de loi de finances pour 2015, Évaluation des voies et moyens, Tome II, Dépenses fiscales".

Apart from the burden they place on public finances, these tax exemptions send contradictory price signals and reduce incentives to use less energy, with adverse consequences on greenhouse gas emissions and air pollution. Although some tax breaks may be justified (for example in order to avoid double taxation of air transport activities covered by the EU ETS since 2012), others, like those for road haulage and the agricultural sector, are used to make up for a lack of competitiveness and ought to be reviewed (Guillaume, 2011).

The allowance paid to low-income households from 2005 to help them with their domestic heating oil bills was scrapped in 2009. The 2014 Budget Act eliminated a number of environmentally harmful subsidies, including the exemption from domestic consumption tax of natural gas, coal, lignite and coke for private use, including collective use. Likewise, it gradually reduced domestic consumption tax exemptions for biofuels to zero in 2016. The scheme had been criticised for overlapping with the general tax on polluting activities, more effective in pursuing the same goal,[19] and for disputed environmental outcomes in terms of greenhouse gas emissions and biodiversity (Cour des Comptes, 2012).

Efforts to reduce environmentally harmful subsidies should be continued and facilitated by better provision of information. For example, the list of tax expenditures attached to the budget bill could include the reduced rate of consumption tax on diesel, as is the case for LPG. The tax shortfall due to the rate differential between diesel and petrol was estimated at EUR 7 to 8 billion[20] in 2011 (Cour des Comptes, 2013). The deductibility of VAT on fuel for business use could also be included. Firms can deduct most of the VAT on the diesel and E85 super ethanol they use (80% for cars, 100% for vans) but VAT on petrol cannot be recovered, whatever the type of vehicle. It was a decisive factor behind the shift

to diesel in company vehicle fleets. Although France cannot remove existing deductions without infringing EU law, introducing an equivalent deduction for petrol would ensure that the fuels were treated equally.

4.2. *Company cars*

Income tax breaks granted to employees for the use of a company car influence the composition of the vehicle fleet and the intensity of vehicle usage (Harding, 2014b). Employees get two types of benefit from a company car: the benefit of not paying or paying lower fixed costs (purchase, insurance, registration, etc.) and variable costs (fuel, repairs, maintenance) (Harding, 2014b). Lower fixed costs may encourage employees to choose a larger car, while lower variable costs may encourage them to drive more at zero marginal cost. These benefits may increase the number of households with more than one car and hence the size of the vehicle fleet. All these factors have substantial negative impacts on the environment and on society (Harding, 2014b; Roy, 2014).

A study of 27 OECD countries showed that no tax system captures all the benefits enjoyed by employees with a company car and that on average countries tax only half these benefits in kind. France captures only a little over 20% of benefits, the fourth lowest rate after Mexico, Hungary and Portugal. That represents a tax revenue shortfall of EUR 5 billion a year, or the equivalent of an annual subsidy of EUR 2,057 per company car compared with an average of EUR 1,600 in the other countries studied (Harding, 2014b). That is mainly due to the fact that taxation of the benefit in kind does not take account of the distance driven by the employee.

5. Investing in the environment to promote green growth

5.1. *Environment-related measures in fiscal stimulus plans*

In response to the economic crisis, France introduced a EUR 27 billion stimulus plan[21] for 2009 and 2010 representing 1.4% of GDP, on a modest scale in comparison with other OECD countries due to a worse initial budget situation (Table 3.2, Cour des Comptes, 2010). The plan promoted investment in sustainable means of transport, energy-efficient building renovation and clean technologies as transition measures to green growth (Présidence de la République, 2008). The environmental measures contained in the stimulus plan are hard to tell apart from those introduced previously, such as investment in transport infrastructure, and those which emerged from the Grenelle Forum, under discussion in parliament at the same time.[22] In all events, the plan speeded up their implementation. According to estimates, environmental measures represented between 8% and 20% of the stimulus plan, or between 0.1% and 0.3% of GDP (Pollitt, 2011). They mainly targeted the sectors hardest hit by the crisis, especially carmaking and building.

One of the plan's flagship measures was the creation of a scrapping premium to support the car industry. In addition to the bonus already in place, a EUR 1 000 premium was paid for any acquisition of a vehicle emitting 160 g CO_2/km[23] at most, when a vehicle more than 10 years old was retired at the same time. The measure was extended in 2010 to prevent a sudden collapse in sales but the amount was reduced to EUR 700 until mid-2010, then EUR 500 until the end of 2010. The scheme proved effective in sustaining demand and growth. The scrapping premium and similar programmes introduced in other European countries from which the French market benefited are reckoned to have accounted for 69% of French GDP growth in the second and third quarters of 2009 (Cour des Comptes, 2010).

Table 3.2. **Environment-related elements of the stimulus plan**

Measure	Description	2009-10 budget (million EUR)
Transport infrastructure[a]	Support for investment in railway, waterway and public transport infrastructure	1 300
Support for the car industry	Scrapping premium: support for the replacement of old vehicles	1 200
	Soft loans for the innovation and development of low-carbon vehicles	450
Grid infrastructure	Support for investment in power grids	600
Energy efficiency	Support for thermal renovation of buildings	400
Renewable energies	Support for investment in renewable energies	300
Total		4 250

a) Most of this corresponded to expenditure brought forward, not the financing of additional projects.
Source: Pollitt (2011).

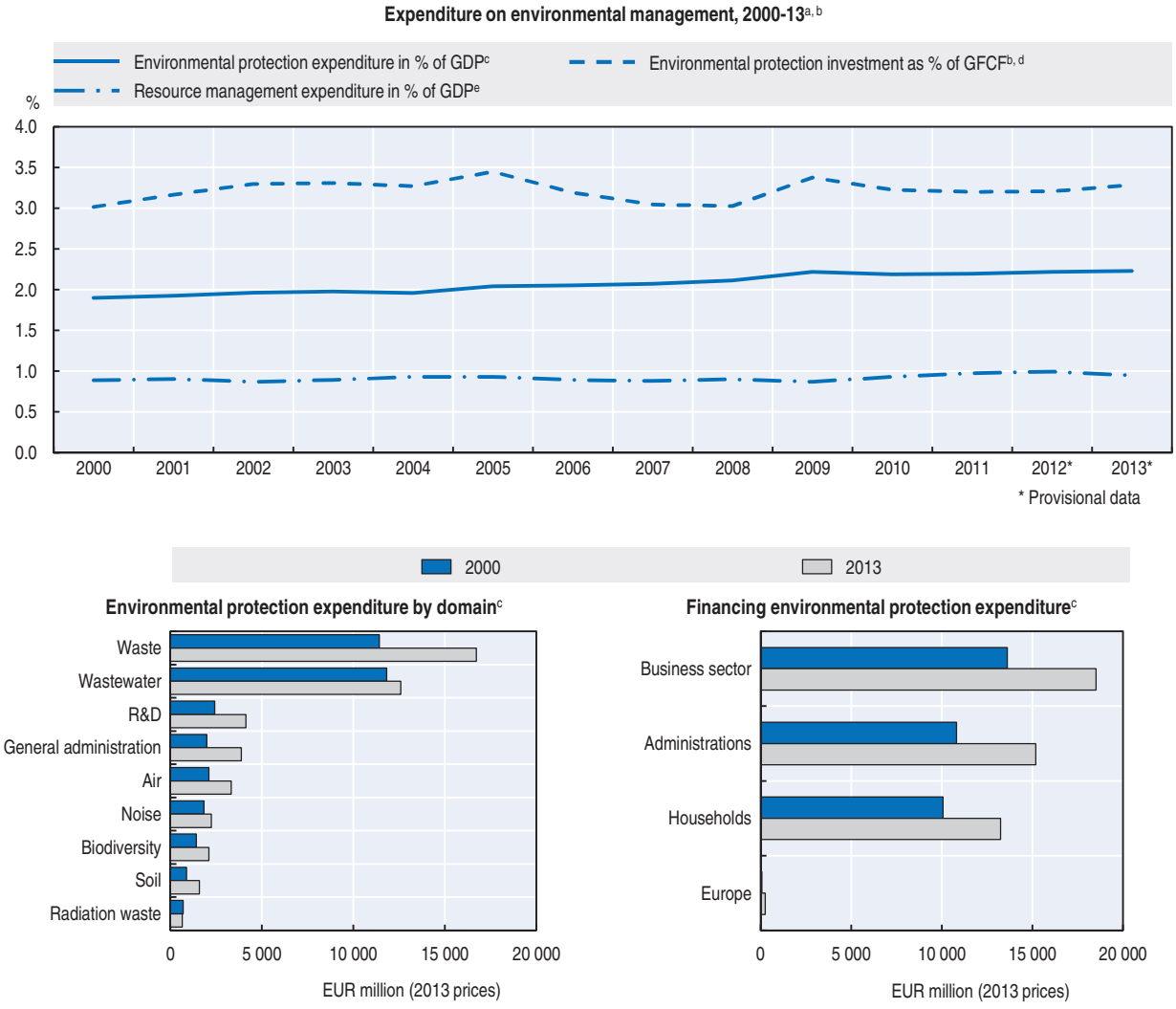
However, the medium- and long-term economic and environmental advantages of such programmes are limited. They encourage consumers to bring forward their vehicle purchases, which are then followed by a collapse of sales when the scheme ends, as happened in 2010. By distorting the market, they are likely to prevent the necessary structural adjustments and cause discrimination between sectors of activity and between consumers, for example to the detriment of low-income households which do not have the means to buy new cars. From an environmental standpoint, they are not cost-efficient. It has been estimated that the benefits of the scrapping premium in terms of improved safety and the avoidance of CO_2 and NO_x emissions represented less than half the cost of the scrapped vehicles (ITF, 2011). That is due to the premium's effect of increasing the fleet of diesel vehicles. The scheme could have been made more environmentally effective by targeting a reduction in NO_x as well as CO_2 emissions. Overall, the scrapping premium cost more than EUR 1 billion rather than the EUR 220 million initially planned.

A systematic cost-benefit analysis incorporating environmental externalities would help to rationalise public spending. Although the 2012 Public Finances Planning Act requires a prior socio-economic assessment to be performed for all capital spending projects undertaken by central government and state institutions, limited use is made of them (Quinet, 2013). Of the 299 investment projects identified by the General Investment Commission in 2014, only 194 had been the subject of a sometimes very cursory or incomplete assessment. Of those, 108 had been the subject of a socio-economic assessment, 108 of a financial assessment, 75 of an evaluation of induced costs and 52 of an environmental assessment (Cour des Comptes, 2015d). Fewer than 30% of urban areas with more than 10 000 inhabitants have introduced a system for assessing their capital spending projects.

5.2. Environment management expenditure

Expenditure[24] on environmental protection[25] rose from 1.9% to 2.2% of GDP between 2000 and 2013, a relatively high figure in comparison with other European countries. Although all sectors have contributed to this growth, public spending has remained flat since 2008 while business and household expenditure has risen steadily. The increase was mainly due to higher current expenditure, especially on waste management, while capital expenditure fell in the second half of the 2000s, especially for wastewater treatment (Figure 3.3) (CGDD, 2015a). Waste management and wastewater treatment remain the largest items of expenditure, even though general administration, soil decontamination and research and development have taken an increasing share since 2000. In 2013, current expenditure accounted for two thirds of spending on environmental protection and capital expenditure for one third.

Figure 3.3. **Spending on environmental protection has increased, especially for waste management**



a) Environmental management: environmental protection and resource management.
b) Expenditure includes investment and current expenditure of households, enterprises specialised in the provision of environmental protection services or not, public administrations (including local authorities, intermunicipal co-operation bodies, water agencies) and European Funds (mainly the European Economic and Regional Development Fund and the European Agricultural Fund for Rural Development).
c) Environmental protection include all activities directly aimed at the prevention, abatement and elimination of pollution and all other forms of environmental degradation resulting from economic production or consumption activities.
d) GFCF: gross fixed capital formation.
e) Resource management: drinking water supply and sewerage.
Source: CGDD (2015), *Les comptes de l'environnement en 2013, Rapport de la Commission des comptes et de l'économie de l'environnement, Édition 2015.*

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Waste management has become the leading item of expenditure on environmental protection, accounting for 35% of the total in 2013 (Figure 3.3) (CGDD, 2015a). Whereas the amount of waste generated per inhabitant has remained relatively stable in recent years, the rise in expenditure is due partly to improved management methods (especially the widespread use of selective collection) but also to insufficient control over collection and processing costs (Cour des Comptes, 2014b; Section 3.4). A cost accounting system for waste and cost tracking indicators in municipalities' annual waste management reports should be introduced across the board, as required by the Energy Transition Act. ADEME,

the French environment and energy management agency, has developed a reference framework for waste management costs and is setting up a national observatory which should encourage transparency and control over costs.

Water infrastructure and services

Wastewater treatment remains the largest item of expenditure on environmental protection, though it fell as a share of the total from 40% to 33% between 2000 and 2013. After growing by 26% in the period to 2007, driven by the need to bring sanitation networks and treatment plants into line with EU standards, capital spending declined by 14% in the period to 2013. The amount of investment in water supply is half that in wastewater treatment, but it has increased more quickly since 2000 (40% versus 8%). Although drinking water networks account for the larger share of investment (55%), spending on treatment plants has grown most strongly in recent years. France has high quality water supply and sanitation infrastructure. 99.5% of the population have access to good quality drinking water and 82% are connected to a public sanitation network. However, replacing often elderly networks could prove to be a problem.

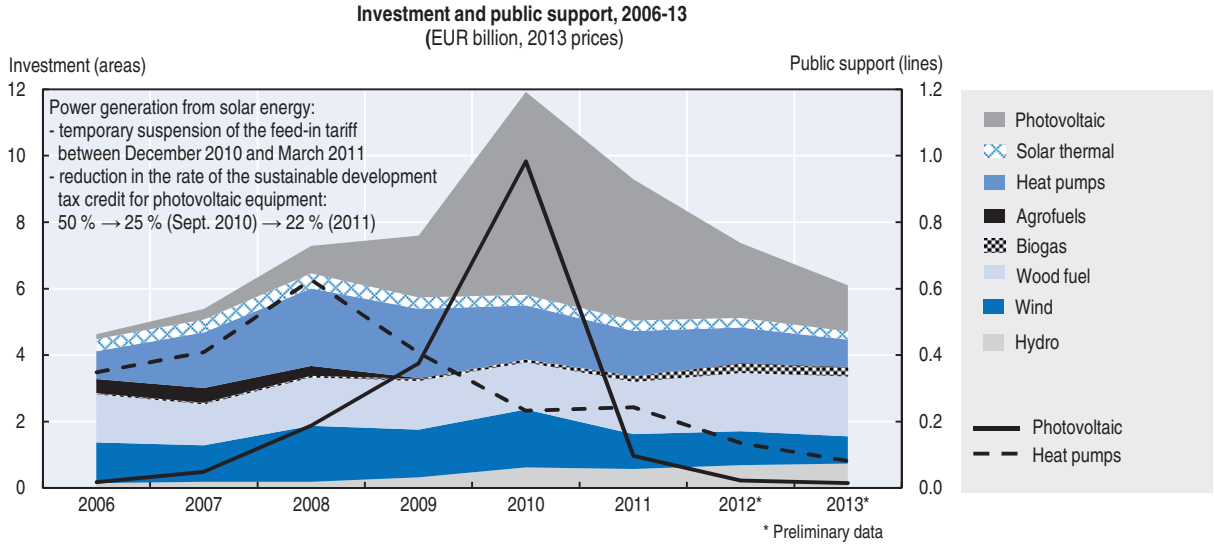
Water charges are the main source of funding for drinking water and sanitation services. They are collected by means of a bill which includes a variable part applied to metered consumption and a flat-rate subscription. Abstraction and pollution charges are based on these bills (Section 3.4). The mechanism covers all capital expenditure and local service management costs, representing over 75% of national water management expenditure (CGDD, 2012). In 2015, the price of drinking water and sanitation services in French cities was 13% lower than the European average and increased more slowly than in most neighbouring countries (BIPE, 2015). However, the water charging system will have to adapt to lower consumption, which could pose a longer-term problem with regard to covering fixed costs (CFE, 2014b).

In 2012, services managed under contract (generally by private firms) concerned 60% of the population for drinking water and 43% for sanitation. The average charge made by municipalities (EUR 3.5/m^3) was lower than that of public inter-municipality co-operation bodies (EUR 3.7/m^3); likewise, the average charge for directly managed services (EUR 3.4/m^3) was lower than that for services under contract (EUR 3.9/m^3) (ONEMA, 2015). This is due to various factors: delegated management may be used when water quality issues imply the management of complex facilities; the returns on networks in delegated services are higher and may reflect heavier property management charges; in direct management, personnel costs are not always fully integrated into the water budget; private operators have to bear specific costs; an exception to the principle of "water pays for water" applies to municipalities with fewer than 3 000 inhabitants (CEDD, 2015). It is not so much a question of the type of management, however, as the fact that the service becomes more efficient as the size of the population served increases. The new Local Government Act, which promotes inter-municipal co-operation, should pave the way for economies of scale (Chapter 2).

5.3. *Investment in renewable energies and energy efficiency*

Investment in renewable energies amounted to EUR 6.2 billion in 2013, over 30% more than in 2006 but nearly 60% lower than the peak in 2010. Feed-in tariffs and the sustainable development tax credit are the main measures to support power from renewable sources and energy efficiency (Chapter 4). Poor calibration and instability over time have greatly affected the level of investment (Figure 3.4; Chapter 4).

Figure 3.4. **Investment is affected by the instability of measures to support renewable energies**



Source: CGDD (2015), *Les comptes de l'environnement en 2013, Rapport de la Commission des comptes et de l'économie de l'environnement, Édition 2015.*

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5.4. *Investment in sustainable transport modes*

Investment in transport infrastructure represented 1.1% of GDP in 2013, considerably more than the OECD average of 0.8%. Almost half was for roads, 30% for the mainline railway network, 15% for urban public transport and 6% for other infrastructure (CGDD, 2015b). The Grenelle I Act stimulated substantial investment in the railway network and urban public transport in addition to the amounts already scheduled in the national railway network upgrade plan for 2006-2010 and the planning contracts between central government and the regions (ADEME, 2014a). Investment in the high-speed rail network more than quadrupled between 2010 and 2013, while investment in urban public transport increased by over 50%. However, the Grenelle targets for modal shift are not being met and insufficient investment in the conventional railway network could threaten its long-term future (Commission sur l'Avenir des Trains d'Équilibre du Territoire, 2015).

The 2011 National Transport Infrastructure Plan which emerged from the Grenelle process called for EUR 245 billion of investment over 25 years (excluding the Grand Paris Express project and public transport), with 71% being earmarked for the railways (DGITM, 2011). Faced with such a large amount, in 2013 the government set up the Mobility 21 commission to assign priorities to targets and projects (Commission Mobilité 21, 2013). The commission's report emphasises the need to modernise the network and deal with sensitive rail hubs before developing expensive new high-speed lines of arguable socio-economic value. It points out that the French transport infrastructure funding agency AFITF does not have sufficient resources to fund new expenditure in addition to the four high-speed lines[26] already under construction.

Railway debt is rising despite substantial public subsidy and could exceed EUR 60 billion in 2025,[27] compared with EUR 32.5 billion in 2010. The allocation of revenue from higher diesel taxes to AFITF in 2015 and 2016 is not a sufficient long-term measure to offset the revenue foregone by abandoning the ecotax (Cour des Comptes, 2014a). Nevertheless, the

government opted for the Mobility 21 commission's most ambitious scenario, which calls for EUR 30 billion over the period to 2030. Although priority is given to improving existing networks,[28] recent commitments to new high-speed lines raise questions over the consideration given to socio-economic assessments in decision-taking processes (Cour des Comptes, 2014a).

Transport infrastructure pricing does not reflect the costs of use or traffic-related externalities such as congestion, pollution, noise and the greenhouse effect (CGDD, 2009). The energy products tax and motorway tolls do not cover the nuisance cost of road traffic, especially in terms of environmental pollution (Section 3). Railway infrastructure pricing does not finance the maintenance and extension of the network. In addition, urban planning does not play enough of a role in reducing transport's environmental impacts. Urban mobility plans, mandatory since 1996 for urban areas with over 100 000 inhabitants, are also being drawn up in smaller urban communities, helping to promote public transport. Difficulties with implementation persist, however, especially because of the number of players involved and the complexity of integrating urban mobility plans into the existing hierarchy of planning documents (CERTU, 2013). Statutory instruments for restricting traffic in urban areas, such as congestion charging and limiting access for the most polluting vehicles, were barely used until recently (Chapter 1).

The 2015 Growth, Activity and Equal Economic Opportunity Act should encourage complementarity and competition between transport modes (OECD, 2015e). It creates an intermodal regulatory authority responsible for railways, motorways and express coach travel and liberalises coach routes which do not offer a service within 100 kilometres of the departure point. That should increase mobility among the less well-off, being cheaper than rail travel, and open up certain areas poorly served by the railways. Similar measures in other European countries have seen coach travel replace a significant number of car journeys, while the substitution effect with the railways has been limited (Perrot, 2015). Depending on coach occupancy rates and the increase in demand for transport, the measure could have a favourable effect on emissions of greenhouse gas and atmospheric pollutants.

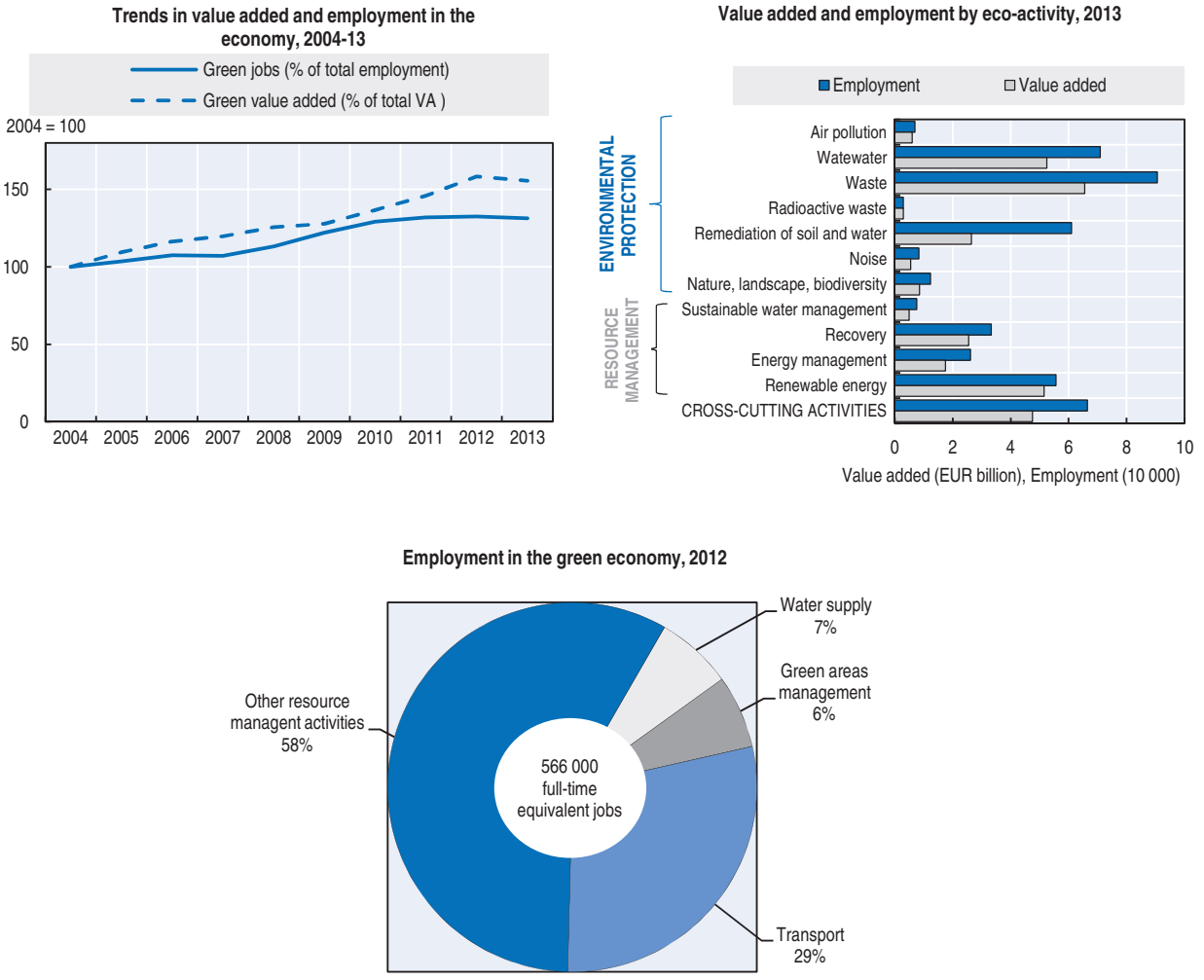
6. Promoting green markets and jobs

Added value and employment in eco-activities[29] grew faster than the economy as a whole between 2004 and 2013. Eco-activities represented 1.5% of GDP in 2013 and over 440 000 jobs, 1.7% of total employment (CGDD, 2015c). Waste management, wastewater treatment and renewable energies accounted for about half of value added and jobs (Figure 3.5). The areas where most jobs have been created and value added since 2004 are soil and water rehabilitation,[30] renewable energies and waste. Although the drastic reduction in numbers in the solar power industry, where the workforce has shrunk by 60% since 2010, has reversed the trend in renewable energies, overall growth is driven by organic farming, which contributes to soil and water rehabilitation (SOeS, 2014, ADEME, 2014a).

Exports in eco-activities amounted to nearly EUR 8.5 billion in 2013. Waste recovery, renewable energies and wastewater treatment accounted for the bulk of sales outside France. The EUR 2.8 billion trade surplus of eco-activities was mostly generated by waste recovery and, to a lesser extent, water resource management and wastewater treatment (CGDD, 2015c).

In 2010, a national plan to promote green jobs and careers[31] was drawn up to accelerate the transition to a green economy by adapting skills to technological, economic and social

Figure 3.5. **Green activities are out-performing the rest of the economy**



Notes: Eco-activities are those which produce goods or services whose purpose is environmental protection or resource management. Cross-cutting activities (general public services, R&D, engineering) are among them. Greening activities make goods or provide services that seek to improve environmental quality: water production and distribution, management of green areas, certain transport activities (construction of railway infrastructure, tramways, cycle paths, etc...) and other activities related to agriculture and fishing (aquaculture), construction (insulation of doors and windows, waterproofing, etc...) and the manufacture of industrial products (condensation boilers, insulating glazing, etc...). Green economy activities include eco-activities and greening activities. Employment figures are expressed in full-time equivalents.

Source: CGDD-Onemev (2014), "L'emploi dans les activités de l'économie verte en 2012", *L'essentiel en chiffre* (website); CGDD (2015), "Les éco-activités et l'emploi environnemental en 2013 : premiers résultats", *Chiffres & Statistiques*, n. 632, avril 2015 ; SOeS (2015) *Indicateurs de développement durable nationaux* (database).

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changes (MEEDDM, 2010). A national observatory of green jobs and careers was created to identify the skills and training courses needed to meet employers' needs. In addition to tracking eco-activities, it studies so-called "greening" activities which produce goods and services favourable to better environmental quality (Figure 3.5). The growth in employment in such activities, which rose by 10% between 2008 and 2012, is mainly due to rising employment in the transport sector linked to car and van maintenance and repair and railway infrastructure (SOeS, 2014). Overall, the green economy (eco-activities and greening activities) accounted for more than a million jobs in 2013.[32] Jobs in those sectors have risen since 2008, while overall employment has remained broadly flat.

Green jobs[33] are male-dominated (87% in 2010), because of the high degree of occupational segregation in the industries concerned (sanitation and waste processing, energy and water production and distribution, building and transport) (CGDD, 2014). Vacancies in greening industries are mainly for skilled workers (blue- and white-collar), whereas most job offers in green industries are for unskilled workers. Recruitment problems persist in skilled building trades. Training programmes and certification schemes focusing on building energy efficiency and the installation of renewable energy systems should be strengthened in order to meet the skill shortages (Chapter 4).

7. Promoting eco-innovation

7.1. Overall innovation performance

The European Innovation Union scoreboard ranks France in the middle of the European league table behind the Scandinavian countries, Germany, the Netherlands and the UK but ahead of southern, central and eastern European countries (OECD, 2014a). France ranks higher than the European average for human resources, scientific publications, public funding and venture capital but scores much less well for business investment, entrepreneurship and linkage between business and innovators, especially in small and medium enterprises.

France's gross domestic expenditure on R&D rose from 2.1% to 2.2% of GDP between 2000 and 2013 (OECD, 2015f). This is lower than the OECD average (2.4%) but higher than the European average (1.9%). The target of 3% of GDP contained in the Europe 2020 strategy will be difficult to achieve. Public investment in R&D has remained flat since 2000 at 0.8% of GDP but indirect support for private-sector R&D has increased considerably. Much of this is due to the research tax credit, expenditure on which amounted to 0.26% of GDP in 2013 compared with 0.09% in 2006 (OECD, 2016). France is the OECD country with the highest level of tax assistance for R&D as a proportion of GDP. Private-sector R&D spending amounted to 1.4% of GDP in 2013 compared with an OECD average of 1.6% (OECD, 2015f).

7.2. Action framework

The French research and innovation system is complex (OECD, 2014a). Two ministries, the Ministry of Higher Education and Research and the Ministry of the Economy, Industry and the Digital Sector, play leading roles, the former in linking education and research and the latter in linking industry and research. Research also falls within the remit of several other ministries (MEEM, Agriculture, Defence, etc.), while public research bodies such as the National Research Agency not only provide funding but also have an operational role. The system has been reformed on a number of occasions over the last ten years (OECD, 2014a). An Investments for the Future Programme was introduced in order to boost scientific excellence and direct public research towards certain economic, social and environmental goals (Box 3.2). By creating new programmes and new entities, however, it also increased complexity and the need for co-ordination.

Eco-innovation policy contains a number of strands embodied by different players, including the National Research Agency, the environment and energy management agency (ADEME), the public investment bank to support innovation in small business (Bpifrance), scientific and technical institutions, and bodies such as the Atomic and Alternative Energies Commission and IFP New Energies. They all roll out a variety of measures and programmes whose coherence is not always apparent. ADEME[34] is the main agency for

Box 3.2. **The Investments for the Future Programme supports innovation for the ecological and energy transition**

The Investments for the Future Programme was introduced in 2010 following the Juppé-Rocard report with the aim of improving the long-term growth potential of the French economy by boosting investment (EUR 35 billion over the period 2010-20, with a further EUR 12 billion top-up in 2014) in five priority sectors: higher education and training; research; industry and small business; digital technologies; sustainable development. With the anticipated leverage, especially joint financing with the private sector, the hoped-for investment is of the order of EUR 60 to 65 billion. The programme is overseen by the General Investment Commission, which reports directly to the Prime Minister.

Nearly EUR 5 billion were allocated to ecology, sustainable development and sustainable mobility over the two phases of the programme. ADEME manages over EUR 3 billion of innovation credits for the ecological and energy transition. In Phase 1 (2010), they concerned renewable energies and green chemistry demonstrators (EUR 920 million), smart grids (EUR 150 million), the circular economy (EUR 140 million) and the vehicle of the future (EUR 920 million). In Phase 2 (2014), they concerned ecological and energy transition demonstrators (EUR 800 million) and vehicles and transport of the future (EUR 200 million). The public/private leverage ratio for this funding was estimated at 1.68 in 2010 and 2.1 in 2011.

Other programmes finance innovative urban projects (the sustainable city and region: EUR 1 billion, managed by the Caisse des Dépôts et Consignations) and industrial projects for the energy transition (EUR 810 million managed by Bpifrance).

The Investments for the Future Programme has already provided funding for 12 institutes of excellence (renamed institutes for the energy transition) in the field of carbon-free energies, bringing together training institutes, public and private applied research laboratories, prototyping and industrial demonstration resources where relevant and economic players on a single site, thus strengthening competitiveness centres.

Source: OECD (2014), *OECD Reviews of Innovation Policy: France 2014*; République Française (2015), *Rapport relatif à la mise en œuvre et au suivi des investissements d'avenir*, annex to the 2016 budget bill.

new energy and environmental technologies (ADEME, 2014b). It supports research by public- or private-sector operators and funds pre-industrialisation phases through research demonstrators (Box 3.2).

Eco-innovation is one strand of France's new industrial policy, reaffirmed in response to the economic crisis in order to promote new sources of economic growth. The ministers for sustainable development and industry created a Strategic Orientation Committee for Eco-Industries in 2008 in order to encourage the development of 19 green industries.[35] Inter alia, it drew up an "Ambition Ecotech" road map in 2012 and helped more generally to frame public policies such as the Investments for the Future Programme (CGDD, 2013d). Renewable energies, thermal renovation of buildings, recycling and green materials, water quality and scarcity management were among the 34 key industries identified in the 2013 New Face of Industry in France plan, followed by the nine industrial solutions[36] in the Industry of the Future plan announced in 2015 in order to modernise industrial facilities and address a reduced number of priority markets. Among the 71 competitiveness centres created in 2014 to encourage public-private collaborative R&D projects, nine concerned energy and seven related to green technologies and the environment (CGDD, 2015a).

Eco-innovation has become a research priority. The 2009 Grenelle I Act committed the government to mobilising an additional EUR 1 billion in 2012 for research into sustainable development, especially climate change, the energies and motors of the future, biodiversity, healthcare and waste recycling. It also provided that expenditure on research into clean technologies and the prevention of environmental damage would be increased in order to attain the same level in 2012 as expenditure on civilian nuclear research. In fact, that was already the case in 2009. Environmental urgency and green technologies were a priority of the 2009 National Research and Innovation Strategy. Sustainable resource management and adaptation to climate change, safe, effective and clean energy, and sustainable mobility and urban systems were among the ten challenges addressed in the 2014 National Research Strategy entitled "France Europe 2020".

7.3. Eco-innovation performance

In 2013, the European eco-innovation scoreboard ranked France among the leaders of eco-innovation in Europe, in 8th place out of 28, behind Germany, the UK and Spain but ahead of Italy and the Netherlands (EIO, 2014). France is particularly effective in water management, sanitation, waste management and environmental engineering, boasting large firms and highly reputed public research institutes. More recently, progress has been made in technologies to combat global warming.

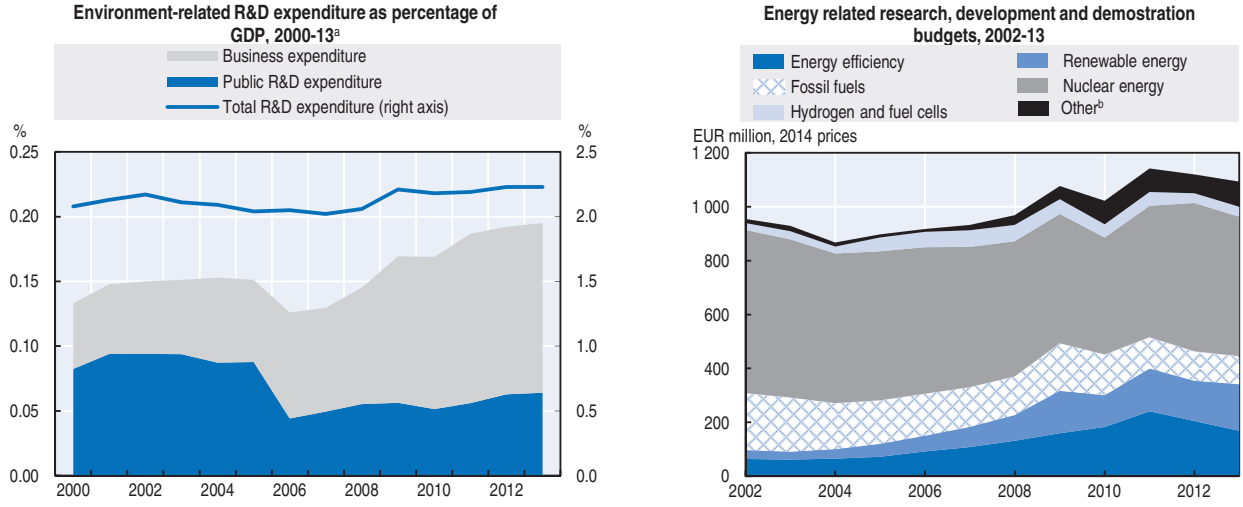
Expenditure on environmental R&D[37] has increased faster than total R&D spending since 2000, rising from 0.13% of GDP in 2000 to 0.20% in 2013 (CGDD, 2015a). Most of this rise is due to private-sector spending, since public-sector expenditure has fallen as a percentage of GDP. However, the trend masks the growing share of indirect public support in the funding of private-sector expenditure.

Public research, development and demonstration (RD&D) budgets dedicated to renewable energies and energy efficiency increased substantially between 2000 and 2013 to reach 31% of public RD&D budgets devoted to energy (Figure 3.6). While that reflects the growing priority given to these areas, the proportion is still lower than in the majority of OECD countries (Annex 3.A2). Nuclear power, though declining significantly, continued to account for half of these budgets in 2013.

Over the period 2010-12, environment-related technologies accounted for 12% of patent applications from inventors resident in France, barely more than the OECD average of 11%, compared with 5% in the early 2000s (Annex 3.A2). As in other OECD countries, growth has been fastest in climate-related technologies, especially those which seek to reduce emissions and improve energy efficiency in transport (conventional and electric vehicles, air transport), and energy-related technologies, such as renewable energies, energy storage and fuel cells (Figure 3.7). Compared with other industrialised countries, France has benefited from industrial champions in sectors that are already mature, such as heating, hydraulics, insulation and cement, or have not really taken off yet, such as electric vehicles, reaping the rewards of publicly funded research (Ménière et al., 2013). In contrast, it has played only a marginal part in the rapid technological development of emerging sectors such as renewable energies, despite the amount of public research in that sphere. In order to position itself as a leader in new clean technologies, France will have to improve the linkage between public research and the private sector.

France has made extensive use of regulatory, price and tax instruments to stimulate eco-innovation, targeting both supply and demand. Major environment policy measures

Figure 3.6. **Government research, development and demonstration budgets are being directed towards renewable energies and energy efficiency**



a) Includes all the research activities aiming at environment protection whatever the natural domain (water, air, soil, etc.), including radioactive waste. management. 2012 and 2013: provisional data. Because of changes to methodology, R&D expenditure on the environment is not perfectly comparable before and after 2005.
b) Including other power and storage tecnologies.
Source: IEA (2015), *IEA Energy Technology and RD&D Statistiques* (database); CGDD (2015), *Les comptes de l'environnement en 2013, Rapport de la Commission des comptes et de l'économie de l'environnement, Édition 2015*; OCDE (2015), "Main Science and Technology Indicators", *OECD Science, Technology and R&D Statistics* (database).

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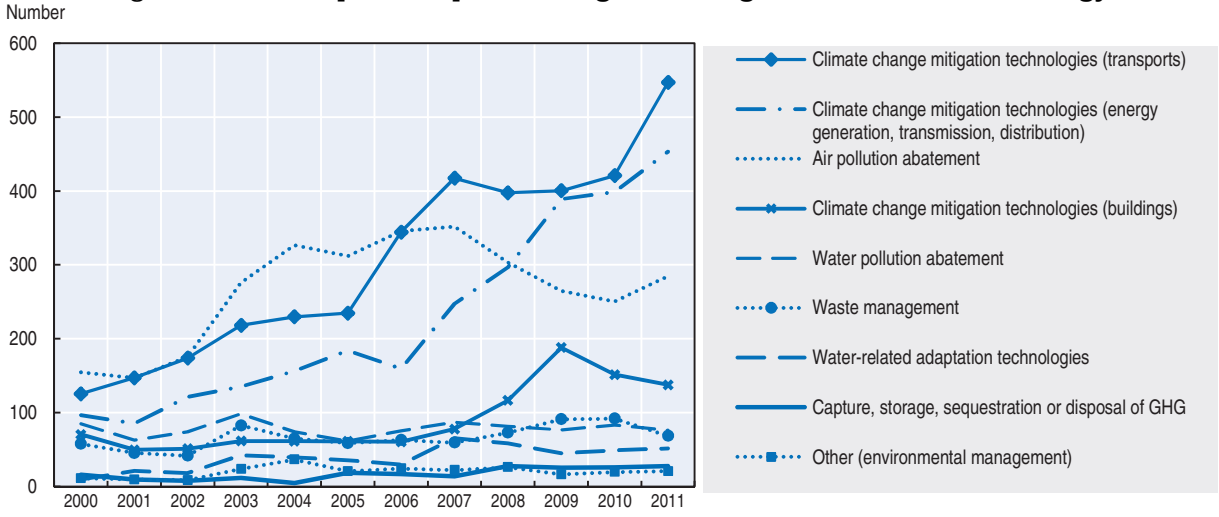
Figure 3.7. **A sharp rise in patent filings involving climate-related technology**



Note: Patent statistics are taken from the Worldwide Patent Statistical Database (PATSTAT) of the European Patent Office (EPO), with algorithms developed by the OECD. Data refer to patent applications filed in the inventor's country of residence according to the priority date and apply solely to inventions of high potential commercial value for which protection has been sought in at least two jurisdictions.
Source: OECD (2015), "Patents", *OECD Environment Statistics (database).*

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include the bonus-malus scheme, feed-in tariffs for electricity from renewable sources, energy-saving certificates, the sustainable development tax credit, soft loans for building renovation and the general tax on polluting activities. European regulations on vehicle emissions, building energy efficiency, extended producer liability and end-of-life vehicles

are a major factor in the development of green industries (CGDD, 2013d). However, the fast-moving nature of such industries requires frequent monitoring so that support measures can be adjusted to changing markets in order to head off windfall effects and burgeoning budget costs. At the same time, adjustments must be sufficiently predictable to give investors medium-term visibility and prevent legal uncertainty (Chapter 4).

Promoting green procurement could help to sustain demand for eco-innovation. Public procurement was estimated at 14% of GDP in 2011, a high percentage within the OECD (OECD, 2015a). The 2007 National Sustainable Public Procurement Action Plan had a limited effect: in 2013, only 6.7% of public procurement contracts worth EUR 90 000 or more contained an environmental clause. The non-binding nature of the plan and the lack of tracking indicators are two of the shortcomings mentioned (MEDDE, 2015). Under the 2015-20 plan, 30% of contracts in 2020 should contain at least one environmental clause and 25% at least one social clause.

Public support for R&D has sustained business R&D during the crisis, in contrast to the situation in other OECD countries (OECD, 2014a). However, firms have probably not increased their expenditure in line with the assistance received and the effects on innovation have fallen short of expectations (Bozio et al., 2014). Although a growing share of public funds intended for businesses is distributed on the basis of open calls for tender, large firms remain the principal beneficiaries of public support (OECD, 2014a). Only a quarter of the investment programmes managed by ADEME benefit small businesses (Assemblée Nationale, 2015). Its PME 2015 small business initiative, which cofinances R&D projects relating to mobility technologies and usages, could be extended to other sectors. Better communication with businesses would also facilitate access to funding, for example in connection with the Ecotechnologies fund for innovative small businesses, in which ADEME is involved alongside Bpifrance. Assessments of the environmental, economic and social impacts of funded projects also still need to be carried out. They should form part of a wider effort to assess the many supports for innovation with a view to rationalising them, making them easier for beneficiaries to access and more economically effective, refocusing government action on the major challenges facing the nation and strengthening the links between them and European funds (République Française, 2015).

8. Environment, trade and development

8.1. Development co-operation

France was the fourth largest donor on the OECD's Development Assistance Committee (DAC) in 2014. However, net official development aid (ODA) has fallen significantly since 2010 (Figure 3.8). It was supposed to reach 0.42% of gross national income (GNI) in 2015 and remain stable at around 0.39% over the period 2016-17 (République Française, 2014). France failed to achieve its objective as an EU Member State of devoting 0.51% of GNI to ODA in 2010 and will not meet the goal of 0.7% in 2015 (Annex 3.A3).

The environment has assumed growing importance in French development co-operation policy since 2007. Mitigating climate change and protecting biodiversity and the environment were included among the four priorities in the second set of strategic guidelines for the period 2007-11 drawn up by the French Development Agency (AFD), which implements the majority of France's bilateral assistance (AFD, 2007). Sustainable development is the guiding principle of the third set of strategic guidelines for the period 2012-16 (AFD, 2012). The inclusion of environmental considerations in all assistance

programmes is a requirement under the Grenelle I Act, which specifically mentions the preservation of biodiversity and adaptation to climate change (Journal Officiel, 2009). The 2014 Development Policy and International Solidarity Act, the first French law on the subject, reinforces this message by stating that "giving full consideration to environmental issues in development policy is a necessary precondition for securing the long-term future of anti-poverty programmes", and identifying climate change as a cross-cutting priority (Journal Officiel, 2014).

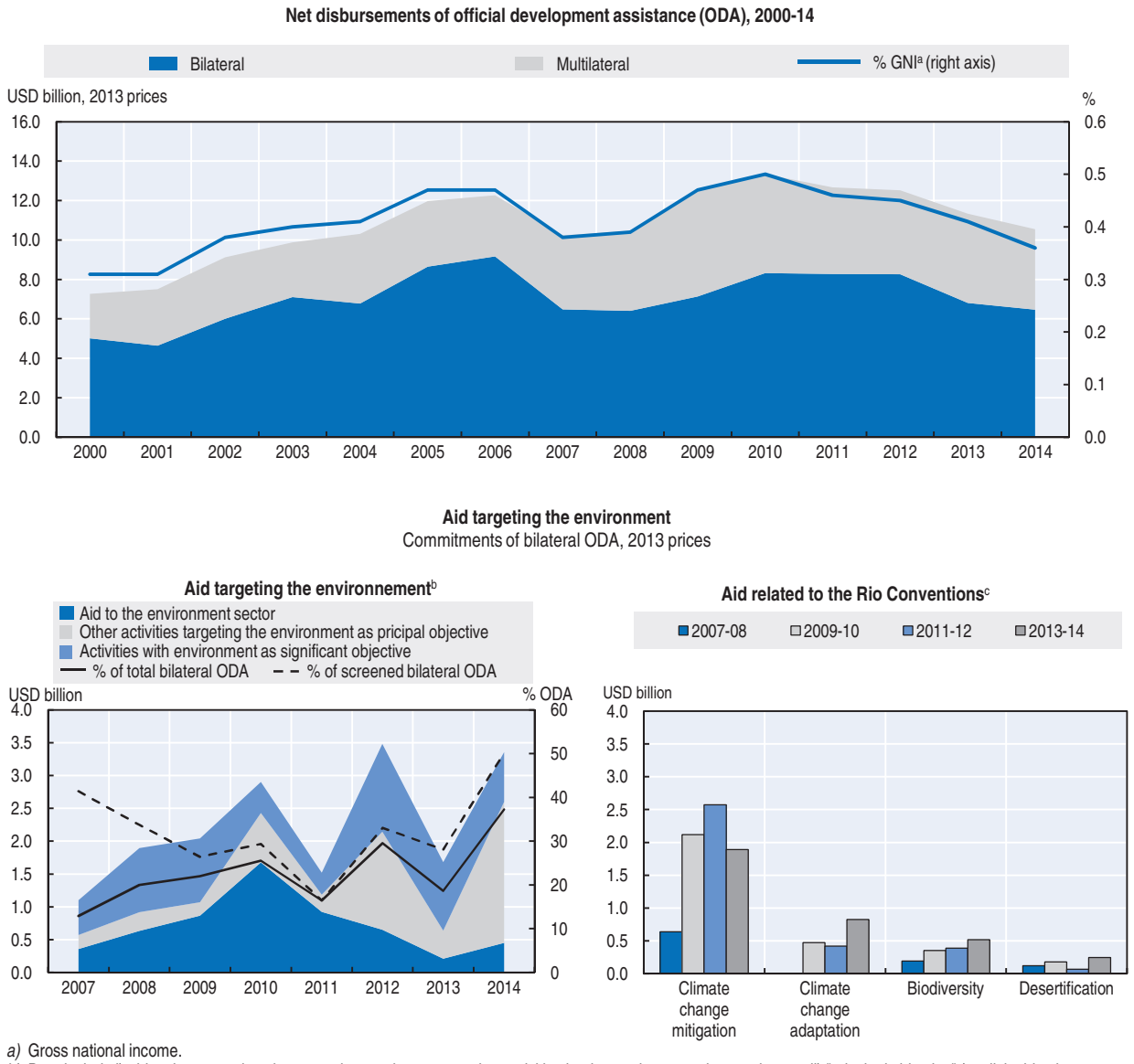
Reflecting the growing priority given to the environment in French co-operation, environment-related commitments in bilateral ODA[38] increased both by volume and as a proportion of total bilateral aid between 2007-08 and 2013-14 (Figure 3.8). France was the fourth largest provider of ODA in this sphere on average over the period 2013-14 and devoted a higher-than-average share of its total ODA to the environment (40% compared with 31%) (Annex 3.A3). More than 84% of French environment-related ODA is allocated in the form of concessional loans, compared with an average of 43% for DAC members. However, France could slip down the ranking when the measurement of development financing is modernised in 2016, since only the "grant equivalent" component of concessional loans will be counted.[39] French environment-related bilateral ODA is increasingly earmarked for programmes containing environmental objectives outside the environment sector (transport, energy and agriculture). In comparison with total bilateral ODA, it focuses on intermediate-income countries in Latin America and east Asia.

France has also strengthened its multilateral commitments to the environment, increasing its contribution to the Global Environment Facility by 40% between the fourth replenishment (2007-10) and the fifth (2011-14) (Polycarp et al., 2012), and by a further 6% in the sixth (2014-18) (GEF, 2010; GEF, 2014). It is also one of the DAC donors to provide other public-sector contributions (which do not meet the criteria for ODA) targeting environmental sectors, especially major water supply and sanitation infrastructure projects, hydropower facilities and dams, and power generation from other renewable sources.

Climate change-related bilateral ODA commitments increased between 2007-08 and 2011-12, especially assistance for mitigation (Figure 3.8), before falling back slightly in 2013-14. Under the 2009 Copenhagen Accord, France committed to providing EUR 1.26 billion in fast-start finance over the period 2010-12, which explains the sudden increase in ODA for mitigation in 2009-10 and 2011-12. Although it fulfilled its commitment (République Française, 2012), the bulk of funding was provided in the form of concessional loans which are difficult for low-income countries to repay (Curtin, 2013; Oxfam, 2012). In addition, climate change-related bilateral ODA is very unbalanced: the adaptation/mitigation funding ratio over the period 2010-14 was 1 to 4.1, compared with a DAC average of 1 to 1.6. In order to achieve the Grenelle I Act objective of integrating adaptation into its co-operation policy, France ought to seek a better balance (OECD, 2014b). That is all the more justified insofar as France aims to concentrate its efforts on the poorest countries, which are also the most vulnerable to the effects of climate change (Journal Officiel, 2014). At multilateral level, France was one of the first countries to replenish the Green Climate Fund: it has signed an agreement to give USD 1 billion over the period 2015-18, the fifth largest contribution.[40]

France uses and promotes innovative financial instruments for the environment and climate change. It has a unique structure for environmental funding in developing countries: the French Global Environment Facility (Box 3.3). It also devotes some of the revenue from the financial transactions tax to development (15% in 2014, 25% in 2015), one

Figure 3.8. **Environment-related ODA is rising**



a) Gross national income.
b) Data include i) aid to the general environmental protection sector; other activities having environmental protections as ii) "principal objective" (explicit objective of the activity and fundamental in its design); or iii) "significant objective" (important, but secondary, objective of the activity).
A number of Member States do not examine all their aid activities with reference to the environment marker. For France, the proportion of aid screened against the environment policy marker was 74% in 2014.
c) Most activities targeting the objectives of the Rio Conventions fall under the definition of "environment-focused aid" but there is no exact match of the respective coverages. An activity can target the objectives of more than one of the conventions, thus respective ODA flows should not be added.
Source: OECD (2016), *OECD International Development Statistics* (database).

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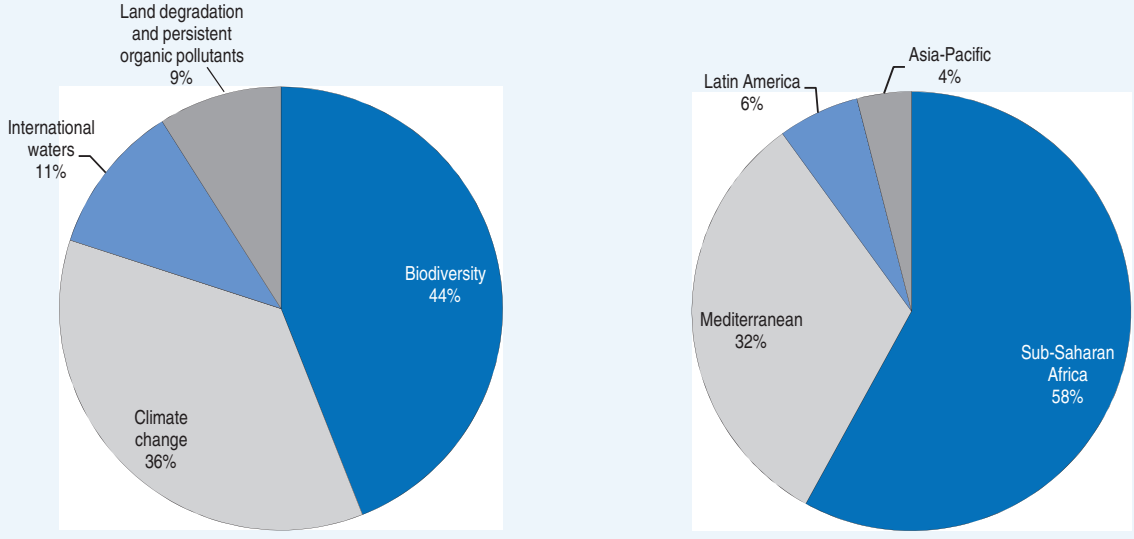
of the two targets being the environment and climate change (République Française, 2014). In September 2014, the French Development Agency issued climate bonds on the financial markets to raise funds for mitigation and adaptation projects (AFD, 2014a).

Under legislation passed in 2005 (the Oudin-Santini Act), local authorities can use up to 1% of their water and sanitation budget to finance co-operation projects in those areas. The scheme was extended to waste in 2014. The entry into force of the Water Act helped to mobilise increasing amounts, up from EUR 10.8 million in 2007 to EUR 23.5 million in 2013,

Box 3.3. **The French Global Environment Facility**

Created in 1994, the French Global Environment Facility (FFEM) cofinances development co-operation projects relating to biodiversity, climate change, international waters, land degradation, persistent organic pollutants and the stratospheric ozone layer. On average, each euro from the FFEM mobilises EUR 9 of additional cofinancing. The FFEM has cofinanced 275 projects since its inception, with a total value of EUR 317 million. It is distinguished from the Global Environment Facility by the geographical concentration of its projects in sub-Saharan Africa and the Mediterranean (Figure 3.9). Under the strategic programming framework 2013-14, at least 35% of funding will be devoted to biodiversity and 35% to climate change; these targets were met in 2013 (Figure 3.9).

Figure 3.9. **Distribution of FFEM funds in 2013**



Note: The FFEM did not finance any stratospheric ozone layer projects in 2013.

A committee of six institutions defines the FFEM's strategy. Its members are representatives of the Ministries of the Economy, Foreign Affairs, the Environment, Education, Research, Agriculture and Development. A scientific and technical committee made up of outside experts has a consultative role. Operationally, the FFEM is attached to the French Development Agency.

Source: FFEM (2014), *Rapport Annuel 2013*; FFEM (2013), *Cadre de programmation stratégique 2013-2014*.

mostly used to finance drinking water infrastructure in rural areas of Africa (the 2014 Water Solidarity Programme). One NGO has estimated that if all local authorities and water agencies were to mobilise their full 1%, they could raise EUR 65 million a year (Défis Sud, 2015).

Since 2007, the French Development Agency has applied a policy of controlling environmental and social risk in project design and execution. The environmental and social risks and impacts of each project must be assessed at the time they are presented to the decision-taking authorities. If the assessment identifies risks and negative impacts, the project sponsor must propose measures to mitigate or offset them. The project sponsor and/or the AFD's supervisory staff then ensure that such measures are implemented. Since 2011, the AFD has had a blacklist of projects which it refuses to finance on environmental

and social grounds, which include destruction of a critical habitat and crossborder trade in waste (AFD, 2011).

In 2014, the AFD introduced the "sustainable development opinion", comprising a formal framework for discussion of sustainable development, an assessment of the expected impacts and a formal opinion. The opinion is based on a scorecard containing six categories, including biodiversity and natural resources and climate change (AFD, 2014b). Being independent and taking a long-term view, it is intended to complement the policy of controlling environmental and social risk (AFD, 2014b). However, the ranking of impacts identified by the two systems remains unclear.

The AFD has adopted a climate-development strategy for the period 2012-16, based on three objectives. The first is to devote 50% of its assistance each year and 30% of that of Proparco, its private-sector financing arm, to climate projects. The AFD achieved its objective for the first time in 2014, while Proparco met its target in 2012 and 2014 (AFD, 2015). The second is to measure the carbon footprint of the projects it finances systematically and in advance. The AFD is one of the first agencies to introduce a system of this kind. The third objective is to take account of a project's impact on the climate, with the help of a scorecard which combines the project's emission levels and the characteristics of the country in which it will be rolled out. For example, the AFD may finance a high-emission project in a less advanced country or a country in crisis but not in an emerging country. This approach suggests that the environment and mitigation are challenges that only the most highly developed countries can consider tackling. The AFD's emphasis on environmental and climate-related ODA in intermediate-income countries lends further credence to that idea. Nonetheless, feedback shows that high-emission development generates substantial healthcare costs (OECD, 2013b), and that renewable energy has considerable potential and may be cheaper and easier to roll out than coal in rural areas of low-income countries (Carbon Tracker Initiative, 2014; IEA, 2014).

8.2. Corporate social responsibility

France promotes the OECD Guidelines for Multinational Enterprises, notably in the Development Policy and International Solidarity Act (Journal Officiel, 2014). In 2013-14, the National Contact Point (NCP) organised ten promotional activities in the form of meetings and presentations, more than any other OECD country (OECD, 2014c).

The NCP, an independent tripartite body co-ordinated and chaired by the Ministry of the Economy, comprises representatives of the business community, trade unions and four ministries.[41] Since 2014, it has revised its rules of procedure in order to increase transparency by structuring the dialogue with civil society and enhancing the possibilities for communication. It has also extended the possibilities for calling on expert advice (PCN, 2014). Although it recently acquired a permanent secretary general, the NCP has neither a specific budget nor an advisory committee (OECD, 2014c). The NCP examines the "specific instances" referred to it by associations, NGOs or trade unions relating to French multinationals' compliance with the guidelines. 19 specific instances have been referred to it since 2001, four of which were of an environmental nature (OECD, 2015g). They concerned the activity in France of a Swiss multinational mining company, a hydropower project carried out by a French company in Laos, the failure of a French company to influence a Cameroon trading partner in the agro-industrial sector which was in breach of the guidelines, and the building by a French multinational of a factory in a zone traditionally used as pasture land in India (OECD, 2015g). The NCP's mediation in the Cameroon case had very positive outcomes in terms of encouraging the company in question to adopt good practices (OECD, 2014c; PCN, 2013a).

In 2013, a group of NGOs criticised the NCP for a lack of impartiality, predictability, fairness and compatibility with the guidelines (CCFD-Terre Solidaire et al., 2013). They pointed out that the NCP did not have sufficient resources to process cases within a reasonable time. The criticism probably contributed to the revision of its rules of procedure. A voluntary peer review of the French NCP is due to take place in 2016.

France ranks third in the world in terms of the volume of climate-related assets held by investors (Novethic, 2015). Between 2009 and 2014, however, the 25 largest French banks invested EUR 847 billion in fossil fuels and only EUR 89 billion in renewable energies, making the French banking sector the third most carbon-heavy in the world after the United States and the UK (Naulot, 2015). The Energy Transition Act introduced a requirement for institutional investors to measure and report their carbon footprint and their contribution to the financing of energy transition. France is the first country to impose such an obligation, which should make investors' activities more transparent and encourage them to green their portfolios; however, clarification is still needed about the definitions, methodology and flexibility of the mechanism in order to maximise its impact (2° Investing Initiative, 2015; Naulot, 2015).

8.3. Export credits

France backs the 2012 OECD Recommendation on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence. Coface, the French export credit guarantee agency, evaluates the environmental and social impacts of all projects with a value of EUR 10 million or more and a credit term of more than two years, as well as of projects in sensitive areas. Since 2005, it has applied the World Bank social and environmental safeguard policies and performance standards to the projects it guarantees. Firms applying for export credits or investment guarantees are systematically informed of the OECD Guidelines for Multinational Enterprises, and France is one of three countries which require applicants to sign and declare that they have read and understood them (OECD, 2014c). Every three months, Coface publishes an online list of projects worth more than EUR 10 million that it has guaranteed, together with details of all Category A projects (projects with significant potential environmental impacts).

In 2015, the government announced the abolition of export credits for the construction of coal-fired power plants not equipped with CO_2 capture and storage systems. This would mark a major step forward: such credits amounted to EUR 1.8 billion between 2003 and 2013, an amount exceeded only by South Korea and Japan (OECD, 2015h). France is also committed to promoting the elimination of fossil energy subsidies in Europe and encouraging multilateral development banks to stop supporting coal-fired power plants. These are laudable initiatives, but in order to ensure that they are politically coherent and credible they should be accompanied by a reduction in fossil energy subsidies in France.

8.4. WTO Environmental Goods Agreement

France, as an EU Member State, is taking part in negotiations on an Environmental Goods Agreement (EGA) within the framework of the World Trade Organisation (WTO). If the negotiations are successful, import duties on a list of goods that improve the environment will be gradually reduced. Several goods considered for inclusion in the list are used to produce renewable energy or to improve energy efficiency.

Recommendations on green growth

- Speed up the reform of energy and vehicle taxation to better internalise costs associated with climate change and air pollution by:
  - confirming in upcoming budget acts that the carbon component (climate-energy contribution) of energy consumption taxes will gradually rise in line with commitments to reduce GHG emissions (EUR 100/t CO_2 by 2030);
  - confirming the time scale and schedule for aligning diesel and petrol taxation in the medium term;
  - reconsidering experimenting with a voluntary regional tax on heavy goods vehicles.
- Develop environmental assessment of direct and indirect public support, in particular via prior evaluation of Budget Act measures, with a view to eliminating measures that may harm the environment; gradually eliminate exemptions to the transport fuel consumption tax; ensure fair treatment of diesel and petrol with regard to recovery of VAT on companies' fuel consumption; eliminate the bonus part of the bonus/malus programme; revise the tax breaks granted to employees for use of a company vehicle in order to take account of distance travelled.
- Ensure the sustainability of financing for water and sanitation services in a context of declining consumption and rising financing needs:
  - speed up inter-municipal co-operation to promote economies of scale;
  - explore sources of funding compatible with resource management policy, including water savings in water stressed areas;
  - introduce a progressive component into the abstraction charge and local or seasonal variations linked to the scarcity of the resource;
  - continue to increase the diffuse pollution charge and extend it to cover mineral nitrogen fertiliser;
  - oversee and regularly evaluate the results of plant protection product savings certificates.
- Accelerate the introduction of incentive pricing for municipal waste management, including for companies and professional producers served by municipal waste collection services; reform the general tax on polluting activities in order to promote waste prevention and recycling; expand the use of cost accounting system for waste and cost tracking indicators in annual municipal waste management reports in line with the ADEME reference framework.
- Systematically conduct a cost-benefit analysis of public investment, giving consideration to environmental externalities, and ensure it is taken into account in decision making; continue research into the valuation of environmental costs.
- Continue efforts to foster R&D and the spread of environment-related technology by:
  - promoting co-operation between public research and the private sector;
  - making access to funding easier for businesses, especially small and medium-sized enterprises;
  - including mandatory environmental criteria in public procurement procedures;
  - regularly monitoring industries that might acquire a competitive advantage;
  - anticipating and developing the necessary skills for such industries;
  - expanding the analysis of the social, economic and environmental impact of aid to eco-innovation within an overall evaluation of measures to support innovation.
- Ensure a better balance between climate change adaptation and mitigation in environment-related ODA; earmark more of such aid for low-income countries, especially in the form of grants.
- Accompany investors in implementing the new environmental reporting requirements, and study the possibility of eventually including their carbon footprint; evaluate the results of the requirements and ensure their consistency with related international initiatives.

Notes

1. Act 2015-1786 of 29 December 2015.
2. Instituted by Article 2 of the Grenelle I Act.
3. Instituted by Article 11 of the Grenelle I Act.
4. Ratio between energy tax revenues and final energy consumption.
5. The 2000 Supplementary Budget Act contained a proposal to extend the general tax on polluting activities to intermediate consumption of fossil energy and electricity products in order to counter the greenhouse effect. The Constitutional Council rejected the proposal on the grounds that the base of the tax was unsuited to its purpose since electricity consumption contributed very little to carbon dioxide emissions (decision 2000-41 DC of 28 December 2000). Following the Rocard report, the planned carbon tax adopted by parliament in 2009 exempted businesses covered by the EU ETS from the carbon tax. The Constitutional Council rejected the plan on the grounds that the exemption was contrary to the principle of equal treatment with regard to a public obligation (decision 2009-599 DC of 29 December 2009).
6. The malus replaced the CO_2 registration surtax, though it remains in effect for the most polluting second-hand vehicles.
7. A EUR 6,300 bonus for buying an electric vehicle plus EUR 3,700 when the new vehicle replaces a diesel vehicle more than 15 years old.
8. Since 2010, an annual tax of EUR 160 has been payable as of the second year of registration by the owner of a private vehicle which emits more than 245 g CO_2/km (190 g de CO_2/km for vehicles registered since 2012).
9. Vehicles purchased after 1 January 2006 or put on the road in the EU after 1 June 2004.
10. Excluding the 8,600 km of toll motorway.
11. The rate was reduced by 40% in the three French regions deemed “peripheral” within the European area (Aquitaine, Brittany and Midi -Pyrénées).
12. Act 2006-10 of 5 January 2006 on the security and development of transport. Act 2008-1425 of 27 December 2008 (2009 Budget Act).
13. In addition, the government had reduced the axle tax in preparation for the introduction of the ecotax and has not revised it since scrapping the measure.
14. Since 1980, the annual Budget Act has included a report on tax expenditure. As part of the general revision of public policies, the Public Finances Planning Act for 2009-2012 provides for the systematic evaluation of the effectiveness and cost of all tax expenditures and reductions in social security contributions within three years of entering into effect.
15. For example, the 2016 budget bill proposes scrapping the general tax on polluting activities relating to classified installations for the protection of the environment on the grounds that it brings in little revenue and has little incentive effect. The prior evaluation indicates that as the tax does not take account of the pollution resulting from the actual activity of such installations, scrapping it will have no effect on the environment.
16. Tax law provisions, regulations or practices which reduce or postpone the tax payable by a small proportion of taxpayers in relation to the baseline tax system.
17. Including fuel tax exemptions in international air transport not counted in the OECD inventory of support measures for fossil fuels.
18. In relation to revenue and GDP in 2013.
19. The very high rate dissuades distributors and oil companies from incorporating biofuels.
20. The upper end of the range includes the differential’s repercussions on the cost of exemptions and reduced rates for diesel.
21. Counting loans and capital grants treated as financial transactions in national accounts data, the French plan amounted to EUR 34 billion.
22. The parliamentary debate on the bill to implement the outcomes of the Grenelle Forum started in October 2008. The 2009 stimulus plan was put forward in the supplementary budget bill in December 2008.

23. In 2009, the bonus applied to vehicles emitting less than 130 g CO_2/km and the malus applied to new vehicles emitting more than 160 g CO_2/km.

24. Expenditure comprises capital and current expenditure of households, businesses specialising in environment protection services or not, public agencies (including local authorities, public inter-municipal co-operation bodies and water agencies) and EU funds (mainly the European Regional Development Fund and the European Agricultural Fund for Rural Development).

25. Environmental protection spans all activities which seek directly to prevent, reduce and eliminate pollution and any other deterioration of the environment resulting from production or consumption processes.

26. Tours-Bordeaux, Brittany-Western France, Eastern France, Nîmes-Montpellier bypass.

27. The aim of the Rail Reform Act of 4 August 2014 is to stabilise the debt levels of SNCF Réseau by 2025.

28. EUR 4.7 billion was invested in maintaining and renovating the rail network in 015, and EUR 4.9 billion has been set aside for this purpose in 2016.

29. Activities which produce goods and services whose purpose is to protect the environment or sustainably manage natural resources.

30. Decontamination and clean-up of soil and underground water and decontamination of buildings and factories (excluding in the nuclear industry).

31. Originally called the national plan to mobilise industries and regions for green growth.

32. 2012 figure for greening activities.

33. The activity-based approach counts the number of "employees" of businesses carrying on a green activity, whatever the type of job. The job-based approach counts only workers whose job is green or greening; in contrast, a green economy worker may be employed in a business that has no connection with the environment and be counted nevertheless among workers with a green or greening job.

34. A public establishment under the joint oversight of the Ministry of Ecology, Sustainable Development and Energy and the Ministry of Higher Education and Research.

35. Biofuels, energy biomass, marine, wind, geothermal and solar energies, low-environmental-impact buildings, green chemistry, hydrogen fuel cells, logistics and flow management, biosourced materials, optimisation of industrial processes, smart grids, energy storage, low-carbon vehicles, CO_2 capture, storage and recycling, water and sanitation, metrology and instrumentation, waste recovery and recycling.

36. New resources, smart cities, eco-mobility, tomorrow's transport, smart food choices, the data economy, smart devices, digital confidence, medicine of the future.

37. This spans all research into environmental protection, whatever the natural environment (water, air, soil, etc.), including radioactive waste management.

38. ODA specifically for the environment sector and activities having environmental protection as a principal or significant objective.

39. The members of OECD DAC issued a communiqué on 16 December 2014 following their high-level meeting to discuss the future international reporting system for development financing. The announced targets and measures included a change in the method for counting concessional loans in ODA: from 2016, only the grant equivalent of such loans will be counted. The full communiqué can be found at *www.oecd.org/dac/OECD%20DAC%20HLM%20Communique.pdf*.

40. The Green Climate Fund, set up at Cancún in 2010, is the UN financial mechanism to help developing countries cope with the effects of climate change.

41. The ministries responsible for the economy and finance, work and employment, foreign affairs and the environment.

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ANNEX 3.A

Data on green growth performance

Figure 3.A1. **Environmentally related taxes**

Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.

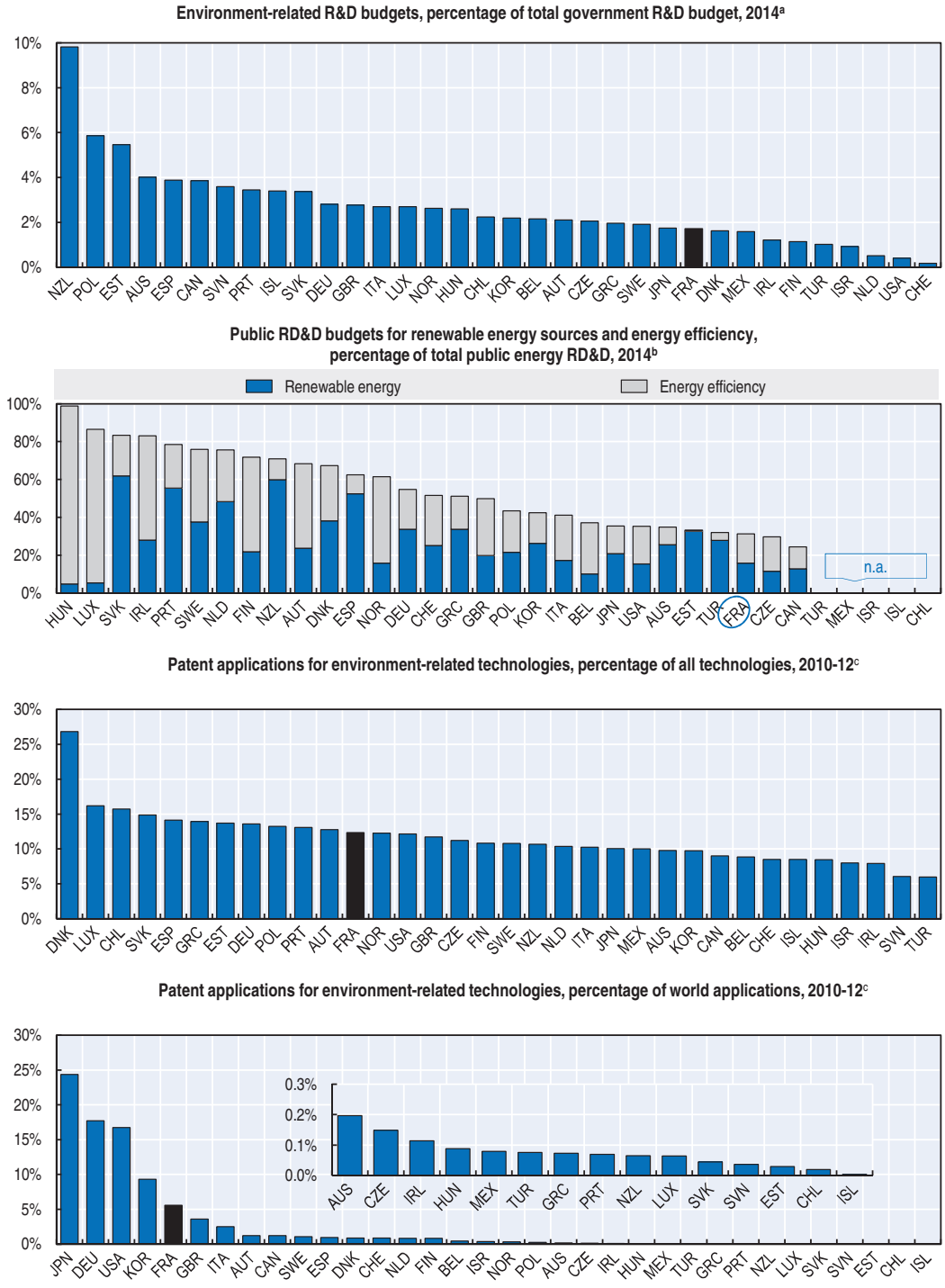
a) Until 2014, the system used to stabilise end-use prices of motor fuels caused tax revenue to turn negative (i.e. become a subsidy) in years when the international oil price was high. Mexico's 2013 Tax Reform corrected this mechanism and introduced a tax on fossil fuels based on their carbon content.

b) Diesel: automotive diesel for commercial use, current USD; petrol: unleaded premium (RON 95), except Japan (unleaded regular), USD at current prices and purchasing power parities.

Source: IEA (2015), *IEA Energy Prices and Taxes Statistics* (database); OECD (2015), *OECD Database on Instruments Used for Environmental Policies and Natural Resources Management* (database).

StatLink http://dx.doi.org/10.1787/888933406434

Figure 3.A2. **Green innovation**

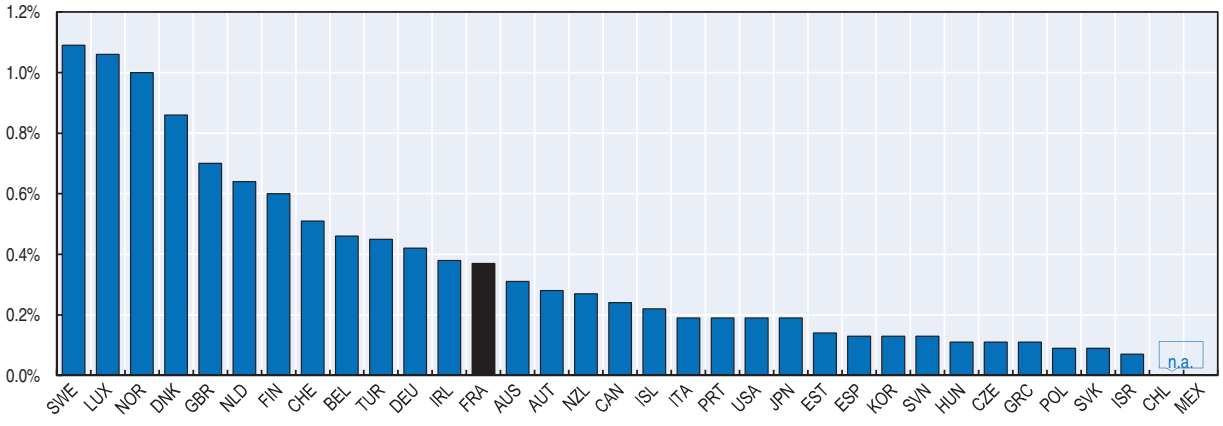


Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates.
a) Government budget appropriations or outlays for research and development (R&D); breakdown according to the NABS 2007 classification.
b) Public energy technology budgets for research, development and demonstration (RD&D).
c) Higher values inventions that have sought patent protection in at least two jurisdictions. Data are based on patents applications filed under the Worldwide Patent Statistical Database (PATSTAT) of the European Patent Office (EPO) and refer to fractional counts of patents by inventor's country of residence and priority date.
Source: IEA (2015), *IEA Energy Technology RD&D Statistics* (database); OECD (2015), "Patents in environment-related technologies: Technology development by inventor country", *OECD Environment Statistics* (database); OECD (2015), "Research and Development Statistics: Government budget appropriations or outlays for RD ", *OECD Science, Technology and R&D Statistics* (database).

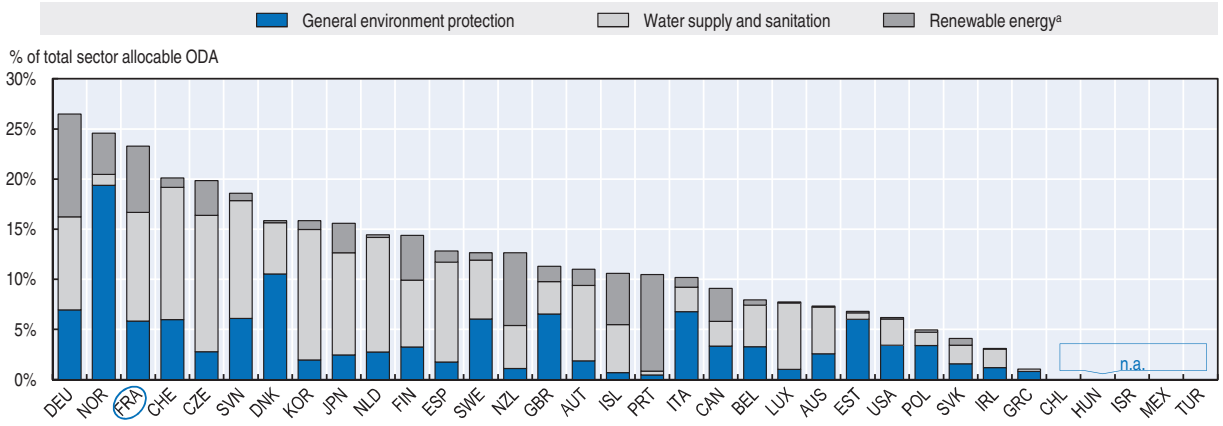
StatLink http://dx.doi.org/10.1787/888933406448

Figure 3.A3. **Development co-operation**

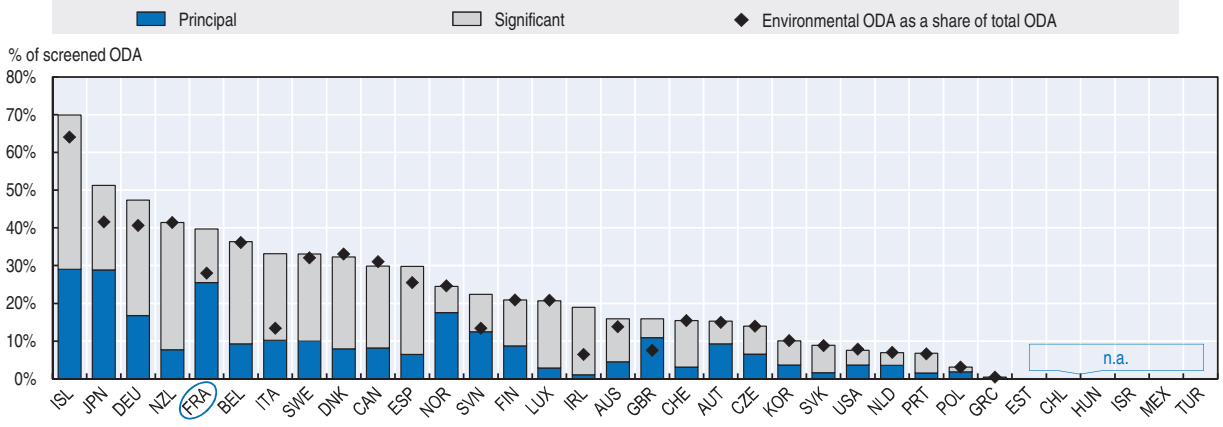
Net disbursements of official development assistance (ODA) as percentage of gross national income, 2014



Bilateral ODA commitments to the environment, water and renewable energy sectors, average 2012-14



Bilateral ODA commitments targeting the environment, average 2013-14[b]



Notes: Data refer to the indicated year or to the latest available year. They may include provisional figures and estimates. CHL, EST, HUN, ISR, MEX and TUR are not members of the OECD Development Assistance Committee.

a) Renewable energy includes power generation/renewable sources, hydro-electric power plants, geothermal energy, solar energy, wind and ocean power, and biomass

b) In comparing data across countries it should be noted that the coverage ratio of the environmental policy objective (i.e. the proportion of aid which is screened against the environment policy marker) varies considerably among countries; low coverage rates can increase significantly the shares of environmental-focused aid.

StatLink http://dx.doi.org/10.1787/888933406452

PART II

Progress towards selected environmental objectives

PART II

Chapter 4

Energy transition: Towards a low-carbon economy

This chapter examines the progress made by France in integrating energy and environmental policies. It analyses changes made to the strategic, institutional and legislative framework in order to meet national and supranational energy and climate targets, and presents the 2015 Energy Transition for Green Growth Act. It highlights changes in energy supply and demand and the main environmental impacts thereof, especially in terms of greenhouse gases and atmospheric pollutants. The chapter also analyses the effectiveness of measures designed to promote renewable energy and energy efficiency, the cost of support schemes and the importance of integrating European networks. Measures to fight against energy poverty are also covered.

1. Strategic and institutional framework for energy and environmental policy

France has, for the last ten years, been on the path to an energy transition that places the environment at the heart of energy policy. In line with the country's international and European energy and climate objectives, this process led to the adoption in August 2015 of the Energy Transition for Green Growth Act (Energy Transition Act), designed to pave the way to an economy that is less reliant on fossil fuels and to set up a new, more sustainable, energy model in response to the energy supply challenge, price trends, the depletion of resources, the need to protect the environment, and above all climate change. The energy transition's objectives are not only environmental, but also economic and social: job creation, the development of green industries that drive growth, the preservation of business competitiveness and the fight against energy poverty.

The implementation of this new model has come up against barriers raised by the current energy model, which is largely based on nuclear power. It is also governed by a relatively complex legislative and institutional framework, with overlapping remits at the various regional levels – France's famously multi-layered administration – and which, until the adoption of the Energy Transition Act, housed a plethora of legal texts and industry objectives with differing deadlines, making it hard to co-ordinate and track progress on energy and climate.

France's ability to reach the environmental, social and economic objectives it has set itself will therefore depend on consistency between the many political and regulatory signals sent to the various economic parties involved in the energy sector and in tax, investment, innovation, municipalities, transport and construction. For a discussion of energy and transport taxes, investment in sustainable modes of transport and steps to promote green innovation, see Chapter 3.

Increased integration of energy and environmental objectives

Increased energy self-sufficiency and economic competitiveness remain the foremost goals of energy policy.[1] The fight against climate change was declared a national priority in 2001, however, and was included alongside the preservation of human health and the environment in the objectives of the POPE Act of 2005 setting the direction of energy policy. This Act set quantitative targets for energy efficiency and the reduction of greenhouse gases (GHGs), including the so-called factor 4, which aims to cut GHG emissions by a factor of four between 1990 and 2050 (see Table 4.1).

France has supplemented its European responsibilities in terms of energy efficiency, the reduction of GHGs and promotion of renewable energy sources (the European Union [EU] energy and climate package adopted in 2008 under the French presidency of the EU) with national sectoral targets for the reduction of GHGs and energy consumption, set by the Grenelle laws of 2009 and 2010 (see Chapter 2). Table 4.1 presents the energy and climate policy targets. Although it demonstrates France's ambition in this field, the multiplicity of sectoral targets with varying timeframes, and overlapping measures do not

Table 4.1. **Main goals of energy and climate policy**

International objectives		
Greenhouse gases (GHG)	Kyoto Protocol (in force since 2005)	First period (2008-12): stabilisation of the main GHGs (CO_2, CH_4, HFC, PFC, N_2O, SF_6) between 2008 and 2012 compared to 1990 levels. Second period (2013-20): contribution to the quantitative target of reducing GHG emissions by 20% on average in the EU compared to 1990 (quantified emission limitation and reduction objectives-QELRO).
	Intended Nationally Determined Contribution (INDC)	The EU's INDC consists of reducing internal GHG emissions by at least 40% compared to 1990 by 2030, with a long-term goal of an 80 to 95% reduction from their 1990 levels by 2050.
National objectives		
	Law setting the direction of energy policy (POPE Act, 2005) Energy savings commitments: system of energy savings certificates (ESCs) (articles 14 to 17 of the POPE Act)	• cutting GHG emissions by a factor of four (75%) from their 1990 levels by 2050. • Final energy intensity: 2% annual decline by 2015 and 2.5% annual decline by 2030. Mandatory energy savings for energy companies, as measured at the end user; volume defined by decree for three-year periods (54 TWh cumac [cumulated and actualised] for 2006-2008, 345 TWh cumac for 2011-2013, a transition year in 2014, and 660 TWh cumac for 2015-2017.
Energy and climate	Directives 2009/29/EC, 2003/87/EC, 2009/28/EC, 2006/32/EC	**2020 objectives:** • emissions reduction targets from 2005 levels: 21% for European Union Emission Trading Scheme (EU ETS) sectors, 14% for non EU ETS sectors (i.e. a total reduction of 17% in GHG emissions compared to 1990). • 20% primary energy savings compared to 2005 levels • 23% of renewable energies in gross final energy consumption
Energy efficiency	National energy efficiency action plan (NEEAP) (in application of directives 2012/27/EU and 2006/32/EC)	**2020 objectives:** • consumption of 131 Mtoe final energy and 236 Mtoe primary energy (excluding international air transport), compared to 155 Mtoe and 260 Mtoe, respectively, in 2013 (representing reductions of 15% and 9%) (2014 NEEAP) • 12 Mtoe targeted energy savings in 2016 at French end users (excluding EU ETS), or 9% of energy savings compared to average final energy consumption between 2001 and 2005 (2008 and 2011 NEEAPs)
Renewable energy sources	National renewable energy action plan (2010 NREAP) (in application of directive 2009/28/EC)	**2020 objectives:** • 27% of gross final electricity consumption produced from renewable sources • 10% of biofuels in transport energy consumption • 33% of renewables in heating and air-conditioning consumption • 50% increase in renewable heating (solar, geothermal)

Table 4.1. **Main goals of energy and climate policy** *(cont.)*

Sectoral objectives		
Buildings	Energy retrofit plan for the home (2013 ERPH)	• 500 000 new homes to be retrofitted by 2017
	Articles 4 and 5 of the Grenelle I Law	**Existing buildings:** • 38% energy savings and 50% reduction in GHG emissions from buildings by 2020 • 400 000 homes retrofitted every year as of 2013 • 40% energy savings in public buildings between 2012 and 2020 • 800 000 social housing units retrofitted, aiming for annual consumption of 150 kWhep/m^2 by 2020 **New buildings:** • General adoption of BBC (energy efficiency) standards (50 kWhep/m^2/year) as of 2010 for public buildings, 2012 for other non-residential buildings, and 2013 for homes (2012 RT) • Energy savings amounting to around 1.15 Mtoe in 2020, generated by the improved energy performance of new buildings. • Positive energy buildings (*bâtiment à énergie positive*-BEPOS) for all new builds as of 2020 (2018 for public buildings).
Transport	Articles 10 to 13 of the Grenelle I Law	• 20% reduction in CO_2 emissions by 2020, back to the level of 1990 • average CO_2 emissions generated by automotive traffic below 120 g CO_2/km by 2020 • development plan for urban public transport: 1 500 km of new tram and bus lines with separate lanes • Non-road and non-air freight 25% by 2022 • 2 000 km of new high-speed lines by 2020 • 2 million electric and hybrid vehicles on the roads by 2020
Renewable energies	Article 19 of the Grenelle I Law	• an additional 20 Mtoe of annual renewable energy production by 2020 • in the overseas départements: 50% of renewable energy in final energy consumption by 2020 (30% for Mayotte) and 100% by 2030
Regional targets		
Regional climate, air quality and energy plan (*Schéma régional climat, air, énergie*-SRCAE) (article 68 of the Grenelle II Law)		Since July 2011, it has been compulsory for regions to have a SRCAE setting targets and priorities for GHG emissions reduction, managing energy demand, the reduction and prevention of atmospheric pollution, leveraging the potential of renewable energies and adapting to climate change.
Regional climate and energy plan (*plan climat-énergie territorial*-PCET) (article 75 of the Grenelle II Law)		A PCET provides a framework for a region's commitment to the fight against climate change, and more particularly its GHG emissions reduction in the light of the "factor 4" drive and the reduction of the region's vulnerability to the effects of climate change. All départements, cities and agglomerations, as well as municipalities and grouped municipalities of over 50 000 inhabitants were required to adopt a PCET by the end of 2012.

Source: ADEME (2015), "Climat, air et énergie : Édition 2014", *Key figures*.

help with assessment and monitoring. This legislative complexity limits the country's ability to steer the energy transition: there is no single comprehensive overview, it is difficult to implement a consistent policy, and policy is hard to assess.

The Energy Transition for Green Growth Act is designed to give France the tools it needs to increase energy self-sufficiency by diversifying its energy sources, and to combat climate change more effectively (see Box 4.1). It sets out all energy and climate targets in a single document. These targets are still numerous and difficult to reconcile, however: reducing the proportion of nuclear power to 50% of electricity production by 2025 while also reducing energy consumption will mean setting clear rules on the lifetime of reactors and wide-scale deployment of renewable energy sources if the GHG emission targets are not to be compromised.

Box 4.1. **The Energy Transition for Green Growth Act**

The Energy Transition Act emerged from the national debate on the energy transition[2] held in 2013 and was enacted in August 2015. It sets out the main goals of the French energy model: to increase energy self-sufficiency while diversifying energy sources and fighting against climate disruption. It also aims to combat unemployment with green growth, to promote new technologies and conquer new markets in renewable energies, clean transport, sustainable construction and energy efficiency, and to improve business competitiveness.

The Conference was broken down into eight main parts:

1. **Defining common goals for the success of the energy transition, increasing France's energy self-sufficiency and economic competitiveness, preserving human health and the environment and fighting climate change**
   - cutting GHG emissions by 40% between 1990 and 2030 (and 75% by 2050);
   - cutting final energy consumption by 50% between 2012 and 2050 (and 20% by 2030);
   - cutting primary consumption of fossil fuels by 30% between 2012 and 2030;
   - increasing renewable energy to 23% of final energy consumption by 2020 and 32% by 2030;
   - diversifying electricity production and cutting the share of nuclear power to 50% by 2025 with installed capacity capped at 63.2 GW.
2. **Improving building renovations to save energy, bringing bills down and creating jobs**
   - energy retrofitting 500 000 homes a year as of 2017, at least half of which will be occupied by low-income households;
   - retrofitting all buildings to BBC standards (*bâtiment basse consommation* – low-consumption buildings) by 2050.
3. **Developing clean transport to improve air quality and protect health**
   - promoting low-emissions vehicles;
   - installing 7 million charge points for electric vehicles by 2030;
   - promoting alternative modes of transport to the private car
   - making more resources available for combating air pollution.
4. **Combating waste and promoting the circular economy: from product design to recycling**
   - increasing material productivity by 30% between 2010 and 2030;
   - cutting household waste and similar products per capita by 10% between 2010 and 2020;

Box 4.1. **The Energy Transition for Green Growth Act** *(cont.)*

- cutting the quantity of non-dangerous, non-inert waste sent to landfill by half between 2010 and 2025, and reaching 65% of material recovery by 2025;
- 70% material recovery from construction waste by 2020.

5. **Promoting renewables to diversify energy sources and leverage regional resources**
   - improving the integration of renewable energies in the grid with new forms of support.
6. **Strengthening nuclear safety and public information**
   - clarifying the operator's responsibilities under the principles of nuclear safety;
   - strengthening the role of the Nuclear Safety Authority (ASN).
7. **Simplifying and clarifying procedures to enhance effectiveness and competitiveness**
   - lifting regulatory brakes;
   - facilitating the development of renewable energies;
   - combating energy poverty.
8. **Giving people, businesses, regions and government the ability to act collectively**
   - involving all stakeholders in timetabling the energy transition—the national low-carbon strategy (*stratégie nationale bas carbone*-SNBC), multiannual energy programme (*programmation pluriannuelle de l'énergie*-PPE), national plan for the reduction of atmospheric pollutants (plan national de réduction des émissions de polluants atmosphériques-PREPA).

Source: Law No. 2015-992 of 17 August 2015 on the Energy Transition for Green Growth.

Improved co-ordination between energy and environmental policies

The merging of environmental and energy issues can be seen in the choices made by the French government: since May 2012, the Ministry of Ecology, Sustainable development and Energy (MEDDE, which became the Ministry of the Environment, Energy and Marine Affairs [MEEM] in 2016) has drafted and implemented energy policy in order to secure supply, combat global warming and promote the energy transition. It shares responsibility with the Ministry of the Economy, Industry and the Digital Sector for policy relating to raw materials and with the Ministry of Mining for policy relating to energy commodities. The Department of climate and energy (DGEC) drafts and implements policy for energy and combating climate change. It includes the Department of energy and raw materials (DGEP), which was part of the Ministry of the Economy, Finance and Industry until 2008. It is not clear whether the Ministry will retain the energy portfolio. In 2010, following a cabinet reshuffle, energy was returned to joint control of the two ministries, before being entrusted to the exclusive responsibility of the environmental authorities in 2012.

A horizontal department within the ministry, the General Commissariat for Sustainable Development (CGDD) is responsible for inter-ministerial co-operation (see Chapter 2). MEEM's remit also covers the Environment and Energy Management Agency (ADEME), for which it shares responsibility with the Ministry of Education. ADEME is a public body which co-ordinates, facilitates and carries out operations designed to protect the environment and energy management.

Some stakeholders have been over-represented in the national debate on the energy transition: the employers' organisation MEDEF was mainly represented by the nuclear sector,

excluding vast swathes of the energy transition, such as energy efficiency businesses, and most of the unions, with the exception of the CFDT, sent representatives from EDF (Électricité de France), the sector's legacy operator (Kerckhove, 2013). Many consultative bodies in the energy sector remain closed to new players in the energy transition, such as the Higher Energy Council, which issues opinions on the government's electricity and gas policies, and tracks progress in achieving the European target of 23% renewable energy by 2020.

At the end of 2008, the French government embarked on a strategy of environmental and sustainable exemplarity in the operation of its departments and public establishments (Prime Minister's circular, 3 December 2008). Average energy consumption per public official fell by 12% between 2009 and 2011, just short of the targeted 13%. In 2011, 91.5% of vehicles bought or hired by government departments produced less than 120g CO_2/km, beating the target of 85% (French government figures, 2011).

State agencies also play a significant role in improving the co-ordination of energy and the environment, in the management of their assets, their investment and city planning choices, and through the award of public contracts (DNTE, 2013a). Tools have been set up to encourage regional authorities to detail PCETs (see Box 4.2). Since the Grenelle I law was passed, PCETs have been mandatory for all municipalities of over 50 000 people, as has reporting of their GHG emissions. At 1 September 2013, 390 municipalities had filed PCETs, although only 124 were required to do so. By 1 May 2014, all regions had also set up a SRCAE.[3] These tools paved the way for the creation of communities of interest and a dialogue between the various stakeholders, without which action cannot be properly co-ordinated and local initiatives cannot emerge. They were supported locally by the regional departments for the environment, planning and housing (directions régionales de l'environnement, de l'aménagement et du lodgement-DREAL), created in 2009, which operate under the joint authority of MEEM and the regional prefects to roll out energy and climate policy on a regional level (see Chapter 2).

Many regions and local authorities remain insufficiently resourced, however, to implement projects promoting energy efficiency and renewable energies. This owes much to the steady rise in local responsibilities, such as waste management and planning, and to declining national credits for funding local action. State-region project contracts are the main tools for co-ordinating funding between central government and the regions: they finance PCETs through ADEME, which had an annual budget of EUR 76 million between 2007 and 2013 (MEDDE, 2014a). They have a term of seven years, in line with the timetable of the European Regional Development Fund (ERDF), in order to be able to draw on co-financing for the region's energy efficiency projects. For 2007-13, ecology and sustainable development were ranked third in terms of the funding allocated among the targets for these contracts, behind transport (mostly rail and river projects) and higher education (see Chapter 2). The energy transition is the second-ranked priority for the current period (2015-20), and accounts for 20% of allocated funding, or EUR 5.6 billion, behind multimodal mobility, which is in receipt of half of total funding (EUR 15 billion) (CGET, 2016).

The complexity of the French regional administration, with overlapping remits and a plethora of local plans at various levels of government hamper the visibility and implementation of these plans. The other local planning tools, such as urban travel plans (plans de déplacement urbains-PDU) and atmospheric protection plans (plans de protection de l'atmosphère-PPA) are not always consistent with the PCET and the SRCAE. It is essential to simplify the toolkit and overhaul the remits of the different levels of regional government

to increase buy-in to the achievement of national objectives among local authorities (DNTE, 2013a). This is the idea behind the Notre Act under which the French administrative territory will be reorganised (French government, 2015) (see Chapter 2).

Box 4.2. **Examples of regional and local implementation of the energy transition**

Grand Paris

Grand Paris is a project that aims to transform the greater Paris area in order to improve quality of life for the local population, level out regional inequalities and build a sustainable city. At its core is the development of a high-quality public transport network that joins economically successful centres to the main modal platforms. The Grand Paris company is responsible for the construction of an automatic metro system that connects Paris more closely to the suburbs, for an estimated cost of EUR 32.5 billion. This is also an innovative institutional project that aims to create a system of governance for Paris and the greater Paris area that breaks down barriers between municipalities and administrations. This special metropolis was established on 1 January 2016.

The third industrial revolution of Nord-Pas-de-Calais

The plan for the third industrial revolution of the Nord-Pas-de-Calais region was presented by the Lille Chamber of commerce and industry and the Nord-Pas-de-Calais Regional Council in 2013. For nine months, it mobilised all the region's public and economic players. It aims to turn the region into one of the most efficient and productive in terms of low-carbon energy by 2050, targeting complete energy self-sufficiency by that date, based on the promotion of renewable energies and energy-producing buildings, electricity storage, the development of smart grids and soft mobility, energy efficiency, the circular economy and a product-service system. In October 2014, there were 150 business proposals illustrating the commitment of the local authorities and social, academic and scientific players to the project.

Positive Energy Territories

A "positive energy territory for green growth" is a label that identifies a territory of excellence in the energy and ecology transition. The local authority pledges to reduce the energy needs of the population, and of the region's buildings, economic activity, transport and leisure. It offers a comprehensive programme for a new development model that is leaner and more economical in the following areas: energy consumption, pollution, clean transport, renewable energies, biodiversity, waste and environmental education. In February 2015, 212 territories were officially designated "positive energy territories", out of 500 applications. They will be able to claim EUR 500 000 for the action they have taken.

Pioneering decentralised energy in the regions

The Montdidier canton has set itself the goal of meeting 100% of its energy needs using renewable energies by 2020, and ultimately of contributing to energy storage and retrofitting 30% of the private rental market in order to reduce energy consumption. The canton's population of 12 500 currently meets 53% of its energy needs using electricity generated by the town's photovoltaic panels and wind turbines.

Source: C. Lepage (2015), *L'économie du Nouveau Monde*, Report submitted to Ségolène Royal, Minister of Ecology, Sustainable Development and Energy.

Improved scheduling tools

Until now, France had no fully integrated scheduling tool covering all the different pillars of energy policy. Multiannual investment programming (PPI), introduced in 2010 under the Nome Law which reorganised the electricity market, rolled out energy policy objectives, including the EU's energy and climate package targets and the national Grenelle targets, through three separate multiannual programmes (electricity, gas and heat).

The Energy Transition Act introduced a framework that is more consistent with multiannual energy programming (PPE) which sets out priority action for the management of all forms of energy in the pursuit of national targets. PPE will cover several different areas, concerning demand management, the diversification of energy sources, securing supply, the expansion of energy storage and of the grid. The first PPE will run for three years (2016-18), followed by a period of five years (2019-23). The following PPEs will be drawn up for two five-year periods, to run concurrently with the President's term of office. They must be compatible with the national low-carbon strategy (see Box 4.3).

2. Main trends in energy and environmental impacts

France's energy mix is still dominated by nuclear power. Despite making big strides, renewable energies contribute less than in most OECD countries. Since 2000, emissions of the main atmospheric pollutants and GHGs caused by the production and use of energy have fallen. Because of the weight of nuclear power in its electricity production, France has one of the lowest-carbon economies in the OECD.

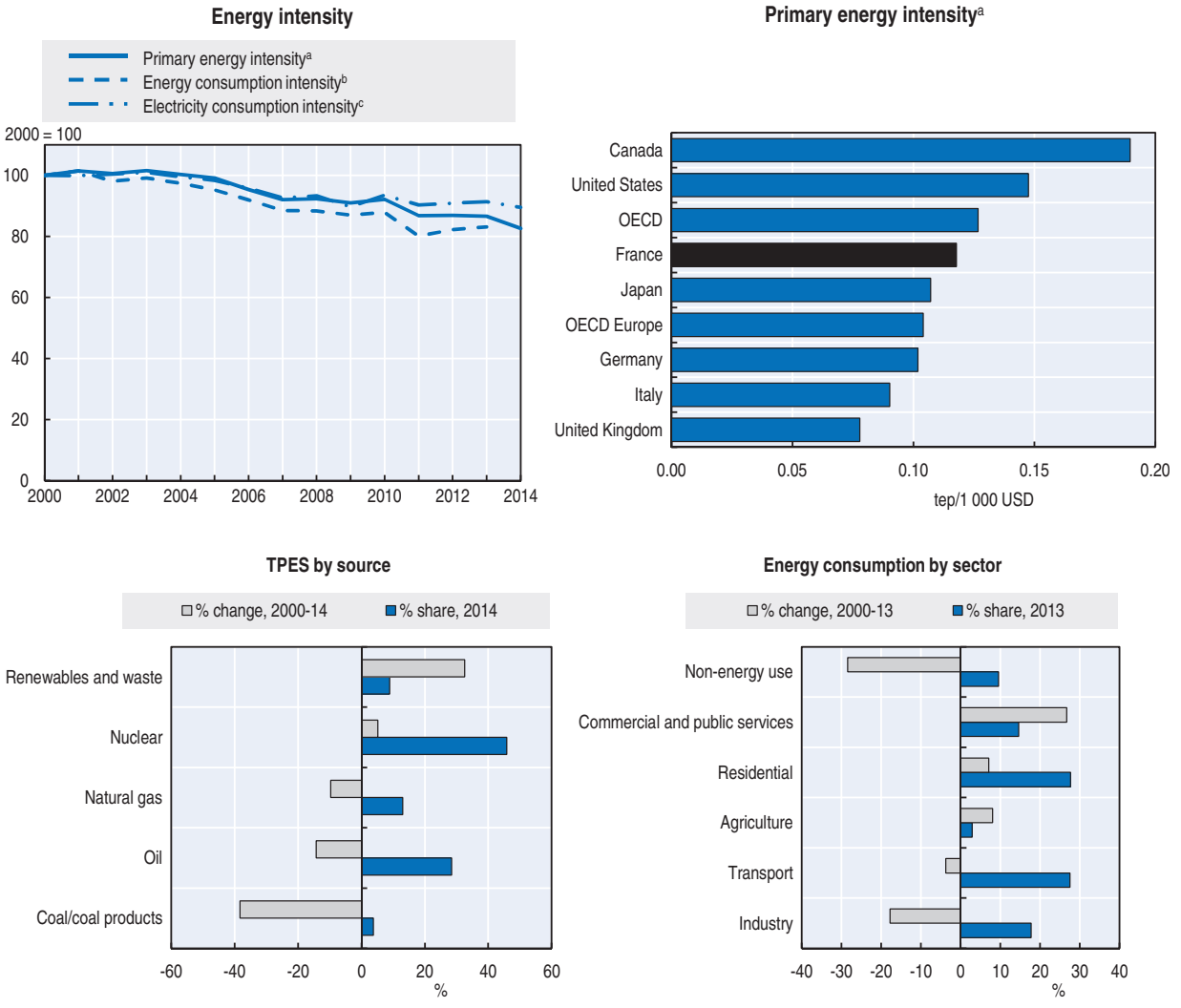
Trends in energy supply and demand

Since 2000, the share of fossil fuels in total primary energy supply (TPES) has given ground to nuclear power and renewable energies (see Figure 4.1, Chapter 1). Fracking, for the exploration and exploitation of fossil fuel reserves, was banned in 2011. Despite the implementation of an assertive policy in 2000, renewable energies only accounted for 9% of TPES in 2014, and 16% of electricity production, which is well below the average among European OECD countries (13% of TPES and 31% of electricity production) (IEA, 2015, see Chapter 1, section 3).

France's energy mix is dominated by nuclear power, which represented 47% of TPES in 2014 and 78% of electricity production. This is the legacy of the Messmer Plan, deployed in the 1970s, under which the nuclear industry spearheaded France's energy self-sufficiency, providing cheap energy that boosted business competitiveness, consumer purchasing power and a low level of GHG emissions from the French economy. The sector now has to deal with major investment needs to maintain its ageing reactors[4] and to meet the more exacting safety requirements introduced after the Fukushima incident (Cours des comptes, 2014).

The production costs of nuclear electricity are rising sharply. The reports of the Cour des comptes highlighted the sector's progress in cost transparency (Cour des comptes, 2012, 2014; OECD, 2005). According to its estimates, production costs have risen by 16% at constant prices, and came to EUR 60/MWh in 2013, a rise attributable to the growth of operating expenditure and the doubling of maintenance investment to meet safety standards and extend the operating life of the reactors. Production costs will probably continue to rise, but estimating them is complicated by the uncertainties surrounding the extension of reactors' operating lives[5] the launch of the third-generation Flamanville reactor[6] and the costs of decommissioning and waste management.[7]

Figure 4.1. **A less energy-intensive economy and increased dominance of nuclear power**



a) Total primary energy supply per unit of GDP at 2010 prices and purchasing power parities.
b) Total final consumption of energy per unit of GDP at 2010 prices and purchasing power parities.
c) Electricity consumption per unit of GDP at 2010 prices and purchasing power parities.
Source: IEA (2015), *IEA Energy Balances for OECD countries* (database); OECD (2015), *OECD National Accounts Statistics* (database).

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Cutting the share of nuclear energy to 50% of electricity production by 2025 will mean balancing reactor closures and extensions and growing renewable energies, in order to forestall the "investment cliff" threatened by a large number of reactors reaching their forty-year limit.[8] Clear decisions on the operating lives of these power stations are therefore urgently needed to give the private sector the long-term visibility it needs to plan its investments (Cours des comptes, 2014). The upper limits estimated by the company RTE (Réseau de transport d'électricité) for electricity consumption would mean the closure of over twenty reactors by 2025 to meet the 50% target (RTE, 2014; Grandjean, 2016; Dessus, 2016).

France has high energy self-sufficiency relative to its European neighbours, but it nevertheless imports most of the oil, natural gas and coal it consumes and all of the uranium required for the production of nuclear power. Reducing France's energy bill, which

came to EUR 55 billion in 2014, or around 2.5% of GDP, remains a key priority for the country's energy policy (MEDDE, 2015a).

The French economy is less energy-intensive than average for OECD Member countries. The primary and final energy intensities of the French economy fell between 2000 and 2014, under the impact of both declining energy supply and consumption and rising GDP (see Figure 4.1), although this effect is less marked than on average for OECD Member countries. The decline in final energy consumption, which began in 2005, gathered pace after the 2008 financial crisis. Consumption bottomed out in 2011, and then began to rise again in 2012 and 2013 (see Chapter 1). The most energy-intensive sectors are homes and transport, which each represent around 28% of 2013 final consumption, and therefore constitute important challenges for the energy transition.

Main environmental impacts of energy production and consumption

The main environmental issues involved in the production and consumption of energy are the risks inherent in the nuclear industry, atmospheric pollution and GHG emissions. The rise of renewable energies also poses the problem of integration into the landscape (dams and wind turbines, for example) and their effect on biodiversity, such as disturbances to bird migration and the destruction of plant life on wind turbine sites. It remains a priority, therefore, to carry out further impact assessments and strategic environmental assessments (see Chapter 2).

Environmental impacts of nuclear energy

The dominance of nuclear power in its energy mix gives France an unusual profile in terms of its exposure to risk and impact: the management and storage of radioactive waste, heat pollution of water during the cooling process that can affect ecosystems, the risk of nuclear accident. The 2005 Environmental Performance Review (OECD, 2005) recommended greater transparency in the nuclear sector, and much progress has been made. The 2006 law on transparency and safety in the nuclear industry led to the creation of the High Committee for transparency and information on nuclear safety, which is responsible for moderating a nationwide public debate, and of the Nuclear Safety Authority (ASN), an independent administrative authority responsible for the oversight of civil nuclear activity in France. The ASN reports on its activity and the state of nuclear safety and protection from radiation in France in a public annual report. There is also the public Institute for Radiation Protection and Nuclear Safety, which contributes expertise and research and publishes reports on the work it carries out.

While there has been a genuine effort to increase transparency, the means dedicated thereto have not always been commensurate with requirements. In 2014, the ASN declared that the government-allocated budget was insufficient to meet the needs of overseeing nuclear safety and protection from radiation (ASN, 2014). The Energy Transition Act strengthens nuclear safety and public information by intensifying the oversight and powers of the ASN (MEDDE, 2015b).

Energy and air quality

European standards and technical progress have brought about a steady decline in pollutants since 2000. France met every target set for 2010 by the EU directive establishing upper limits for national emissions (2001/81/EC) except for NO_x, most of which is emitted by road transport (see Chapter 1). Widespread adoption of catalytic converters, stricter

emissions caps for vehicles and the natural turnover of cars on the road have failed to offset increased traffic and uptake of diesel motorisations.

The targeted reduction of fine particle emissions ($PM_{2.5}$), set by the Gothenburg Protocol for 2020, has already been almost achieved, but France is also one of 17 European countries which have not honoured their pledge in terms of PM_{10} levels since new EU legislation came into force in 2005, and France was referred to the European Court of Justice by the European Commission for failing to take sufficient steps to reduce this pollution (see Chapter 1). One of the drivers of urban pollution is the uptake of diesel-powered vehicles, which has been encouraged by advantageous tax policies for many years (see Chapter 3). Recent measures – such as the inclusion of carbon in energy taxation, an increase in duty on diesel and a narrowing of the petrol-diesel taxation gap – are well targeted.

Atmospheric pollution connected to energy use, especially by transport, is a public health issue. The OECD estimates that the impact of air pollution on health (the cost of the 21 158 premature deaths linked to air pollution in 2013) amounts to around EUR 54 billion, or 2.5% of GDP (see Chapter 1).

Energy and climate change

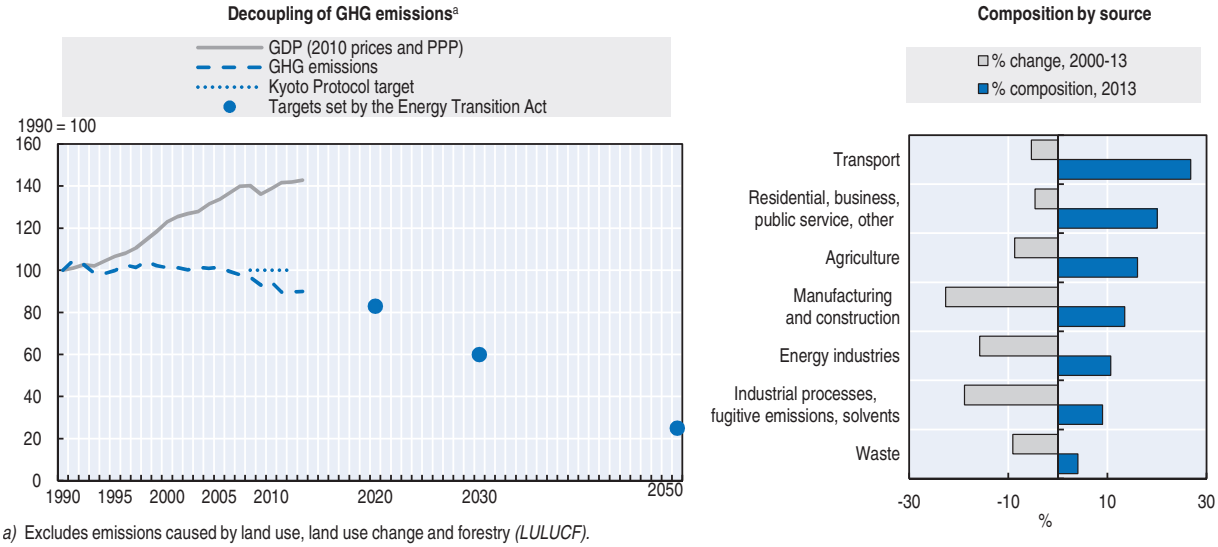
As in most OECD countries, GHG emissions in France are largely caused by the use of energy, which accounted for 72% of total emissions in 2013, excluding emissions and removals from land use, land-use change and forestry (LULUCF). Transport (27%), the housing and service sectors (20%), manufacturing and construction (13%) and the energy industry (11%) are the main sectors emitting GHG from the use of energy. Because of the high share of nuclear power in its electricity production, France's GHG emissions intensity is among the lowest of OECD Member countries, with 0.21 tonnes of CO_2 for USD 1 000 of GDP, compared to the OECD average of 0.39 tonnes (see Chapter 1). Since 2000, mitigation measures and the economic crisis have helped to break the link between GHG emissions and economic growth (see Figure 4.2).

France has surpassed its self-imposed target under the Kyoto Protocol of limiting its GHG emissions for 2008-12 to their 1990 levels (see Figure 4.2). This fall can be attributed to improved energy efficiency, the industrial slowdown brought about by the financial crisis, the arrival on the market of lower carbon vehicles and to the declining share of coal and oil in residential heating relative to gas and electricity. These welcome results should be tempered in the light of the GHG emissions related to imports to meet internal demand in France, which are not included in national inventories and which grew by 54% between 1990 and 2012, pushing the country's carbon footprint up by around 2% over the corresponding period (CGDD, 2015).

Under the EU's energy and climate package, France has committed to reducing the emissions covered by the emissions trading scheme (EU ETS) by 21% between 2005 and 2020, and emissions not covered by the EU ETS by 14%. Forecasts suggest that it is well on the way to achieving this objective (EEA, 2015).

The development of renewable energies and improvements in energy efficiency are not happening fast enough, however, and this is threatening the country's ability to reach its longer term emissions reduction targets (MEDDE, 2013; sections 3 and 4). France is not headed for a fourfold reduction in its GHG emissions by 2050 compared to their 1990 levels: emissions declined by an average annual 1.5% between 2005 and 2013, whereas meeting the target would require an annual fall of 3% between 2005 and 2050.

Figure 4.2. **Fall in GHG emissions**



a) Excludes emissions caused by land use, land use change and forestry *(LULUCF)*.

Source: OECD (2014), *OECD Environment Statistics* (database); UNFCCC (2015), *2015 Submission by France to the United Nations Framework Convention on Climate Change*; UNFCCC (2014), *France's first biennial report to the United Nations Framework Convention on Climate change*; OECD (2015), *OECD National Accounts Statistics* (database).

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Reaching the long-term GHG reduction targets would require not only the strengthening of current economic, financial and regulatory instruments, such as the carbon tax, heat regulations and vehicle emissions standards (see below), but also securing their use over time, by laying the foundations of governance that can co-ordinate strategy in the long term. The proliferation of framework documents (climate plan, national energy efficiency action plans), deadlines and targets has created a situation in which the long-term vision is lacking to create a real low-carbon trajectory. The adoption of the national low-carbon strategy (Stratégie nationale bas carbone-SNBC) under the Energy Transition Act is intended to rationalise climate governance by creating a flexible framework for long-term planning (see Box 4.3). Article 173 of the Act explicitly states that France's low-carbon strategy "ensures that the national mitigation effort is not compromised by an increase in the carbon content of imports", by taking the carbon footprint as its indicator for tracking public policies; its implementation is vital for the achievement of France's objectives.

Box 4.3. **The national low-carbon strategy**

Since 2004, climate policy has been expressed in a climate plan, a strategic document that sets out the national policies to be implemented to reach France's European and international climate targets. This umbrella document includes the different plans for reducing GHG emissions in key sectors and creates the framework in which France can measure its general progress towards its climate objectives. The first plan was formulated in 2004, and was designed to ensure that targets set by the Kyoto Protocol were met (see Table 4.1). It was subsequently amended in 2006, 2009, 2011 and 2013.

The climate plan has now been replaced by the national low-carbon strategy, SNBC, adopted in 2015. The SNBC sets out the direction of sectoral and transversal policies to steer a course towards the factor 4 target, and the pledge to cut GHG emissions by 40% by 2030.

Box 4.3. **The national low-carbon strategy** *(cont.)*

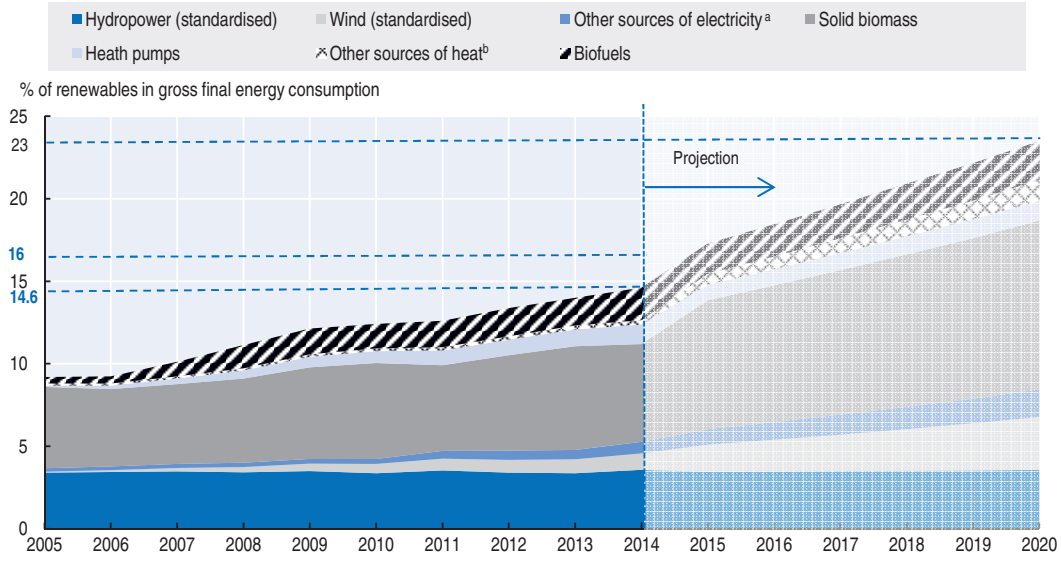
It is a steering and co-ordination tool that aims to ensure consistency throughout climate policy.

The SNBC is based on carbon budgets modelled on the British system, specifying national GHG emission ceilings. Carbon budgets are drawn up for an initial term of four years (2015-2018), then for five-year terms as of 2019, ten years in advance: the 2019-23 and 2024-28 budgets were drawn up in 2015, and the 2029-33 budget will be drawn up in 2019. The SNBC is reviewed every five years, at which point the scope of the two following budgets can be adjusted if necessary. The budgets are allocated by tranches that correspond to emissions by gas and by sector, in order to facilitate the analysis of any divergence from the targeted trajectory. It remains to be seen, however, how the budgets will be measured and checked.

3. Promoting renewable energy sources

Renewable energies are at the heart of France's energy transition strategy and they determine its ability to keep carbon low while reducing the share of nuclear power in its electricity production. They represent the fastest-growing source of energy in the energy supply, rising by 33% between 2000 and 2014. Despite the existence of an arsenal of political incentives, however, the current pace of deployment falls short of the objectives set by the National Action Plan for Renewable Energy (MEDDE, 2009). The intermediary objectives have largely been surpassed in photovoltaics, but onshore wind farms and solid biomass remain below the expected level, and offshore wind farms are worryingly far behind, since this sector has yet to take off (see Figure 4.3). There is too much of a grid connection backlog.

Figure 4.3. **Deployment of renewables falls short of targets**



a) Solar photovoltaics, marine energy, geothermal electricity, biomass electricity (fuel wood, biogas, incinerated waste, bagasse).
b) Thermal solar power, geothermal power, biogas.
Source: SOeS, B*ilan de l'énergie* (achieved, up to 2014) and *national action plan* (projection, as of 2014).

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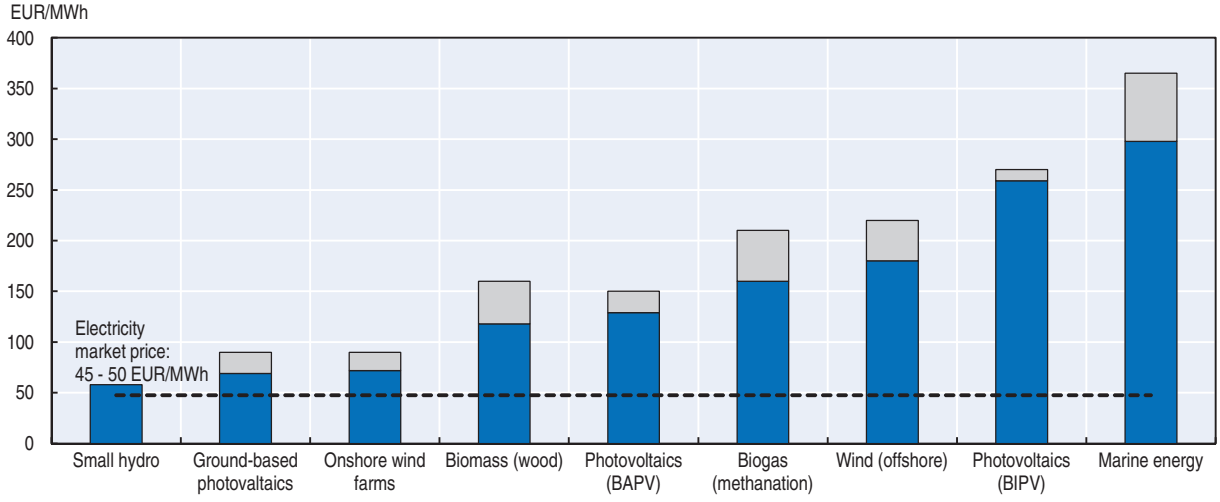
EU objectives seem to be unattainable in the light of current policies. To reach 23% of renewable energies in France's gross final consumption by 2020, the effort made since 2005 would have to be almost tripled for renewable electricity and almost quadrupled for renewable heat between 2014 and 2020 (see Figure 4.3). The 32% of renewables targeted for 2030 in the Energy Transition Act also seems to be overly ambitious given current progress. Many barriers have hampered the deployment of renewable energies, including a lack of stability in policies supporting new technologies and excessive red tape surrounding requests for authorisation. Current schemes must be ramped up and reviewed in order to accelerate installation, while limiting deadweight effects and costs to electricity consumers, who are currently meeting the full cost of support policies.

The production costs of renewable energies remain higher than those of other energies, despite a spectacular fall in the costs of solar and wind power in the last ten years (see Figure 4.4). The deployment of renewables cannot take place, therefore, without State support, and a range of measures and incentives specific to each segment has been put in place, including feed-in tariffs, tax breaks for private investors under the CIDD scheme (sustainable development tax credit) and reduced VAT rates, and subsidies for renewable heat production installations (biomass and heat networks) through the heat fund, managed by ADEME.

Figure 4.4. **Estimated production costs for the main renewable electricity generation sources in 2014**



Notes: BAPV—Building-Applied Photovoltaics; BIPV—Building-Integrated Photovoltaics. The bars indicate the upper and lower limits of prices estimated on the basis of feed-in tariffs or calls for tenders.
Source: Medde (2015), *Panorama énergie-climat*.

Streamlining the regulatory framework supporting renewables in electricity generation

In France, the system to support the use of renewables is based on purchase obligation rates for small installations and calls for bids for larger installations:

- The obligation on electricity suppliers to purchase at a regulated rate was introduced under Law 2000-108 of 10 February 2000. The difference between the regulated rate and the market rate is refunded to the supplier by the consumer in the form of a tax (*contribution au service public de l'électricité*-CSPE). In 2015, the CSPE came to EUR 19.5/MWh, or around 15% of the average household electricity bill (CRE, 2014).

- The bidding procedure is launched if the objectives of the multiannual investment programme have not been reached in highly capital-intensive segments that need strong leadership and in which imbalanced access to information complicates the task of evaluating production costs for legislators. The Energy Regulatory Commission (*Commission de régulation de l'énergie*-CRE) is tasked with assessing the projects, and the specifications are drawn up at EU level. Several calls for projects have been launched since 2003: biomass in 2003 and 2005, combined heat and power generation (CHP) in 2006, and photovoltaics and biomass in 2009. A first call for offshore wind farm bids was launched in July 2011, for maximum capacity of 3000 MW, of which 2000 MW were allocated in April 2012. A second call for bids was launched in March 2013 to build offshore wind farms near Le Tréport in Normandy and the Île d'Yeu off the western coast, with capacity of 1000 MW (MEDDE, 2014a). In 2014, several calls for bids were launched for major photovoltaic power plants.

This process has not yet driven deployment up to a level sufficient to meet France's objectives. There is a long waiting list for the connection of renewable power plants to the grid, especially wind farms: 963 MW came onstream in 2014, but this figure would need to rise to an annual 1 647 MW to meet the targets for 2020 (Cassin, 2015). The main shortcomings of the current tools are a lack of long-term stability in investment signals, grid connection delays caused by red tape, and the high cost met solely by the consumer.

Like other European countries, France has changed its support measures several times in recent years, giving rise to some legal uncertainty over the regulatory framework. The French solar photovoltaic market overheated for a period in 2010 under the combined effects of highly incentive feed-in tariffs introduced in 2006 and the falling cost of photovoltaic panels: the number of requests for grid connection skyrocketed, and the total number of projects installed and pending in 2010 had already reached the installation target set by the Grenelle law for 2020. A report by the Inspection générale des finances (IGF) suggested that if tariffs were not cut, the photovoltaic industry would represent a major financial risk for the consumer and contribute 2% to France's trade deficit, largely because of photovoltaic panels imported from China (IGF, 2011). The unilateral announcement that feed-in tariffs were to be cut by 12% followed in August 2010, as well as a three-month moratorium on new installations. A new framework set up in March 2011 brought a further reduction in feed-in tariffs, stricter qualification criteria for these tariffs and mechanisms to adjust the tariffs to industry costs.

While these reforms may have protected the public purse from massive losses, they have had significant medium- and long-term effects on the industry (solar business collapses), investment and private-sector confidence (grid connections in solar and wind power have fallen sharply since 2011, dropping by 55% between 2011 and 2013 in solar and 33% in wind) (RTE, 2013). This episode also exposes flaws in the socio-economic evaluation of the tools implemented and a lack of control over the system, leading to deadweight effects. In 2010, solar tariffs in France were tangibly higher than the EU average, and producers could enjoy cumulated benefits sufficient to enable them to generate returns of over 20%. Increasing the link between ex ante and ex post evaluation and political decision-making is vital to bring the economic and financial impacts of the growth of these industries under control (Cour des comptes, 2013a).

In order to improve the effectiveness of support policies and reduce their cost, France began in 2015 to turn towards a system restricting purchase obligations, in line with the new EU guidelines on State aid for energy from 2014 to 2020 (see Box 4.4). These guidelines

Box 4.4. **European guidelines on State aid**

In order to incentivise the market integration of electricity from renewable sources and to limit the distortions of competition caused by State aid to energy from renewable sources, the European Commission adopted new guidelines on State aid for environmental protection and energy in June 2014, including:

- The possibility to use feed-in tariffs for wind energy installations with an installed electricity capacity of less than 500 kW or 3 MW or three generation units;
- The imposition of market premiums as a support instrument for installations with an installed electricity capacity of more than 500 kW as of 1 January 2016;
- The imposition of technology-neutral competitive bidding processes for installations with an installed electricity capacity of more than 1 MW or 6 MW or six generation units as of 1 January 2017.

Source: European Commission (2014), *Guidelines on State aid for environmental protection and energy 2014-2020*, Communication from the Commission No. 2014/C 200/01, 28 June 2014

introduce the requirement that state aid take the form of a bonus that is added to the market price. Producers must sell their electricity on the market in order to prevent deadweight and the distortion of competition between European countries. The Energy Transition Act provides for the gradual change from feed-in tariffs to "additional remuneration" for installations in mature segments over a certain size. Whether this system can offer sufficient incentive to ramp up the deployment and grid connections of renewable energies remains to be seen.

Having the consumer alone fund support for electricity produced from renewable sources (through the CSPE) is not sustainable (Cour des comptes, 2013; IGF, 2011). CSPE charges dedicated to renewable energies grew from EUR 0.6 billion in 2009 to EUR 4 billion in 2015, including EUR 2.5 billion for solar power and EUR 1 billion for wind power (MEDDE, 2015a). They could reach EUR 8 billion by 2020 (Cour des comptes, 2013a), fuelled by the growth of these segments, the increasing weight of the additional charges linked to the overly favourable feed-in tariffs granted for the first photovoltaic contracts and by the fall in the market price for electricity (on which the compensatory additional costs are based). The CSPE also funds the growth of renewable energies with the consumption of electricity alone, despite the latter's low carbon content. The Amending Finance Law for 2015 reformed the CSPE in order to bring it more firmly under parliament control and rebalance taxation between energy sectors: buy-back charges will now also be funded by part of the revenues from the increased domestic carbon tax on fossil fuel consumption. This reform should rebalance taxation between different sources of energy.

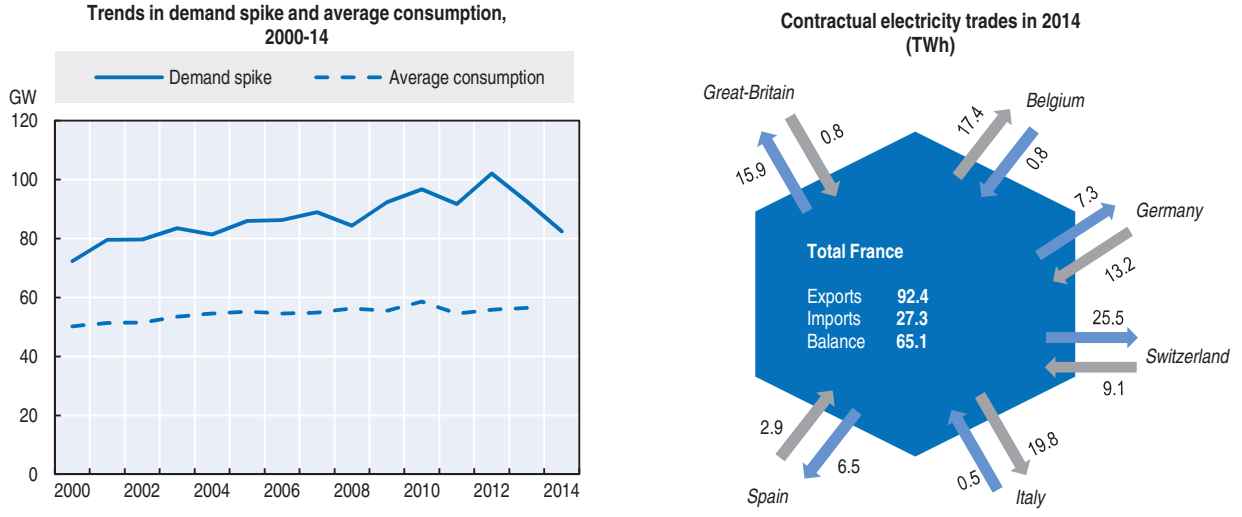
Another barrier to the development of renewable energy is the excessive red tape surrounding requests for authorisation. In 2013, it took three times longer to construct an onshore wind farm in France than in Germany, from the submission of the project to implementation (Cour des comptes, 2013a). In addition, the framework governing the development of the transmission network required to integrate renewable energy installations is equally complicated. Once approved, it can take ten years to install the power lines necessary for transferring the output of a wind plant, with most of the time spent on pre-construction procedures and two years on construction itself (RTE, 2014).

The Brottes Act of 2013 contained initial simplification measures for the wind power industry, and an ordinance in 2014 established a single permit procedure for regions with strong wind energy potential.[9] These measures led to renewed expansion in wind capacity in 2014 (RTE, 2014). The Energy Transition for Green Growth Act goes further by tackling the issue of energy transmission and imposing an 18 month deadline for grid connection, with compensation in the event of delays, and the widespread implementation throughout France of the single permit for wind turbines and biogas plants.

Demand management to cope with winter surges and the growing share of renewables

Although France is traditionally a net exporter of electricity, surges in demand during cold spells can result in risks of electricity supply disruption, as power demand in France is particularly sensitive to temperatures. This is due to the large installed base of electric convection heaters (one third of homes use electric heating, which is twice as many as 20 years ago) (ADEME, 2013a). Between 2000-10, the demand spike rose 2.5 times faster than annual electricity consumption (see Figure 4.5; MEDDE, 2015a). Growth in the spikes has slowed in recent years as the share of electric heating in new build falls as a result of new thermal regulations. Nevertheless, the risk of supply disruption remains a concern (RTE, 2015a).

Figure 4.5. **Increased risk of supply disruption due to spikes in electricity consumption**



Source: Medde (2015), *Panorama énergies-climat - Édition 2015;* RTE (2014), *Bilan électrique français.*

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If renewable energy is to account for 40% of final energy consumption by 2030, then electricity systems will not only have to be more flexible, they will also have to handle increased charging of electric vehicles and the possibility given to consumers to manage their demand. To reduce power consumption at times of peak demand and make the electricity system more flexible, France has put in place demand response capacity mechanisms whereby operators can, on a voluntary basis, choose to reduce their electricity consumption compared to their normal levels. The 2013 Brottes Act provides for a greater role for demand response through bonuses granted for the benefits for local authorities.

Strengthen European collaboration in electricity markets

The liberalisation of the electricity markets has thrown up many challenges for the European electricity markets, in particular the fact that the current market model has a negative impact on the investment climate and increases the risk of supply disruption in some Member countries (OECD et al., 2015). In the absence of a common European framework, some countries, including France, have put in place unilateral capacity mechanisms. Under the French system, all electricity suppliers are obliged to guarantee that they have energy capacity in a certain amount to cover their clients' consumption during spikes. To do so, they must either receive certification of their own capacity or purchase capacity guarantee certificates from other suppliers. This market complements the electricity market by remunerating spare capacity and demand side capacity in addition to power generated. It is scheduled for implementation in winter 2016-17.

Capacity mechanisms, while helping improve energy security at the national level, must not run counter to energy/climate objectives (by favouring the most adaptable energies, which are often fossil fuels) or create distortion of competition. Also, the increased generation capacity they create could also discourage investment in neighbouring countries, which would then have to rely on French electrical capacity, thereby, paradoxically, increasing the risk of power outages (Thomazo, 2014). Moreover, their implementation could affect Europe's ability to reach its climate targets and deployment objectives for renewable energy sources, and drive up the cost of these policies. The compatibility of capacity mechanisms with a European vision of the electricity markets remains to be proved, and there are few signs of harmonisation and co-ordination of national initiatives (Grigorjeva, 2015).

There is an urgent need to integrate energy security issues, like climate problems, at European level, and to assess them in terms of their environmental consequences beyond the national dimension. One particularly important step in the creation of a European energy union is the optimisation of the resources and infrastructures at European level. Cross-border measures (better interconnection between European networks, the coupling of European wholesale markets, regional co-operation) allow for a better integration of European electricity sectors and cost-efficient use of renewable and conventional resources.

France is interconnected with six countries, with import capacities of around 12 GW and export capacities of 16 GW (MEDDE, 2015a). These levels are insufficient given the volumes that the energy market actors would like to exchange. The bottlenecks formed by interconnections led RTE to introduce rules for capacity allocation (CRE, 2013). Increasing interconnection capacities between countries is another key factor in developing renewable energies in Europe. For example, Spain, which is a major actor in wind energy, has one of the lowest interconnection levels in the EU, thereby restricting its ability to guarantee its supply. A better connection with France would enable both countries to improve their energy security and increase the likelihood of using renewable energies. The opening of a new interconnection line in 2015 (between Baixas in France, and Santa Llogaia in Spain) has doubled interconnection levels between France and Spain, but this is not enough for Spain to respect the minimum interconnection rate of 10% recommended by the EU, meaning that further investment is required (RTE, 2015b).

The Heat Fund at the heart of renewable heat initiatives

In 2014, renewable heat represented 50% of total renewable energy consumption and 7.5% of final energy consumption (MEDDE, 2015c). The framework for support policies in

this sector is the Heat Fund, managed by ADEME, which ensures that the price of renewable heat produced is 5% lower than that obtained with conventional energy by providing aid in the form of grants for investment and/or per kilowatt-hour produced.[10]

A budget of EUR 1.2 billion for the period 2009-14 has helped the Fund boost renewable heat production projects, helping over 3 000 facilities for total annual production of 1.6 Mtoe. The support provided by the Heat Fund to biomass installations over the period 2009-13 helped prevent the emission of 2.6 million tonnes of CO_2 per year. Calls for projects also impose strict conditions with regard to the emissions of dust, CO and fine particles (ADEME, 2015a; 2015b).

Nevertheless, appropriations have remained far below initial intentions. The Heat Fund is due to be strengthened under the Energy Transition for Green Growth Act, with a twofold increase in its budget to EUR 420 million between now and 2017, an expansion of its remit and the allocation of additional financial support from the fund for the financing of energy transition.

4. Promoting energy savings

In 2005, the POPE Act set numerical energy management targets and established the guidelines of national plans. These targets were integrated into different National Energy Efficiency Action Plans (NEEAPs 2008, 2011 and 2014) which contain measures for all sectors to help the EU reach its 20% energy efficiency target by 2020 (see Table 4.2). The Energy Transition for Green Growth Act goes further by setting a target to reduce final energy consumption by 50% in 2050 compared to 2012.

After two decades of growth, final energy consumption in France fell between 2005 and 2013, in both absolute terms and in relation to GDP. Nonetheless, and despite significant measures to promote energy efficiency in all sectors, this reduction falls short of national and European objectives (see Figure 4.6). The progress made reflects a continuation of trends rather than a genuine downturn in the energy intensity of the economy. In order to meet medium- and long-term targets, the existing measures need to be reinforced, in particular in the residential and transport sectors (EEA, 2015).

Assessing the efficiency of Energy Saving Certificates

Energy saving targets were exceeded during the first two periods of implementation of energy saving certificates (ESC), and the list of "obliged sellers" has gradually been extended to fuel sellers. ESCs, which were established by the 2005 POPE Act and implemented in 2006, impose quantified three-year energy-saving targets on energy suppliers[11] (the "obligated sellers"), thereby giving them an incentive to encourage their clients – households, local authorities and businesses – to reduce energy consumption in order to generate "energy saving certificates" which can then be exchanged. At the end of the three years, the sellers have to prove that they have met their obligations by holding a number of certificates equivalent to said obligations, which they can obtain either through their own energy-saving initiatives, or by purchasing them from other obligated sellers. Failure to respect the obligations results in a full-discharge penalty payment (MEDDE, 2016).

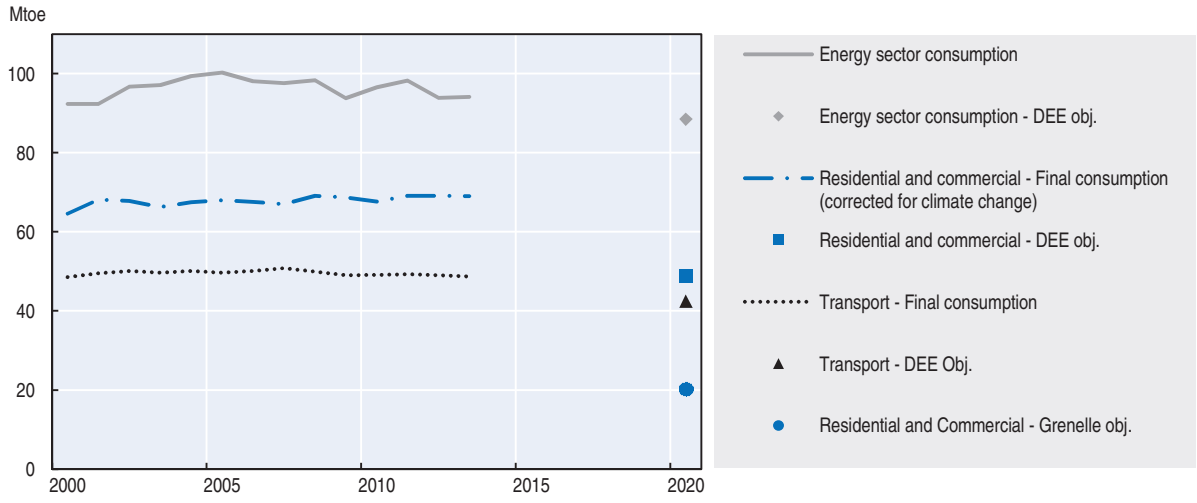
In 2013, the Cour des comptes highlighted the complexity of this scheme, the absence of any a posteriori control of realised energy savings, the lack of transparency and the need to encourage further initiatives. It also pointed to the fact that it is difficult to distinguish ESC energy savings from other incentive schemes such as the sustainable development tax credit

Table 4.2. **Main measures and expected outcomes of the NEEAP and the Climate Plan**

Sector	Objectives	Implemented	Emission reduction in 2020 (kt CO_2 eq)	Final energy saving (Mtoe)			
Transport				2010	2013	2016	2020
Measures aimed at reducing emissions from passenger cars (CO_2 labelling, scrapping premium, environmental reward/penalty scheme)	Energy efficiency in the road transport sector – light-duty vehicles	2007	9 000	0.1		1.1	2.2
kilometric eco-tax on heavy vehicles	Take into account the cost of using the non-concessionary national highway system to generate resources to finance transport infrastructure projects	No	260 to 600			0.165	0.168
National Transport Infrastructure Plan (*Schéma National des Infrastructures de Transports* - SNIT)	Investment in transport infrastructures (2 000 km of high-speed rail lines by 2020)	No	2 500				
Residential							
New Thermal Regulation (RT) 2012	Energy efficiency in new buildings	2011	3 550			0.41	1.15
Sustainable Development Tax Credit (CIDD)	Encourage private individuals to invest in home retrofits	2005	3 760		0.78	0.93	1.08
Low-interest loans to encourage residential retrofit work (Eco-PTZ)	Encourage major building renovation	2009	330		0.18	0.19	0.19
Low-interest loans for social housing (Eco-PLS)	Encourage renovation of social housing stock	2009			0.35	0.65	1.03
Energy Saving Certificates (ESC)	Promote energy saving initiatives	2006	6 200		2.5	5.17	9.29
Energy							
Heat Fund to support the development of thermal renewable energy	Develop alternative energy sources to fossil fuels to generate heat	2009	6 600				
Regulations on fluorinated gases	Reduce emissions of fluorinated gases with high global warming potential (GWP).	2007	7 170				
Support for agricultural methanisation	Reduce CH_4 emissions from the agricultural sector and perform energy recovery	2009	950				
The European Union Emissions Trading System (EU ETS)	Reduce GHG emissions from high emission plants (mainly power stations and industry)	2005					
Feed-in tariffs on renewable energy sources of electricity	Encourage development of renewable energy sources of electricity	2001	12 850				
Domestic tax on consumption of energy products (TICPE)	Tax on diesel				4.9	4.3	4.1
	Tax on petrol				0.5	0.4	0.3

Source: MEDDE (2014a) France's first biennial report under the United Nations Framework Convention on Climate Change; MEDDE (2014c), The Energy Efficiency Action Plan for France – 2014.

Figure 4.6. **Energy consumption by sector and objective**



Note: DEE - Directive on Energy Efficiency (2012/27/EU).
Source: Medde (2014), *Plan National d'Action Efficacité Energétique 2014* (database); *SOeS* (2015), *Pégase* (database).

StatLink http://dx.doi.org/10.1787/888933406214

(CIDD) and the interest-free eco-loan (eco-PTZ). A report published in 2014 confirmed these criticisms and recommended a revision of the amount (often overestimated at present) of the ESC corresponding to each standardised worksheet, greater public information through energy renovation passports on the different energy efficiency projects and their return on investment (which varies widely from household to household), and better targeting of the most energy-intensive buildings (CGEDD, IGF and CGEIET, 2014).

A third period began on 1 January 2015, containing modifications taking into account the criticisms of the previous periods. The three-year target has been doubled from the second period, which is expected to foster greater competition between the obliged sellers (Cour des comptes, 2013b). For the first time, the target is in line with the objectives of the European directive on energy efficiency. The scheme has also been simplified and made more transparent, with the introduction for example of a declarative system whereby applicants' files are considered to be implicitly accepted if they have received no response from the administration after two months. The standardised worksheets are being revised. ESCs can also be used to finance energy renovation passports and, as of 2016, energy sellers will have to allocate some of their ESCs to fighting fuel poverty (MEDDE, 2016). At present, the ESCs are also being used as a model for certificates for the economic use of phytosanitary products in the agricultural sector.

Adjusting measures to improve the energy efficiency of buildings

The role of the building sector is decisive when it comes to meeting energy efficiency targets, reducing GHG emissions and deploying renewable energy. France has adopted very ambitious objectives for energy-efficient building renovation: a 38% reduction in primary energy consumption in existing buildings between 2009 and 2020, the annual renovation of 500 000 homes until 2017, efforts to make low-energy buildings more widespread in new builds in 2013, and, in 2020, all new buildings should be positive energy buildings (see Table 4.1).

Despite a range of regulatory and economic instruments, and measures aimed at providing training and information and raising awareness (see Table 4.2), results are still falling short of objectives. In 2013, despite steadily increasing by 1.5% per year, the number of homes receiving energy retrofits stood at only 265 000, compared to the target of 500 000 renovations per year by 2017 (OPEN, 2015; CGDD, 2012). Measures are needed to simplify these schemes, extend financial initiatives and improve access to information. In addition, energy efficiency must also integrate the issue of fuel poverty, which requires specific actions targeting disadvantaged households.

Strengthening thermal regulations for existing buildings

Thermal regulations (RT) set the level of thermal performance for residential and commercial buildings. The first RT dates back to 1974 but there have been major advances in the system since 2005:

- Thermal regulations for existing buildings In 2005, thermal regulations were put in place for existing residential and commercial buildings, with the aim of ensuring that the energy performance of a building improves when work is carried out (renovation, installation of new heating equipment). Regulatory requirements differ according to the extent of the project. For major renovations, the regulations set a global performance target for the building (the Global RT for existing buildings, defined by the Order of 13 June 2008). For other renovations, the regulations establish minimum performance standards for individual categories of installation (the Element-by-element RT for existing buildings, defined by the Order of 3 May 2007).
- Thermal regulations for new buildings with increasingly stringent requirements The aim of RT 2012, adopted following the Grenelle Forum on the environment, is a threefold reduction in energy consumption by new buildings, to 50 kWh/m^2/year,[12] compared to 150 kWh/m^2/year in RT 2005, and an average of 240 kWh/m^2/year for the existing building stock (PLF, 2015). It also discourages the use of electric heating in new buildings in favour of other more efficient forms of heating.

RT 2012 is an example of good practice in thermal regulations as it focuses on performance requirements and targets rather than requirements with regards to the means used. However, the performance requirements in the RT for existing buildings are focused on the means rather than the end, resulting in a lack of visibility and consistency in terms of its contribution to the objectives. The implementation of performance requirements instead of obligations regarding the means used could increase the consistency and visibility of the current regulatory measures and pave the way for meeting objectives (Hilke and Ryan, 2012).

Simplifying and sustaining financial incentives

Since 2005, France has put in place several measures providing direct and indirect funding support for energy efficiency retrofits in existing buildings. For households, the two main instruments are the Sustainable Development Tax Credit (CIDD), created in 2005 (and renamed Energy Transition Tax Credit [CITE] in 2015), and the interest-free eco-loan (eco-PTZ), created in 2009:

- Through the CIDD, private individuals receive a tax credit when they purchase and install high-performance materials or equipment permitting energy savings. Between 2005 and 2011, over 9 million projects were declared eligible for the CIDD. The tax expenditure

over the period was EUR 13 billion, with EUR 46 billion of declared household expenditure (PLF, 2015).

- The eco-PTZ allows homeowners and landlords to finance major renovation works in their properties through "mixed works" designed to achieve a minimum overall energy performance for the property. It is financed by sustainable development savings accounts (LDD), which are regulated passbooks launched in 2007 to provide banks with a specific loan product for energy efficiency projects. Since 2009, around 235 000 eco-PTZ loans have been issued for an average expenditure on works of EUR 19 200, which is below the objective of 150 000 loans a year as of 2010 (PLF, 2015). In 2014, eco-loans represented under 3% of non-centralised outstanding LDD loans.

The impact of these two instruments has been lessened by constant revisions to the conditions governing the allocation of these aids, the eligible equipment and materials, and the significant deadweight impact (as the schemes primarily benefit wealthy households which would have carried out the work anyway). The CIDD weighs heavily on public expenditure, costing EUR 1.4 billion in 2016, making it one of the most expensive forms of tax expenditure (MINEFI, 2015). Moreover, these mechanisms have to date encouraged element-by-element retrofits, which are less efficient than complete retrofits. The cost of completed projects has fallen continuously since 2006, and only 10% of renovation projects can be considered ambitious (roof, interior or façade insulation). In 2014, a standard subsidy rate of 30% was set for the CIDD. In addition, responsibility for establishing the eligibility of requests for eco-PTZ loans has been handed to construction companies rather than local banks, which lacked the technical competence required to process said requests (Hilke and Ryan, 2012).

Third-party investment and financing mechanisms, based on the premise that retrofit investments can be financed by third parties who charge the beneficiary a fee equivalent to a part of the energy savings achieved, have been developed in the United Kingdom. This is not yet the case in France, but the situation should improve through the development of Energy Performance Contracts (EPC) which allow public and private contractors to use external organisations which guarantee a quantified improvement in energy performance by funding the work and using the income from the savings to repay the cost of the project. However, the development of EPCs has not matched expectations for the target segments (public, private and tertiary markets) as local authorities find them too complex, the transaction cost for setting up the project is high for individuals, and it is impossible to combine this scheme with other available instruments (MINEFI, MEDDE, 2013). Some of the measures in the Energy Transition for Green Growth Act are designed to remove these barriers, such as the creation of a guarantee fund for energy retrofits, financed by ESCs and the CDC's own funds, and the creation of regional third-party financing companies which can, under certain conditions, qualify for an exemption from banking monopoly rules.

Strengthening tools for training, information, documentation and awareness-raising

In 2013, the government set up a network of 450 Renovation Information Service Points (PRIS) across the country where members of the public can obtain all the technical, financial, fiscal and regulatory information they need. This one-stop approach for access to aid was accompanied by a national awareness campaign called "j'éco-rénove, j'économise" ("by eco-renovating, I save money"). The PRIS have a key role to play in boosting the profile of retrofit schemes, provided that they are manned by competent staff capable of giving property owners the guidance they require and that they are backed by a sufficiently large

network of competent contractors. The Energy Transition for Green Growth Act also introduces energy renovation passports, which will be tested in 2016 (MEDDE, 2015d).

Smart electricity and gas meters, promoted by awareness-raising measures, could also encourage consumers to invest in energy efficiency[13] and reduce households' energy consumption by 5 to 20% (CEDD, 2013). However, there are still legal uncertainties about the ownership and potential use of the data from these meters. The Grenelle II Law guarantees local authorities access to data from the gas and electricity networks under the SRCAE and PCET, but some limitations currently exist with regards to the interpretation of the use of commercially sensitive information (CSI). Discussions are required to establish the nature, level of detail and format of the data and their transmission (DNTE, 2013b). There are also practical issues to resolve, as some meters are not situated within household living areas, therefore making it difficult to follow real-time energy consumption (Que Choisir, 2013).

Efforts to boost the profile of these various incentives is also hampered by the lack of expertise in the industry, which results in significant disparities in the quality of the diagnostics and services provided (DNTE, 2013a). France has launched several projects to support training and the recognition of training, such as financing research (research and experimental programme for the energy of buildings [Prebat]), training designed to create a sector par excellence (training in energy saving for building companies and artisans [FeeBat]), and the development of information, monitoring and assessment tools for instructing parties. Accordingly, an energy performance diagnosis has been mandatory for all residential and non-residential homes since 1 November 2006, within the framework of the European directive. To counter the lack of competencies among professionals in this field, an action plan was launched in 2012 aimed at promoting transparency, improving calculation methods, and providing better training for certified individuals and better oversight of the profession.

Further structuring of the industry is required if the schemes are to be secured as, in a sector mainly comprising small artisanal businesses, few professionals invest time and money in training. The government introduced the principle of environmental conditions for financial support to encourage training. Individuals are therefore required to use businesses with an RGE quality certificate "guaranteeing environmental recognition" if they want to apply for an eco-PTZ loan (2014) or the CIDD tax credit (2015). The systematic implementation of this measure should improve professionalism within the industry.

Combating fuel poverty while respecting energy transition targets

In 2015, 5.1 million households (and 11.5 million individuals) in France suffered from fuel poverty, i.e. around 20% of the population (ONPE, 2015). The causes are complex, but are generally the result of three factors, which are low household income, poor housing energy performance and ever-increasing energy cost pressures. The government spends around EUR 3.5 billion a year on combating fuel poverty (Chancel et al., 2015) through a raft of measures at both the national and local level aimed at improving the thermal performance of homes, helping households reduce and pay their energy bill, and improving information for and communication with households in fuel poverty.

Improving the thermal performance of homes

The "Habiter mieux" programme by the French National Habitat Improvement Agency (ANAH) was put in place to help 300 000 households in fuel poverty over the period 2010-17. Between 2010 and 2015, the programme financed energy efficiency upgrades for

140 700 homes compared to the 2017 target of 300 000 homes (ANAH, 2015). One of the main difficulties in terms of implementing the programme is identifying and communicating with those eligible. Another is the amount that struggling households still have to pay. Even if the CIDD tax credit and eco-PTZ loan can be used to cover most of the retrofit costs, the potential down payment and the residual amount to be paid are often off-putting, as most households in fuel poverty only have limited access to credit. A "Habiter mieux" eco-loan was created in 2016 to provide this funding.

Financial aid with energy bills

France is testing several schemes for helping cover energy bills, which have yet to prove their effectiveness. The refund on heating oil for non-taxable households was phased out in 2009 as it encouraged energy consumption. The implementation of progressive electricity and gas pricing, adopted by the French parliament in March 2013, was rejected by the Constitutional Council for being overly complex.

The current system is based on social energy tariffs, housing solidarity funds to pay overdue bills, and communal social action centres (CCAS) which can co-finance this cost. Social energy tariffs are based on the size of the family and its consumption. However, they have two main flaws, namely the identification of the target population, due to the complex cross-referencing of data from the health insurance organisations and tax authorities, and their inequity, in that households with gas heating can combine gas and electricity tariffs. Moreover, the average amount of aid available through social energy tariffs, which is about EUR 8 per month, does not seem sufficient to provide genuine protection from fuel poverty, while the cost of implementing the scheme is prohibitive (approximately 10% of the total bill) (ADEME, 2013b; Chancel et al., 2015).

Changes have been made to legislation recently in a bid to overcome these issues. In 2012, the allocation of social energy tariffs was automated using data from the family allowances fund (CAF) and the energy suppliers. While this helped increase the number of beneficiaries from 900 000 to 1.75 million, it also allocated social energy tariffs to individuals not in fuel poverty and excluded eligible applicants without a recognised energy contract (ADEME, 2013b). The 2013 Brottes Act broadened the eligibility criteria for recipients, which helped increase the number of beneficiary households to 3 million in 2015. In 2016, social energy tariffs will be replaced by an "energy cheque" to help consumers pay their energy bills, regardless of their heating modes, or to finance energy retrofits, as long as they meet certain income conditions.

Despite the existence of different measures to combat fuel poverty, there is no global strategy to ensure overall co-ordination, and the lack of linkage between the schemes undermines their effectiveness (Chancel et al., 2015). Communication about these initiatives should be improved, especially to the most isolated households, which are often the most vulnerable. The aid available should also be readjusted to meet the requirements and financial capabilities of the target populations (Erard et al., 2015). Better data production and management is also required to better understand and diagnose fuel poverty, focus the initiatives, assess their impact and develop a global long-term strategy (Chancel et al., 2015).

Avoid overlapping measures in the industrial sector

Energy consumption in the industrial sector in France is extremely concentrated, with 1% of industrial sites responsible for two thirds of the energy consumed. The largest consumers include the chemical industry (26%), food processing (16%), steelmaking (15%),

non-metallic mineral products – cement, glass, brick, tiles – (14%) and paper/cardboard (9%) (ADEME, 2015). Between 2000 and 2013, final energy consumption in industry decreased more than industrial production, causing a 7% fall in energy intensity, which was nevertheless less accentuated than the average 19% downturn in OECD Member countries (IEA, 2015). This decline is mainly due to improved production processes (especially in chemicals and steelmaking) (CGDD, 2014). However, the economic crisis has caused improvements in energy intensity to slow since 2009 through sub-optimal use of production capacities.

French policy on energy efficiency and the reduction of GHG emissions in the industrial sector is primarily based on European directive 2003/87/EC, which establishes a cap and trade system for emission allowances (EU ETS) within the EU. During the 2005-07 test phase, and the second period from 2008-12, France established national allowance allocation plans for 964 regulated sites, which must comply every year by surrendering enough allowance to cover all their verified emissions for the year. The implementation of energy efficiency initiatives is one of the levers they can use to meet objectives.

Nevertheless, against a backdrop of relatively low energy prices in France and reduced investment capacity in businesses following the economic crisis, investing in energy efficiency is not always on the list of priorities for companies that are not intensive users of electricity. Consequently, France has put in place other measures to complement the EU ETS and encourage investment in energy efficiency (see Table 4.3):

- *Information tools to foster a better understanding of energy efficiency*: the creation of a French standard reference for energy diagnostics in 2006 (AFNOR BPX30-120); mandatory four-year energy audits for all business, except SMEs, in application of European directive 2012/27/EU on energy efficiency;
- *Incentives to support investment*: "green loans" were established under the "programme of investments for the future" to provide SMEs with subsidised rates or guarantees for carrying out energy retrofits; *Banque publique d'investissement* (BPI) provides Eco-Energy loans to SMEs and VSMEs; as well as the ESC scheme and ADEME funds for demonstration or exemplary projects, in conjunction with;
- *Measures to support research and development*: under the "programme of investments for the future", but also as part of France's industrial strategy to develop profitable industries, some 20 strategic sectors have been identified, such as smart energy networks, renewable energy for optimised industrial processes, and vehicles of the future.

The Energy Transition for Green Growth Act also provides for conditioning the access of electricity intensive industries to special rates on their undertaking to adopt better energy performance practices. However, by overlapping with the EU ETS, these measures could increase the cost of reducing emissions and move the emissions elsewhere. It is important that the additional measures also cover sectors other than those subject to EU ETS.

Table 4.3. **Main energy efficiency measures in the manufacturing sector, excluding EU ETS**

Incentive Measures	Energy Saving Certificates (ESC)	Between 2006 and 2010, around 9.2% of total ESC were issued to industry, representing annual energy savings of 5.6 TWh (NEEAP, 2011).
	Decision-making support, ADEME	Funding is mainly given to carrying out studies on energy efficiency in industry, including energy diagnostics.
	"Rational use of energy – investments" funding, ADEME	This system supports investments by businesses aimed at improving their energy efficiency. The funds are only available for demonstration or exemplary projects.
	"Green loans"	These loans, launched under the programme of investments for the future, offer SMEs and medium-sized industrial firms low rates and loan guarantees (SMEs only) for investments which will improve the competitiveness, and the energy and environmental performance, of their activities.
	"Eco-Energy loans"	The purpose of this system, designed for VSMEs and SMEs, is to finance the installation and upgrading of equipment that consumes a lot of energy (lighting, heating, air conditioning and electric motors).
Regulatory Measures	European directive on energy efficiency (2012/27/EU)	The obligation of a mandatory energy audit every four years for all business, with the exception of SMEs, and businesses without ISO 50001 certification.
	Directive 2008/1/EC concerning integrated pollution prevention and control	Requires assurance that energy is used efficiently in depollution installations and systems in respect of certain industrial activities (energy industries, production and processing of metals, mineral industry, chemical industry and waste management).
	Directive 2010/75/EU on industrial emissions	Imposes, on many operators in different industrial sectors, the implementation of the best available techniques for the reduction of harmful emissions and the increase of energy efficiency.
Information	POPE Act	It is mandatory for businesses selling energy or energy services to encourage energy savings in their advertising messages, i.e. "L'énergie est notre avenir, économisons-la !" (energy is our future so let's save it!).
	Support for innovation and calls for projects	The National Research Agency's (ANR) energy efficiency of industrial systems programme (EESI), ADEME's call for R&D projects to improve the energy performance of industrial processes and utilities (APEPI), the Ecoindustries programme (ADEME/BPi-engance/General Directorate for Competitiveness, Industry and Services), calls for interest in the ADEME/Total programme on energy efficiency, etc.

Source: MEDDE (2011), *Energy efficiency action plan for France – 2011*; *www.developpement-durable.gouv.fr/Prets-verts.html*.

Recommendations on energy transition

- Complete and implement the strategic framework for energy policy:
  - draw up the multiyear energy programme in consultation with the regions, defining road maps for developing generation capacity compatible with the national low-carbon strategy;
  - continue efforts to monitor production costs of energy industries;
  - put in place arrangements for revising implementation measurements when annual tracking indicators for the multiyear energy programme and the national low-carbon strategy stray too far from the road map.
- Ensure long-term clarity and transparency of measures to support renewables and energy efficiency; tighten monitoring to reflect changing technology costs and ensure that they do not lead to windfall profits; step up efforts to simplify and stabilise the legal framework regulating the installation and operation of renewables-based supply; strengthen efforts to develop biomass use and biogas production.
- Promote EU co-operation on the electricity market; develop interconnection capacities with EU grids to integrate renewables.

Recommendations on energy transition *(cont.)*

- Add overall building energy performance obligations to thermal regulations for existing buildings; make financial incentives for energy efficiency renovation conditional on an improvement in overall building performance.
- Encourage third-party investment.
- Structure the building renovation sector and increase training.
- Improve information on fuel poverty in order to better identify the issue and target assistance; evaluate the cost-effectiveness of such assistance.

Notes

1. As set out in the Energy Code, amended by the Energy Transition for Green Growth Act. The Energy Code, enacted in 2011, comprises all laws concerning the right to energy and includes the objectives of the POPE Act setting the direction of energy policy.
2. The debate was based on input from experts and the involvement of the public, and was completed in July 2013, with a summary document being officially presented at the Environmental Conference in September 2013.
3. These plans were introduced by the Grenelle II Law and are co-created by the regional prefects and the chairs of the general councils. They set the regional line for the fight against climate change, atmospheric pollution, air quality, demand management, renewable energies and adaptation to the 2020 and 2050 targets.
4. The average age of the reactors is thirty years, and their planned operational lifetime is forty years.
5. French regulations do not set a cap for the operating life of a nuclear power station. The Nuclear Safety Authority may, on a case by case basis, extend a reactor's operating life at the time of the ten-yearly inspection.
6. The European pressurised reactor (EPR) at Flamanville was initially expected to be launched in 2012 but this date has been pushed back to 2018.
7. The cost of the projected deep geological repository for radioactive waste has been estimated at EUR 14 to 28 billion, depending on the source.
8. Around twenty reactors will have been operating for over forty years in 2022.
9. Ordinance No. 2014-355 of 20 March 2014.
10. In the form of annual calls for projects for large scale biomass and heat facilities (> 1 000 toe/year) in the industrial, agricultural and tertiary sectors; for small scale projects, regional aid managed by ADEME at regional level.
11. Suppliers of electricity, gas, heat, cold, domestic heating oil and motor fuels.
12. Adjusted according to building use and geographic conditions.
13. 35 million meters will be installed by 2020, funded by EDF to the tune of EUR 35 million.

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PART II

Chapter 5

Biodiversity: Protection of areas of outstanding natural beauty

This chapter analyses the efforts made by France to strengthen its policy framework for the protection and sustainable use of biodiversity. It describes the status and development of biodiversity in France, as well as the pressures upon it. The chapter analyses the strategic, legislative and institutional framework in place and ongoing efforts to streamline the governance of biodiversity. It examines the increase in protected areas, the instruments used for conservation and the sustainable use of biodiversity, as well as funding resources. The manner in which biodiversity-related objectives are integrated into agriculture, land use planning, infrastructure and urban development is also analysed.

1. Status, trends and pressures on biodiversity

1.1. Status and trends

Due to its geographical position in Europe and overseas, France has an extremely rich natural heritage that makes it one of the 18 megadiverse countries (Mittermeier et al., 2008).[1] The Mediterranean basin forms part of the world's 35 biodiversity "hotspots",[2] along with the Antilles, the Amazon, the Indian Ocean Islands, New Caledonia and the Pacific Islands, where various French overseas territories are located (with a total land area of 119 394 km^2) (Conservation International, 2015; Mittermeier et al., 2008). According to the French National Inventory of Natural Heritage (INPN), new species are discovered in these areas at a rate of over 10 000 per year. Because of its overseas territories, France is the world's second largest maritime nation, with over 10 000 000 km^2 of maritime area under its jurisdiction in all the oceans and in French Polynesia in particular. France is therefore responsible for 10% of the world's coral reefs and 20% of its atolls. It is one of the countries with the most threatened species and therefore has huge responsibilities in this respect (Bocquet and Gargominy, 2013).

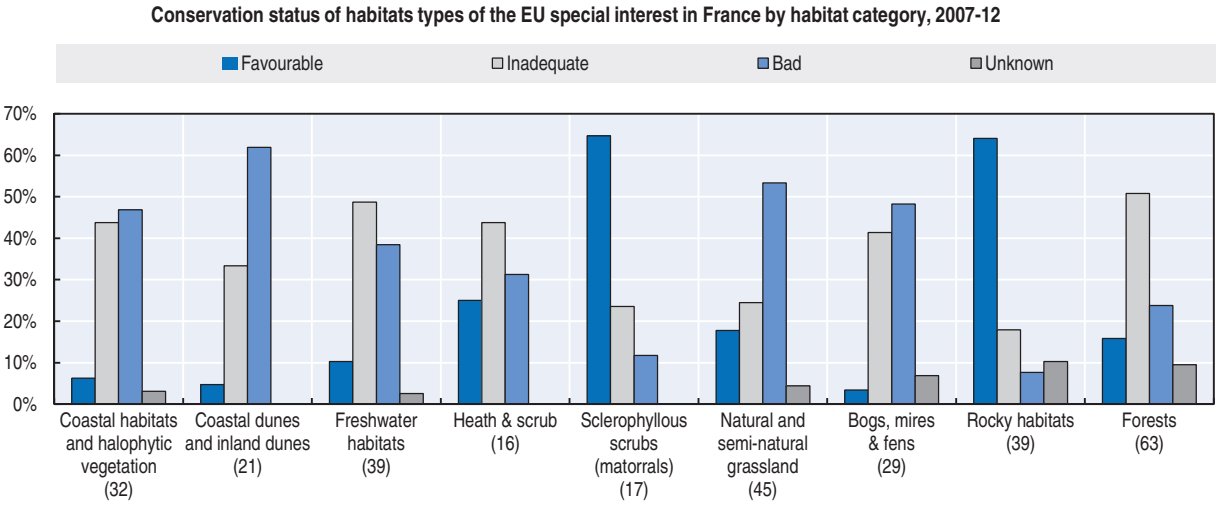
France also has significant responsibility for European biodiversity. With a territory of 549 000 km^2, metropolitan France is the largest EU country and benefits from a rich diversity of landscapes and natural environments, at a crossroads between several biogeographical areas. It accommodates a broad diversity of species (over 87 000) and leads Europe in terms of amphibian, bird and mammal diversity. It is also home to 40% of European flora species and 132 (61%) of the 216 habitats of Community interest in EU territory, i.e. rare habitats or habitats in danger of disappearance and recognised as such by the Habitats, Flora and Fauna Directive (92/43/EEC).

Natural environments

The situation of natural environments in metropolitan France continues to raise concerns, with three-quarters of its habitats of Community interest assessed as at an unfavourable conservation status, without notable improvement since 2007 (Figures 5.1 and 5.2). The action taken has not produced the expected results. Only 22% of natural habitats are at a favourable status, and the status of 5% of these is unknown. The status of many habitats in the Atlantic and Continental biogeographical zones in particular is unfavourable, and the status of some is poor.

The disappearance of wetlands is a global conservation challenge because of their special biodiversity, but also because of the various ecosystem services they provide, especially in terms of water cycle regulation (floods, droughts). France lost two-thirds of its wetlands between the end of the 19th century and the 1990s, and 50% in the second half of the 20th century. French wetlands cover a mere 3% of national territory. The assessment report on the 2010-13 National Action Plan for Wetlands (Lavoux et al., 2013) refers to "degradation that barely slowed down, where over half the sites deteriorated substantially or in part between 2000 and 2010, 28% of sites were considered to be stable and 14% had improved". In the

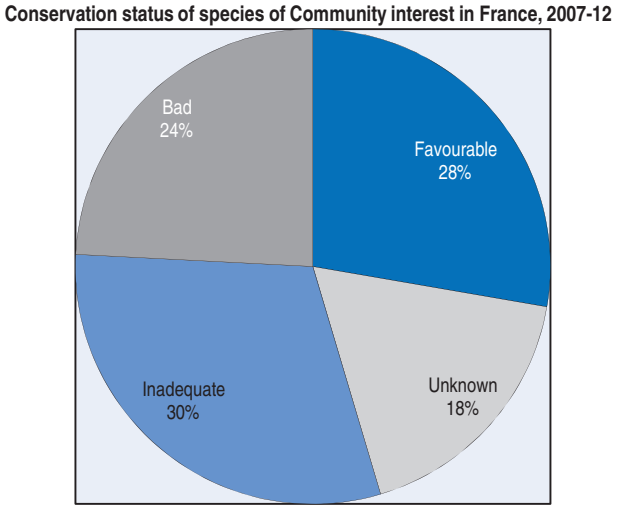
Figure 5.1. **Three-quarters of habitats of Community interest have an unfavourable conservation status**



Note: Number in brackets refer to the number of evaluations carried out.
Source: ONB (2015), *Indicateurs de biodiversité en base de données* (database).

StatLink http://dx.doi.org/10.1787/888933406228

Figure 5.2. **Over half the species of Community interest have an unfavourable conservation status**



Source: Medde (2014), *Convention on Biological Diversity - Fifth National Report of France.*

previous survey, covering the period between 1990 and 2000, the experts were more negative: 51% of sites were considered to have deteriorated in part and 5% to have deteriorated sharply, suggesting that progress had been made. These findings are based on experts' consultations, since few aggregated data are available nationally to facilitate an assessment of the area and functionality of wetlands. Inventories were taken at departmental or municipal level (or by water agencies at water basin level), but small wetlands (less than 1 ha) are not usually inventoried, and methods of assessing functionalities are not standardised.

The ecological status of a significant proportion of continental aquatic environments other than wetlands is not good. The 2009 assessment of the ecological status of water

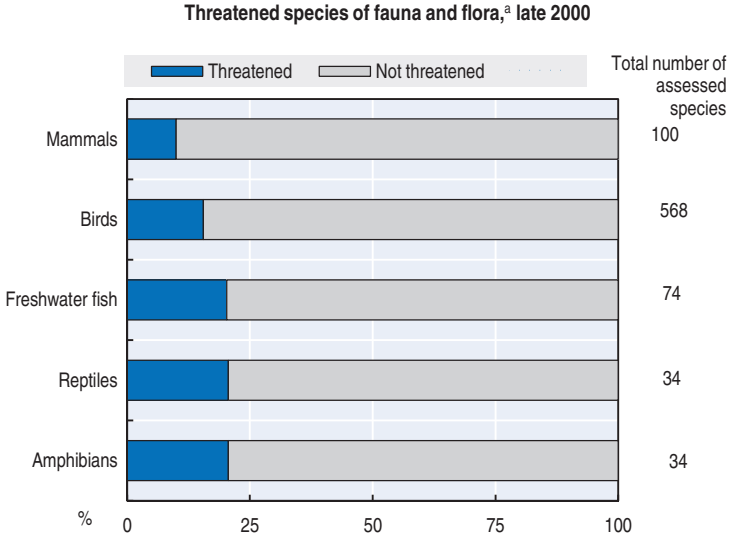
bodies shows that, out of 11 523 surface water bodies (watercourses, stretches of water, transitional waters, coastal waters), 7% were heavily modified or artificial and fewer than half (45%) had a good or very good ecological status (Vial et al., 2010). The assessment of fish populations was more positive: in metropolitan France from 1990 to 2009, the average number of species by sampling point (590 points at metropolitan level) increased in 58% of cases (and fell in 34%), while species density increased in 74% of cases (Poulet et al., 2013).

With respect to marine environments, the proportion of non-assessed habitats continues to be high: 53% for the Atlantic Ocean and 67% in the Mediterranean, where many fish stocks are heavily overexploited (MEDDE, 2014). In the overseas territories, knowledge is even poorer, but a 2008 assessment suggests that 30% to 50% of reefs are degraded on the most heavily populated coasts (Antilles, Réunion, Îles de la Société, Mayotte) (Ifrecore, 2008).

Flora and fauna

Around 10% of mammals, 15% of birds and 21% of reptiles and amphibians are threatened in metropolitan France[3] (Figure 5.3). While these rates are high, they are lower than those in most OECD countries.

Figure 5.3. **One out of five species is threatened in metropolitan France**



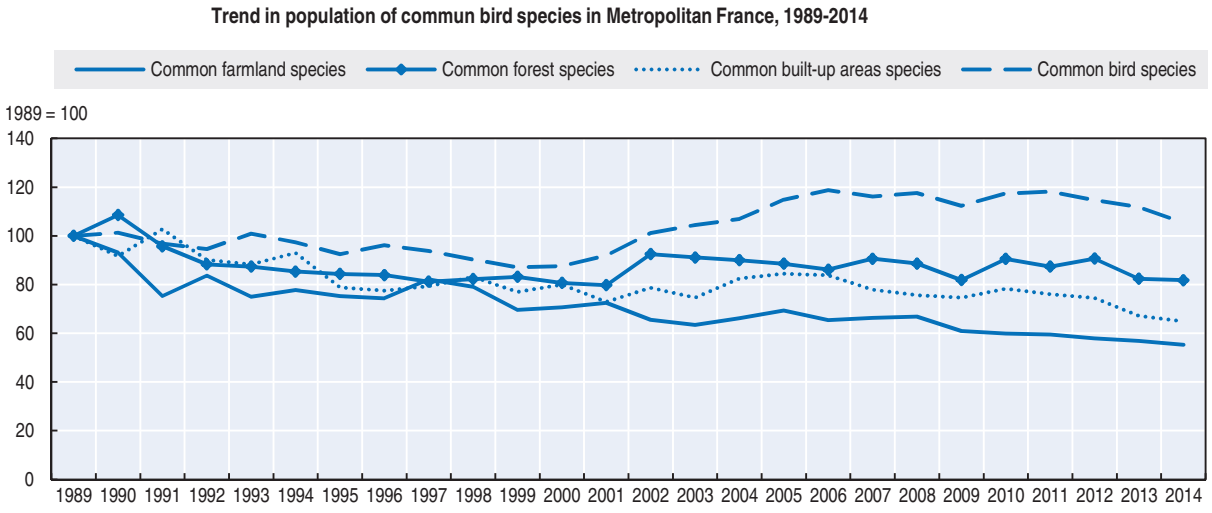
a) IUCN categories "critically endangered", "endangered" and "vulnerable" in % of assessed species.
Source : OECD (2015), *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/888933406230

Some of these species benefit from targeted action plans, most of which began in 2010-11, such as those for certain birds of prey (section 4.2). Many common species not covered by these plans, however, continue to decline (Figure 5.4), particularly specialised species in agricultural environments, whose abundance levels are significantly below 1989 levels (-32%) and probably well below 1970s levels compared to Europe as a whole. The current situation therefore continues to be a cause for concern. Stocks of general species, on the other hand, have been increasing significantly over the past 10 years, illustrating the phenomenon of homogenisation of biological communities, a key factor in biodiversity loss.

The situation is even more serious in the overseas territories. In Réunion and Guadeloupe, for example, over 30% of birds are threatened or have already disappeared. A

Figure 5.4. **Specialised birds in agricultural environments continue to suffer from intensive farming**



Source: ONB (2015), *Indicateurs de biodiversité en base de données* (database).

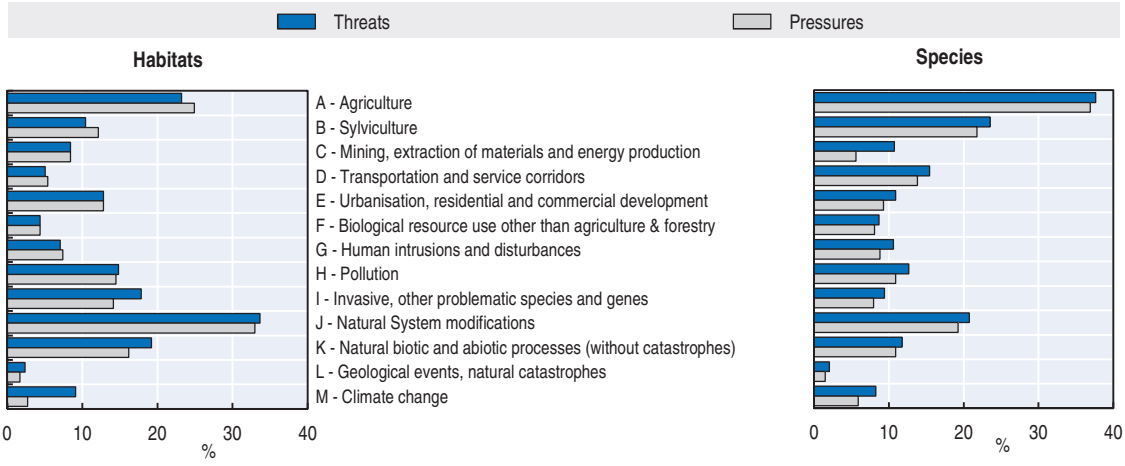
StatLink http://dx.doi.org/10.1787/888933406248

third of Réunion's native vascular plants are threatened, as are the island's three land reptiles. In New Caledonia, an area of less than 20 000 km2 accommodates 3 371 species of vascular plants, 75% of which are endemic. The island hosts 7% of the planet's conifers. The rate of endemism exceeds 90% for low and medium altitude scrubland associated to heavy metal soils. These habitats have suffered most from mining activity.

1.2. Pressures on biodiversity

Intensive agriculture, habitat fragmentation and land take but also alien invasive species and climate change are the greatest threats to French biodiversity (Figure 5.5).

Figure 5.5. **Agriculture and habitat conversion and fragmentation are the principal threats to habitats and species**



Source: EIONET (2014), National Summaries under Article 17 of the Habitat Directive, 2007-12.

StatLink http://dx.doi.org/10.1787/888933406252

Agriculture

As in other Western European countries, agriculture is regarded as the primary anthropogenic parameter with an impact on biodiversity in France. Agricultural land (arable land and crops, grassland and pasture) occupies over half the metropolitan area, and increased agricultural output resulting from the modernisation and intensification of agricultural practices since the 1950s has led to strong homogenisation of agricultural landscapes and biodiversity depletion (Le Roux et al., 2008). Grassland declined by 8% between 2000 and 2012, and where large-scale crops are grown, deep ploughing, pesticide use, nitrogen mineral fertilisation, drainage and irrigation have brought about an overall decline in biodiversity.

Synthetic plant protection products, used repeatedly for perennial crops, are now regarded as a major cause of biodiversity decline in agricultural ecosystems in industrial countries. In 2013, France was the second-largest European consumer of pesticides by total volume, behind Spain, while in 2010 it was in eighth place at world level (Chapter 1). The presence of pesticides in watercourses and groundwater is a cause for concern. This contamination is due largely to herbicides in metropolitan France and insecticides in the overseas territories. The presence of pesticides in groundwater is relatively lower than in watercourses, but the situation has developed little since the beginning of this century.[4]

Although surplus agricultural mineral elements (nitrogen and phosphorus) have declined in France since 2000, the impact of farming is still significant, largely because of the intensification of fodder production (grassland conversion) and the eutrophication of aquatic and coastal ecosystems, particularly in intensive farming areas in western France (Chapter 1). Phosphorus inputs have fallen by 50% since 2010, due partly to the widespread availability of soil studies to rationalise fertilisation and because of variations in phosphate prices.

Land take and fragmentation

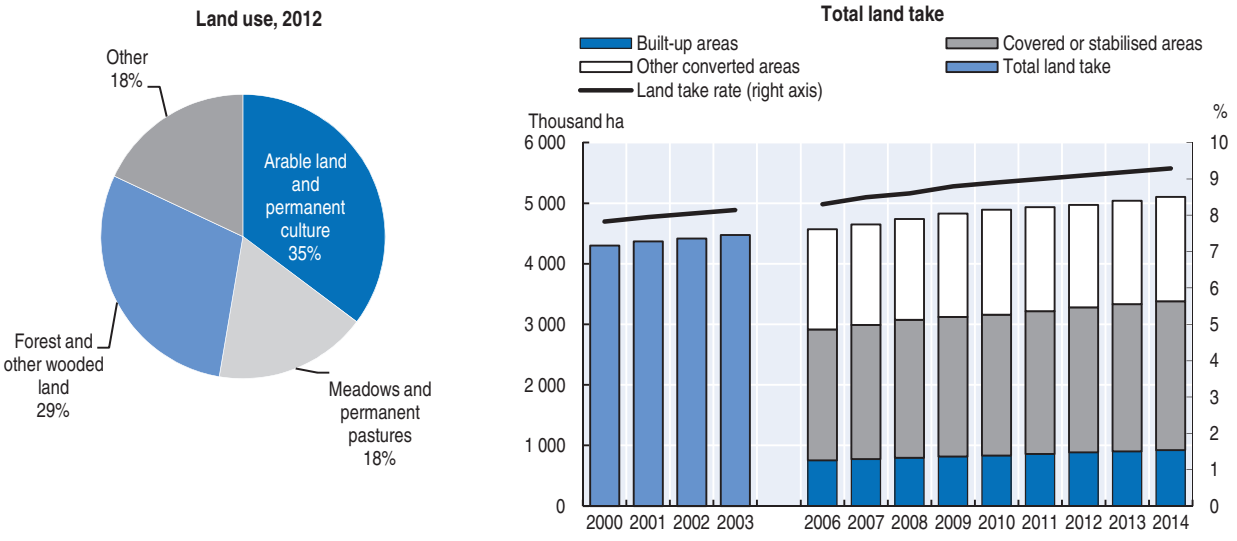
Land take increases twice as quickly as the population, mostly at the expense of agricultural areas and woodlands and habitats needed by fauna and flora. This consumption of space also breaks up habitats and ecosystems, giving rise to additional impacts on biodiversity (EEA, 2011).

Artificial areas represented over 9% of the land area in 2014, an increase of 19% compared to 2000, with a net acceleration since 2006 (Figure 5.6). Space is mostly given over to economic activities (waste treatment, trade and service companies), public amenities and transport infrastructure, particularly roads and motorways. The latter account for 80% of surfaced and stabilised land, the area of which increased by 14% between 2006 and 2014. Urban development has affected areas increasingly distant from the major conurbations and the coastline, particularly along transport infrastructure and borders (EEA, 2011; SOE, 2014).

Alien invasive species

Alien invasive species (AIS) are one of the main threats to biodiversity in the overseas territories because these ecosystems are so vulnerable to biological invasion. In Réunion, for example, invasive species have become the primary cause of biodiversity loss, with 133 non-native plant species and 16 non-native land vertebrate species whose voluntary or chance introduction by man threatens ecosystems, habitats and native species, with negative environmental, economic and health consequences. These species represent a threat to

Figure 5.6. **Land take is accelerating**



Source : FAO (2015), *FAOSTAT* (database); MAAF (2015), *TerUti-Lucas Survey, 2014.*

StatLink http://dx.doi.org/10.1787/888933406266

biodiversity because biological communities have homogenised and gradually become more commonplace at world level.[5] In metropolitan France, 2 623 species are considered to be AIS (DAISIE, 2013), and in 2010 few wetlands were immune to them (CGDD, 2013a).

AIS management costs France around EUR 19 million per year, 68% of which is spent in the overseas territories and 32% in metropolitan France (CGDD, 2015a). The (essentially health-related[6]) damage caused by these species, which persist despite management measures, has also been estimated at EUR 19 million per year.

1.3. *Projections with maintenance of the status quo*

A number of forecasting exercises have been carried out in the context of French and European research programmes or have been promoted by public sector stakeholders. The Ministry of Ecology, Sustainable Development and Energy (MEDDE), for example, carried out a study entitled "Biodiversity 2030" (CGDD, 2013b). The MEDDE constructed and subsequently mapped five scenarios to identify and examine major trends in and challenges facing biodiversity, including a "sheltered biodiversity" trend scenario. In this scenario, competition between socio-economic and environmental policy factors would continue despite a gradual strengthening of environmental regulations, though socio-economic aspects always prevail in preserving the environment. The resulting image in 2030 is that of "declining ordinary biodiversity because of fragmentation and artificialisation but an increase in general species which are the only ones that can resist increasing artificialisation. Noteworthy biodiversity persists in several conservation pockets". The analysis proposed in this chapter corroborates these conclusions.

Beyond the trend scenario, the results of the study indicated that certain areas were particularly sensitive to development and land use planning trends. Coasts are particularly sensitive because of land and demographic pressure and the risks associated to climate change. In agricultural areas, particularly where large-scale crops are prevalent, the development of farming systems will be crucial. Permanent grasslands in particular are

vulnerable to technical and economic choices because they are protected and managed by short- or medium-term contractual instruments. The future of forests, the area of which is likely to stabilise, will be linked in part to the possible development of a wood-energy sector. These forecasting exercises illustrate the importance of greater respect for biodiversity in the agricultural sector and in land use planning, particularly in coastal areas.

2. Strategic and institutional framework

2.1. Biodiversity conservation objectives and legislation

France met the international commitments set out in the Convention on Biological Diversity (CBD) through its 2004-10 National Biodiversity Strategy (NBS), followed by the 2011-20 Strategy. The country's biodiversity policy is largely determined by EU legislation, particularly the birds, habitats and fauna and flora Directives, and falls within regional conventions such as the Berne Convention on the Conservation of European Wildlife and Natural Habitats, the Alpine Convention and the six Regional Sea Conventions (Mediterranean, Antarctic, Caribbean, Indian Ocean, South Pacific and North Atlantic). The policy has resulted in the formulation of copious legislation, from the Grenelle Environment laws to the current draft law on biodiversity. At the 2012 Environmental Conference, the President of the Republic set a target of ensuring that France becomes an exemplary country in biodiversity conservation.

National Biodiversity Strategy 2004-10

Pursuant to Article 6 of the CBD, the principal objective of the 2004 NBS was to halt biodiversity erosion by 2010. France, like other countries, did not achieve that objective, though the NBS did keep pace with significant developments concerning species and area protection in particular, underscored in the appraisal carried out by the Ministry of Ecology, Sustainable Development, Transport and Housing (MEDDTL, 2012). Assessments by the Government (Alexandre et al., 2010) and the French Committee of the International Union for the Conservation of Nature (IUCN, 2010) or in connection with the impact study on the draft law on biodiversity (National Assembly, 2014) are more qualified. The sectoral nature of the 10 action plans[7] for implementing the NBS, drawn up by the Ministries concerned, led to a lack of cohesion and an erosion of the Strategy's ambitious objectives in favour of insubstantial changes to the sectoral policies. The commitment of the various Ministries in drawing up and piloting the plans was also rather mixed if not totally absent in the case of urban development (Juffé et al., 2012; Alexandre et al., 2010). Finally, certain sectors were not approached, such as education and industry, and there was a marked lack of planning for water and aquatic environments.

The lack of involvement of stakeholders was emphasised, the NBS being formulated initially largely by the former management of the Ministry's Department for Nature and Landscapes and some technical contributors (associations and scientists). The Strategy was in addition not presented well to the general public. The action plans were rekindled in 2009 to include contributions from the Grenelle Forum, thus correcting the lack of consultation to some extent. In the eyes of the public, however, the Grenelle Forum took over the NBS rather than vice versa.

The Grenelle Forum, 2007

Opening in 2007, the consultation process known as the Grenelle Forum led to major developments in terms of biodiversity (Chapter 2). The Grenelle II Law resulted, in particular,

in the reform of impact studies, the definition of national green and blue infrastructure and regional ecological consistency schemes, and the definition of a national strategy for the integrated management of the sea and coastline.[8] Local authorities, however, particularly in the overseas territories, were not sufficiently involved in the consultations. One of the working parties set up under the Grenelle Forum focused on biodiversity and natural resource conservation. Its main proposal was to create "green infrastructure" to counter habitat fragmentation,[9] taken up from 2008 under the responsibility of an operational committee dedicated to "trames vertes et bleues" [green and blue belt network] (TVB)[10] (sections 3 and 6.2). Although representatives of the departments and regions had been invited, they never took part in the meetings (Vimal et al., 2012), which involved highly technical discussions. Despite these limitations, however, the consultation approach adopted by the Grenelle process is often held up as a model, particularly because of the place granted to civil society in drawing up proposals.

A Grenelle Forum working party sought to adopt sustainable production and consumption methods (agriculture, fisheries, agri-foodstuffs, distribution, forests, sustainable land use) by including representatives of employees and companies in its work. One of the project's most notable successes was the increasing recognition by enterprises of their social and environmental responsibility (RSE).[11] The results in terms of biodiversity, however, will be difficult to assess.

National biodiversity strategy 2011-20

The momentum generated by the Grenelle Forum prompted a revision of the 2004-10 NBS, with greater stress being laid on consultation among upstream stakeholders and on voluntary commitments downstream, whereby stakeholders "adhere" voluntarily to the NBS and are thus labelled. This participatory approach addresses one of the main criticisms levelled at the previous NBS, though it did not sufficiently mobilise local authorities (Juffé et al., 2012; Le Clézio, 2010). In March 2015, over 450 organisations had adhered to the NBS and were therefore committed to its implementation, yet only 74 projects had been labelled. Over and above the value of this approach in enabling a variety of stakeholders to participate in biodiversity policy, the recourse to voluntary commitments undoubtedly leads to the labelling of projects that would have been implemented even in the absence of the NBS framework. The impact of these projects is furthermore difficult to assess in anything other than qualitative terms, since they do not have specific objectives to reduce pressure according to precise deadlines.

While the 2011-20 NBS was conceived on the basis of Aichi Targets defined in the CBD strategic plan, its targets are not quantified and do not have deadlines, which makes them difficult to assess. By way of illustration, the NBS seeks to "build a green infrastructure including a coherent network of protected areas" (Target 5) and to "preserve and restore ecosystems and their functioning" (Target 6). The corresponding Aichi Target (Target 11), meanwhile, clearly specifies the objectives to be achieved by 2020. The NBS 2004-10 targets, such as the establishment by 2020 of a coherent network of protected maritime areas for 20% of territorial waters under French jurisdiction, or the introduction of strong protection for at least 2% of the metropolitan land area before 2020, were not included in the NBS 2011-20. The NBS was nevertheless underpinned by a range of target indicators, such as the proportion of threatened species (identified under the National Strategy for the Creation of Protected Areas), for which the metropolitan network of protected areas is regarded as satisfactory or partially satisfactory in ensuring their conservation, expressed in the form of a percentage completion of the network of protected areas for endangered species. An

indicator of this kind appears to be more relevant in measuring the effectiveness of actions carried out under NBS Target 5 than a simple percentage of the country's area.

The NBS does not specify a strategy for mobilising resources, unlike the CBD. Credits for biodiversity protection and enhancement, however, are shared out among a number of tasks and programmes under the finance acts, in various ministries, making it difficult to assess their amount and their contribution to NBS implementation. Furthermore, "innovative" funding, from the private sector in particular, is not assessed, while the NBS mentions payments for ecosystem services and green offsets as levers for action. These shortcomings in the NBS in relation to the role of the State and its funding had been identified from 2011 by the Economic, Social and Environmental Council (ESEC), which correctly concluded that the issue of resources allocated to biodiversity would arise particularly acutely in coming years (Blanc, 2011). Target 9, which involves developing and perpetuating financial and human resources for biodiversity, is therefore particularly relevant.

The French State's biodiversity commitments for 2011-13 (Prime Minister, 2011) do not adhere to the framework proposed by the NBS and do not refer to its targets. Communication regarding these commitments focused on calls for projects with a view to encouraging stakeholders to commit themselves in this area too. The communication options taken concealed or minimised the importance of planned legislative or regulatory developments, making the overall coherence of state action more difficult to perceive. The legislative changes made by ministerial departments as a whole and by Parliament must be better integrated into the strategic framework of the NBS to improve the image of these changes and to ensure that the contribution of the NBS to the National Strategy for Ecological Transition towards Sustainable Development (SNTEDD) is not watered down.

The draft law on biodiversity conservation

The draft law, currently under discussion in Parliament, seeks to renew the vision of biodiversity by ensuring that it encompasses all living things and by promoting its inherent dynamism in a context in which the disappearance of biodiversity services may have an impact on human activities. Its key measure is to rationalise biodiversity governance by setting up the French Biodiversity Authority (section 2.2). The draft law also seeks to introduce a scheme providing access to genetic resources and to the sharing of advantages arising out of their use following the ratification of the Nagoya Protocol (section 5.4) and the modernising of a number of instruments for preserving species and their habitats, such as environmental offsets (section 6.2).

International commitments

France is deeply committed to development co-operation in relation to biodiversity and was one of the first OECD countries to formulate a co-operation strategy addressing this issue (Drutschinin et al., 2015; AFD, 2013). Public development aid for biodiversity has almost tripled since 2007-08, making the country the sixth largest sponsor among OECD Development Aid Committee members in 2012-13 (ONB, 2015a; OECD, 2015a). Under the CBD, France is committed to doubling financial flows for world biodiversity in 2015 (compared to the 2006-10 annual average) and maintaining them until 2020 (COP 11, Decision XI/4, 2012; COP 12, Decision XII/3, 2014).

France was a driving force in setting up the IPBES (International Science-Policy Platform on Biodiversity and Ecosystem Services)[12] (IUCN, 2010). It is also one of the two donor countries to the Critical Ecosystem Partnership Fund, which awards grants to NGOs and

the private sector to facilitate civil society engagement in protecting biodiversity hotspots. It is also one of the two countries which finance the work of the Conservation Finance Alliance on sustainable funding mechanisms for biodiversity conservation (Drutschinin and Ockenden, 2015). The French Development Agency funds pilot projects for establishing these mechanisms in a number of sub-Saharan and Pacific countries.

In 2005, France became one of the 10 IUCN framework partners. This partnership supported the strengthening of protected areas in Africa and the development (currently under way) of a biodiversity funding tool for European overseas territories. Finally, the Small-Scale Initiatives Programme (PPI), launched by the French Global Environment Facility (FFEM) in 2005 to support African NGOs in sustainable biodiversity conservation and management, was so successful that the IUCN made it a model for developing the PPI for civil society organisations in North Africa (PPI-OSCAN), funded by the FFEM and the MAVA Foundation (Switzerland) (IUCN, 2014).

2.2. Institutional framework and co-ordination mechanisms

The State

In 2007, the Ministry responsible for biodiversity became part of a ministry with broader responsibilities, covering ecology, regional development and planning and subsequently energy (MEDDE, which became the Ministry of the Environment, Energy and Marine Affairs [MEEM] in 2016). This merger brought together the competence for biodiversity held by government departments responsible for infrastructure and urban development, two areas that exert intense pressure on biodiversity, together with agriculture. It also had the effect, however, of confining certain issues that could have been addressed at inter-ministerial level (Chapter 2) to discussions within MEEM. A national independent environmental authority was set up in 2009 to avoid conflicts of interest in assessing the effects on biodiversity of policies and projects promoted by MEEM. Its opinions are public and inform both public enquiries and legal decisions in the event of cases concerning authorisations granted by the administrative authority.

Biodiversity is addressed within MEEM by the Directorate General for Planning, Housing and Nature (DGALN[13]), which oversees the Department for Water and Biodiversity (DEB). Co-ordination between the latter and other MEEM services is organised, inter alia, by the General Commission for Sustainable Development (CGDD), a cross-cutting MEEM structure. The sometimes difficult liaison between regulatory activities historically carried out by the DEB (e.g. in protecting species and areas) and partnership activities promoted by the CGDD (e.g. by the use of financial incentives) is ensured through dialogue between these two bodies.

This merging of ministries in 2007 had an impact on services devolved at regional and departmental level. Besides their role in administrative decisions, these services also ensure control over the application of these decisions, particularly through the "environment inspectors", introduced in 2012,[14] whose enforcement activity has been co-ordinated since 2008 by the Prefect with the activity of the Office National de l'Eau et des Milieux Aquatiques (ONEMA) [National Office for Water and Aquatic Environments] and the Office National de la Chasse et de la Faune Sauvage (ONCFS) [National Office for Hunting and Wildlife]. Officials of the Office National des Forêts (ONF) [National Forestry Office] and of certain protected areas also have enforcement powers.

The State generally delegates the application of regulations covering species and area protection to an administrator while retaining the respective formal responsibility (for the

content of regulations and the limits of areas to which it applies, thanks to the involvement of sworn officials). Protected area management is therefore ensured by various public institutions, local authorities or associations (but cannot now be entrusted to enterprises). The administrator then implements a management plan in the form of planning, information and education measures, or "enhancements" (parking spaces, paths, landing stages, anchorages and sometimes commercial franchises). Some of these administrators are consulted on government decisions that may have an effect on the species or areas they are responsible for, such as project authorisations.

Specialised public institutions under state supervision

A number of public institutions manage protected areas, a function that has developed since 2005 into a more partnership-based approach. The reform of national parks in 2006 increased the influence of local authorities in their decision-making bodies by creating "buffer zones" around the "core areas" of the parks, which are governed by charters which the municipalities can adhere to if they wish. While the level of protection of national park core areas has been maintained, their effectiveness now depends partly on the goodwill of the municipalities, which can sometimes be fiercely opposed to the parks, as shown by the recent setback involving Vanoise National Park. The marine natural parks and the Agency responsible for marine protected areas (MPAs) were also created at the same time (Box 5.1).

Box 5.1. **The Agency for Marine Protected Areas**

Since 2006, a voluntary project has been in place for marine protected areas, consisting of new tools such as marine natural park status and the creation of a specialised agency: the Agency for Marine Protected Areas. This *ad hoc* public body is overseen by MEEM, which uses performance contracts to entrust it with enforcement, expertise and incentives duties so that it can implement the respective policy, hitherto divided among different departments in different ministries with no co-ordination between them. The State's intention can also be gauged by the substantial resources initially allocated to the Agency, though they were revised considerably downwards when greater budget austerity was called for.

The Agency is now the designated administrator of the marine parks, which were created at the same time, and is tasked with implementing the national strategy for marine protected areas. It works in partnership with local authorities (particularly in the overseas territories), supporting them and encouraging them to create protected areas. The Agency does not, in fact, have regulatory or hierarchical powers. The marine natural parks are "structures to ensure protection through the integrated management of a maritime area of particular interest for biodiversity and human activities", and their creation is not associated to any rules restricting usage rights over the marine environment. Like the Regional Nature Parks (PNR), these areas are subject to consultation that may eventually lead to the adoption of administrative regulations (Féral, 2011). The Agency can also engage in education and research activity and can make improvements to the parks.

Despite the improved co-ordination ensured by this specialised structure, the Agency and the marine natural parks actually represent a step backwards in the regulatory approach to conservation in favour of approaches based on consultation and voluntary commitments under incentive mechanisms. These approaches allow local and decentralised control of national objectives without excluding the use of regulatory or financial tools, and have without doubt avoided a repeat of the initial failure in implementing the Natura 2000 network.

Source: www.aires-marines.fr/.

After the MPA Agency, the ONF[15] is by far the public institution which manages the largest natural area: 120 000 km^2 of public forests, 44 000 km^2 of which are in metropolitan France and 76 000 km^2 in the overseas departments (mostly Guiana). These areas include almost 50 000 ha of reserves and 650 000 ha of Natura 2000 sites, which may also be situated in a regional national park, for example (ONF, 2012; Attali et al., 2013). The ONCFS also manages national hunting and wildlife reserves (covering over 28 000 ha), but its supervisory and enforcement tasks in relation to the environment and hunting cover national territory as a whole, giving it a key role in managing biodiversity. ONEMA also plays a part in enforcement but is not an administrator with the same status as the ONCFS or the ONF. The French Biodiversity Agency (AFB), provided for in the draft law on biodiversity, would bring these establishments together and rationalise their governance (Box 5.2).

Box 5.2. **The French Biodiversity Agency**

The draft law on the preservation of biodiversity, nature and landscapes provides for the creation of a French Biodiversity Agency (AFB). While the term "agency" is not a legal category in French law, it nevertheless reflects the intention to create an autonomous structure given responsibility by the State for implementing national biodiversity policy on the basis of performance targets. This proposal is a welcome response to the "historic" accumulation of structures with often overlapping thematic and geographic powers, and functioning under highly varied legal and partnership arrangements (Gervasoni, 2008; Badré and Duranthon, 2010; Michel and Chevassus-au-Louis, 2013).

The current version of the draft law provides for the AFB to bring together the powers of ONEMA, the National Parks of France (PNF), ATEN and the MPA Agency, as well as certain national botanical protection agencies. The ONF and ONCFS were left out of the draft law, as were the Nature Reserves of France (RNF). The integration process is therefore incomplete, but its structures could eventually be linked with the AFB. This is particularly advisable with respect to the ONCFS, whose role as a provider of knowledge and technical support but also as an enforcement organisation is entirely consistent with the mandate of the AFB.

The AFB clearly cannot resolve the vagueness inherent in the NBS immediately, but it could play a key role in adopting the NBS and the various commitments of the State and its stakeholders in determining the framework of its action and its performance targets. This could be facilitated by establishing a single consultative body, the National Biodiversity Committee, and a scientific body, the National Council for the Protection of Nature (reformed), as proposed in the draft law. The same model would then be followed at regional level, where scientific councils for natural heritage already exist, while converting the regional TVB committees into regional biodiversity committees. These developments should help to simplify biodiversity governance in France, thereby undoubtedly making it more effective and clarifying public action.

Source: National Assembly (2014), *Étude d'impact du projet de loi relatif à la biodiversité*.

Several administrators may be in charge of the same area, such as when a nature reserve is situated in a Natura 2000 site which is itself within the buffer zone of a national park or in a regional natural park. The draft law on biodiversity provides for the piloting of a procedure to designate a "single administrator", a welcome move in improving the clarity and effectiveness of public action.

The proliferation of structures involved in managing natural areas is offset in part by the work of the Atelier Technique des Espaces Naturels (ATEN) [Technical Workshop for Natural Areas], whose membership increased significantly in 2010. ATEN organises technical exchange networks between administrators and develops shared management tools (e.g. for Natura 2000 and the TVB).

Regional and local authorities

The departments, which are responsible for over 200 000 ha of sensitive natural areas (ENS), are among the most important biodiversity stakeholders. The law on the modernisation of territorial policy and the cities (MAPAM), however, adopted in 2014, gave the regions a leading role in biodiversity (including the management of EU funds allocated to Natura 2000 and agri-environment measures). It was also the regions, together with the State, that drew up the regional ecological consistency schemes (green and blue infrastructure). These changes helped to clarify the decentralisation of public-sector biodiversity measures, though without depriving the departments of their capacity for initiative. Due to these overlapping responsibilities, ad hoc co-operation structures between regional and local authorities (local government boards) grew in number. Regional natural park charters came to be applied in this way (Box 5.3). Decentralisation naturally gives rise to a non-uniform application of national guidelines according to the intentions of local elected officials, though the State generally retains an important role in validating proposals put forward by the authorities, as occurred with the regional natural parks. Within certain limits, the rare exceptions are the regional nature reserves, which are the prerogative of the regions (including Corsica's nature reserves and the sites listed in Corsica), the ENS and the protected and enhanced areas of departmental peri-urban agricultural and natural areas (PAEN).

Box 5.3. **Regional natural parks**

The 51 regional natural parks (PNR) account for the bulk of French protected areas and reflect the country's decentralised, contractual and incentives-based approach. PNR activities are underpinned by a charter, a contractual document drawn up on the initiative of the region prior to classifying the park and defining the respective 12-year sustainable development plan for the region. The charter, which is subject to a public enquiry, establishes the objectives to be achieved and the associated measures, which must seek, in particular, to protect and manage the natural, landscape and cultural heritage and regional development. The State classifies the area, on a proposal from the region.

PNR actions are decided and implemented by a mixed park planning and management committee consisting of at least the municipalities and intermunicipal authorities with an interest in the park as an area, and the departments and regions (the principal providers of funds). A PNR charter is binding on its signatories. It therefore takes precedence over urban planning documents drawn up by the municipalities (local urban development plan [PLU]) and intermunicipal authorities (regional consistency scheme [SCOT] and intermunicipal local urban development plan [PLUi]), and must be compatible with the latter if they exist. The PNR thus offer a more effective institutional implementation framework than the purely voluntary commitments of uncoordinated stakeholders.

Source: www.parcs-naturels-regionaux.fr/.

Although they do not have dedicated instruments, the municipalities and intermunicipal authorities are involved in implementing biodiversity policies, particularly in designating protected areas or the scope of land policies (e.g. departmental ENS and PAEN), for which their opinion or agreement may be required. They are also the administrators of a significant number of nature reserves and areas owned by the Coastal Protection Agency.

Since 2015, the municipalities have been responsible for preventing floods and managing aquatic environments, and for protecting and restoring the respective sites, aquatic ecosystems, wetlands and neighbouring forest areas. The possibility of delegating this task to établissements publics territoriaux de bassin [regional water basin authorities] (EPTB, existing) or to établissements publics d'aménagement et de gestion de l'eau [planning and water management authorities] (EPAGE, to be created), operating at water basin level, retains the advantages of a water planning and management policy historically based on the water basin, through the respective Master Plans (SDAGE) and Schemes (SAGE) for Water Development and Management, with the participation of users who sit on local water committees, together with state and local authority representatives.

Box 5.4. **Specific features of overseas territories**

Recognising that EU provisions for preserving outstanding ecosystems do not apply in the French overseas territories, the Grenelle Forum adopted a recommendation in the Message from Réunion (2008) on the implementation of an Ecological Network in the Overseas Departments (REDOM), which is in preparation. The introduction of a French Overseas Territories Biodiversity Initiative (IFREBIOM) had also been decided at the time of the Grenelle process but has yet to come to fruition. The European Commission meanwhile financed the introduction of a platform similar to IFREBIOM covering the outermost regions and overseas countries and territories of all EU Member States (BEST 2.0 platform, managed by the IUCN). France must seize this opportunity to achieve the objectives originally assigned to IFREBIOM. This would improve co-ordination between its overseas territories' efforts and those of their neighbours to ensure that information on overseas biodiversity is shared, in line with the commitments France made in 2014 at the Guadeloupe Conference (Message from Guadeloupe, 2014).

The delays in implementing REDOM and IFREBIOM are caused by weaker technical capacity and more recent mobilisation of local stakeholders in the overseas territories with respect to biodiversity issues. The recent experience of the MPA Agency nevertheless shows that targeted technical support can ensure rapid results. France could also draw on the work of its Coral Reef Initiative (IFRECOR), the French equivalent of the International Coral Reef Initiative (ICRI). This involves a national committee and a network of eight local committees, as well as the overseas authorities, which implement local action plans and cross-cutting programmes. IFRECOR also benefits from French expertise and favours international co-operation schemes under the ICRI. This initiative should be developed and included in the future AFB if possible.

Source: https://portals.iucn.org/best/?q=fr; www.ifrecor.com/.

Private biodiversity stakeholders

France has a significant pool of ecology professionals employed by associations and companies that provide ecological engineering services or manage natural areas. Under the NBS 2011-20, the State undertook to promote the organisation of a more effective and

more visible ecological sector that could contribute towards "the green economy". In 2014, this led to the creation of a federation of engineering and ecological stakeholders. In 2015, several of these stakeholders signed an undertaking for consultancy firms focusing, in particular, on the content of environmental assessments to make the technical expertise underpinning environmental decisions and therefore biodiversity more understandable. Their experience could be better harnessed to improve the interface between science and public-sector action. These structures moreover generate significant volumes of biodiversity data, the inclusion of which in the Nature and Landscapes Information System (SINP) should be promoted.

Scientific and technical expertise

French scientific biodiversity research is abundant and relatively well funded[16] but not yet sufficiently mobilised to play a guiding role.[17] There are no strong links between the research bodies, working together since 2008 in the Fondation pour la Recherche sur la Biodiversité [Biodiversity Research Foundation] (FRB),[18] and bodies such as the Conseil National de la Protection de la Nature (CNPN) [National Council for the Protection of Nature], the Conseils Scientifiques Régionaux du Patrimoine Naturel [Regional Scientific Councils for Natural Heritage] (CSRPN), the Conseil Scientifique du Patrimoine Naturel et de la Biodiversité [Scientific Council for Natural Heritage and Biodiversity] (CSPNB) or the Office Parlementaire d'Évaluation des Choix Scientifiques et Techniques [Parliamentary Office for Evaluating Scientific and Technical Choices]. The uncoordinated proliferation of these organisations was reported on a number of occasions at the time of the successive assessments commissioned by the Ministry of Ecology, several of which addressed the reform of the CNPN, founded in 1978 (Badré and Duranthon, 2010; Le Maho and Boucher, 2011; Schmitt, 2012; Michel and Chevassus-au-Louis, 2013).

The lack of clarity of the CNPN as a scientific and technical body does not encourage researchers to invest in it for fear that it could be detrimental to their professional career. It nevertheless plays an important role in drawing up opinions on draft laws and on certain administrative decisions. Since 2007, the CNPN has been designated as an independent body exclusively responsible for protecting biodiversity interests in connection with granting exemptions from the strict protection of certain fauna and flora species. These exemptions are generally conditional upon measures to avoid, reduce and offset (in kind) the impacts of planning projects (section 6.2). Its opinions, however, are merely advisory. In the absence of an independent organisation capable of opposing authorisations,[19] conflicts of interest and economic pressure will always tend to favour sectoral interests to the detriment of biodiversity preservation objectives (Mermet et al., 2005), particularly when the administrative authority authorising projects – often the Prefect of a department or region – is also responsible for ensuring the economic development of the areas concerned.

In view of the multiplicity of authorities, the draft law on biodiversity proposes to create a consultative body, the Comité National de la Biodiversité (CNB) [National Biodiversity Committee], which would bring several existing bodies together, and which the NBS national committee is a precursor of. Provision would be made to co-ordinate the CNB with other national consultative bodies addressing issues directly linked to biodiversity. The CNPN should also be given the role of a strictly scientific and technical body by merging it with the current Scientific Council for Natural Heritage and Biodiversity. The role foreseen for the CNPN, however, is not that of an independent authority, which

therefore means that certain difficulties such as the uniform application of the "avoid, reduce, offset" sequence (ARO), which is regularly challenged for its anti-biodiversity bias, will not be resolved.

At regional level, it is proposed to convert the regional TVB committees into regional biodiversity committees. The existing CSRPN would play the role of the CNPN at regional level. While these developments are welcome, in terms of mobilising researchers and experts, a distinction must be drawn between technical opinions concerning particular decisions (e.g. the conditions for granting an exemption from the protection of a particular fauna and flora species) and opinions concerning guidance of a more general nature (e.g. in connection with a draft law).

Civil society

The Grenelle Forum marked a turning point in civil society involvement in the drafting of biodiversity policies, with pride of place going to environmental protection NGOs in particular. The latter are now associated at the very highest level with national policy formulation in this area in connection with MEEM initiatives. This new role for NGOs through MEEM was consolidated by the revision of the NBS and subsequently by NGO participation in the Conseil National de la Transition Écologique (CNTE) [National Council for Environmental Transition]. Some other ministries, however, such as those responsible for agriculture or economic and financial affairs, to name but two, have not adopted the Grenelle principles and give only a minor role to biodiversity stakeholders, thereby automatically restricting the inclusion of biodiversity in their sectoral policies.

NGOs are now better able to influence legislative processes, even though they are still less well-equipped than representatives of other sectoral interests. They have, in fact, benefited from the higher media profile[20] of the Grenelle process and from the establishment of a parliamentary committee to monitor the implementation of its 268 commitments.

3. Information systems

National Biodiversity Observatory

The establishment of a Nature and Landscape Information System (SINP) and a National Biodiversity Observatory (ONB) was a Grenelle Forum proposal. In connection with species and habitats, the SINP was based on a clearly identified community of stakeholders, which meant that it could be put in place more quickly than its "landscape" dimension and more quickly than the ONB, the "social" dimension of which must be underscored. In 2011, the NBS gave the ONB the task of developing indicators to monitor the effects on biodiversity of the action of stakeholders as a whole. There is little information, however, on the cost-benefit ratio of these actions between the indicators adopted. Since 2012, the ONB has posted targeted up-to-date information on biodiversity and on how it is perceived by French society on a joint website with the SINP (ONB-SINP, 2015). The ONB also monitors indicators on the implementation of the CBD by France (including the overseas territories). Correspondence with Aichi indicators is signalled almost systematically on the ONB website, though many Aichi and European biodiversity strategy indicators are not calculated by the ONB.

Information on natural environments and species

The SINP[21] has helped to improve information on the status and distribution of species and natural habitats. This is a partnership mechanism between the Ministry of

Ecology and the leading providers of species data, who are often amateurs.[22] SINP scientific co-ordination is ensured by the National Museum of Natural History (MNHN) (on the taxonomic list to be used, for example), which also encompasses the INPN. The system is still in its infancy but meets strong challenges and has had a positive impact, reflected in particular in partnership with major public- and private-sector planners. The latter meet on an informal basis in the Linear Infrastructure and Biodiversity Club (CILB), which funds the capture of a significant volume of data concerning their infrastructure projects.

The SINP has sought for many years to provide decision-makers with information on diversity. Since 1982, the Inventaire des Zones Naturelles d'Intérêt Écologique, Faunistique et Floristique (ZNIEFF) [Inventory of National Areas of Ecological, Fauna and Flora Interest] has contributed to the mapping of sectors with strong biological capabilities and a good conservation status. This is a very useful adjunct to statutory zoning requirements (for protected areas) in guiding planning decisions and avoiding the artificialisation of very challenging areas. More recently, the schémas régionaux de cohérence écologique (SRCE) [regional ecological consistency schemes], which establish the TVB have provided information for biodiversity decision-makers by indicating the location of "biodiversity reservoirs" and the major regional ecological continuities. The latter generally include the ZNIEFF, but consultation on the formulation of SRCE has increased the number of people who are aware of the challenges of biodiversity at this level. It has also raised awareness of the advantages arising out of biodiversity by introducing the concept of ecosystem service.

Ecosystem service information

In 2013, France began to assess and review its ecosystems and ecosystem services and their development trends and to estimate the value of the services they produce up to 2016. This initiative, led by MEEM, falls within European biodiversity strategy and contributes to NBS Target 7 by providing a foundation for "factoring biodiversity into economic decision-making".[23] Ecosystem services have not been factored into decision-making thus far because of assessment method limitations and also because of the limited use of cost-benefit analyses in public decision-making, except to demonstrate the disproportionate nature of the cost of ensuring a good ecological status for water bodies and obtaining a (temporary or permanent) exemption from Water Framework Directive objectives.[24] Most of the analyses have been superficial, making use of the "transfer of profits" and seeking ex post justification for failure to invest in restoring water quality (Feuillette et al., 2015).

The use of ecosystem service assessments is an important communication lever to justify public investment in biodiversity, particularly in protected area networks (Box 5.5; Hernandez and Sainteny, 2008). At local level, some departments have begun to renew their ENS scheme by promoting the concept of ecosystem service, reflecting the intention to adopt a cross-cutting approach and to include regional challenges, but also to allow decision-makers and the population to take greater control of ENS policy.

Box 5.5. **Assess ecosystem services to justify investment in national parks**

National parks are often perceived by neighbouring populations and local elected officials as obstacles to economic and social development. In this context, studies carried out on the Port-Cros and Guadeloupe national parks have shown that the costs of running these protected areas are largely offset by the range of monetary and non-monetary advantages identified (PNF, 2015). These advantages, however, are known to be undervalued *a priori*: local costs and visitor satisfaction, ecosystem services, image and heritage value, etc.

Updated on a 20-year basis, EUR 1 spent out of the Guadeloupe National Park budget (EUR 6.1 million per year) generates over EUR 10.7 in benefits for the region, including EUR 0.8 annual turnover for companies, and EUR 0.2 of added value (an annual turnover of EUR 4.8 million is directly attributable to the existence of the park), the remainder corresponding to non-market earnings, including a contribution of EUR 8.7 to the welfare value of leisure activities on park sites. The study does not meanwhile provide any findings on the opportunity costs of protecting sites compared to other types of use. At Port-Cros, the results show that EUR 1 spent out of the park's budget (EUR 6.6 million per year) generates EUR 91.8 in earnings for the region, including EUR 3.1 in added value produced by local businesses (EUR 82.8 million annual turnover for local businesses is directly attributable to the existence of the park), with EUR 26.6 corresponding to the welfare value of leisure activities on park sites and EUR 62.0 attributable to the pecuniary value (legacy and existence values) of the park's natural areas.

Other studies carried out by a number of NGOs in the overseas territories have drawn similar conclusions. These studies, however, respond more to a need for institutional communication rather than the need to provide innovative mechanisms for funding the parks, based for example on entrance or residence charges indexed to the welfare value of leisure activities in the parks. At the time of writing, there is insufficient consensus on the assessment methods and results obtained to provide a basis for such decisions, but they may stimulate an interest in taking action.

Source: PNF (2015), *Éléments de valeur des parcs nationaux.*

4. Protection of areas of outstanding natural beauty

France has a number of instruments to ensure biodiversity conservation and sustainable use (Table 5.1). Over and above regulatory approaches, which are generally preferred for managing areas and species (section 4), economic instruments can finance programmes in favour of biodiversity (section 5) and can contribute with other instruments to the inclusion of biodiversity in economic sectors (section 6).

4.1. *Protected areas*

France has already achieved the objectives laid down in the CBD to protect at least 70% of its land area and at least 10% of the water under its jurisdiction by 2020 (Figure 5.7). In 2015, however, only 0.7% of metropolitan territory was IUCN Category I and II protected areas (the highest levels of protection), compared to an OECD average of 3%. The level of protection is substantially higher in the overseas territories, where Categories I and II represent 23% of the territory.

The extent of areas under regulatory protection increased by 45% compared to 1988 and represented 1.4% of the territory in 2015 (Figure 5.7). France is nevertheless still well below its target of 2% of metropolitan land area under regulatory protection by 2020,

Table 5.1. **Key instruments supporting the conservation and sustainable use of biodiversity**

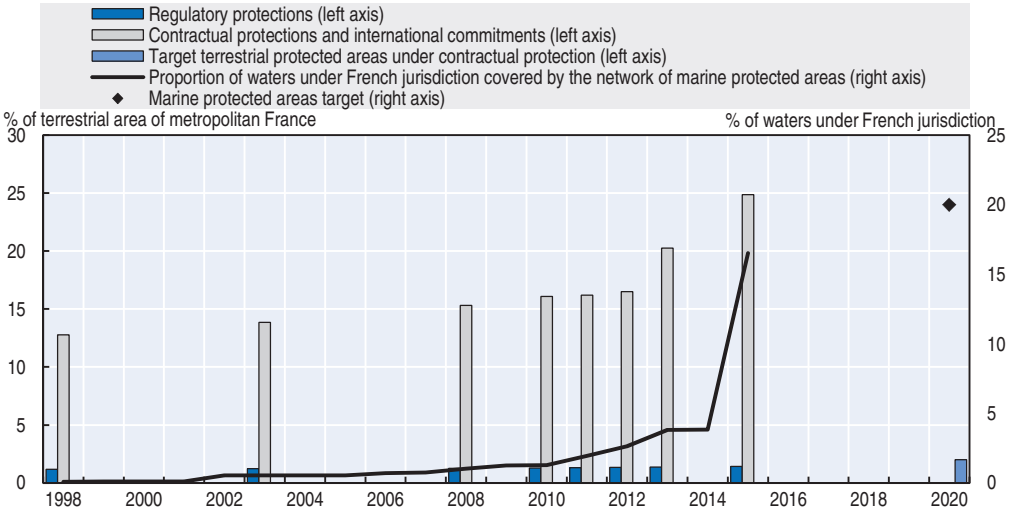
Regulatory approaches	Economic instruments	Information and other instruments
Restriction or prohibition of access and use ● protected areas designated at national level (national parks, national nature reserves), regional level (regional nature reserves) or local level (land acquired by natural area protection agencies and French departments) offering variable levels of protection (section 4.1)	Price-based instruments ● rates (fees) charged by water offices (section 5, Chapter 3) ● planning fee, payment for under-use (section 5) ● annual vessel registration fee (section 5) ● subsidies under the Common Agricultural Policy (section 6.1)	Zoning (sections 3, 6.2) ● natural areas of ecological, fauna and flora interest (ZNIEFF) ● green and blue infrastructure (TVB) under regional ecological consistency schemes (SRCE) ● pre-emption boundaries of sensitive natural areas (ENS) and protection and enhancement of peri-urban agricultural and natural areas (PAEN) ● classified forested areas and sundry zonings in local urban development plans (PLU) and regional consistency schemes (SCOT) ● hunting reserves
Bylaws for the conservation or reduction of certain species ● national or regional protection of certain flora and fauna species (section 4.2) ● designation of certain species as harmful or alien invasive species (section 4.2)	Ecological offsets and natural asset reserves (in preparation) (section 6.2)	Eco-labelling and certification ● forestry certification ● environmental certification of farms ● organic farming labels ● labels on consumer products, including those from agricultural sectors with terms and conditions
Planning tools and guidelines ● environmental impact studies and environmental assessments (Chapter 2)	Payments for ecosystem services (voluntary measures) (section 5.3)	Sharing of expertise and farmer training ● "Ambition Bio 2017" programme ● Écophyto plan ● Agri-ecological project (section 6.1)
Permits and quotas ● hunting permits and hunting plans (quotas) ● angling licences and quotas ● fishing licences (Mediterranean)	Negotiable permits ● transferable quotas between fishing organisations (Atlantic), under the Common Fisheries Policy ● plant protection product saving certificates (Chapter 3)	Voluntary commitments in natural resources management ● charter for eco-friendly angling ● hunting reserves ● public and private forest management plans
Quantitative, qualitative or design standards ● fishing technique regulations ● quality standards for water released into the environment	Access and benefit-sharing by application of the Nagoya Protocol (planned) (section 5.4)	Voluntary commitments in the framework of the NBS Voluntary initiatives concerning corporate "biodiversity" compatibility ("biodiversity review")
Establishment of responsibility instruments (Chapter 2) ● environmental responsibility law ● inclusion of the notion of ecological damage in the Civil Code (planned)		Environmental criteria in public procurement and calls for projects piloted by the State or local authorities (e.g. for granting licences for public infrastructure: motorways, dams, etc.)
Restriction or prohibition of use ● prohibition of certain plant protection substances ● restriction on the use of certain agricultural inputs on certain land (water abstraction, etc.)		

established by the 2009 Grenelle I Law, the implementation of which is specified in the Strategy for the creation of metropolitan protected land areas (SCAP). Over the same period (1998-2015), the size of areas under "contractual" protection almost doubled to reach 25% of the territory (INPN, 2015). The 49 PNR, covering 7 million ha, represent the majority of these areas.

In the overseas territories (i.e. the five overseas departments, Saint-Pierre-et-Miquelon, Saint-Martin, Saint-Barthélemy and the French Southern and Antarctic Lands), these proportions are more significant. The areas under regulatory and contractual protection each represent an almost identical part of the territory (35%) (INPN, 2015), due in particular to large protected areas such as the Amazon National Park in Guiana or the Nature Reserve in the French Southern Lands.

The good results of the contractual approach should not disguise the risks involved or the setback at the time of writing of the designation of sites under strong protection under the SCAP. The metropolitan network of protected areas is satisfactory for only a quarter of the selected species in the SCAP (Coste et al., 2010). Since "priority" species occupy

Figure 5.7. **Surface area of protected areas increases**



Source: MNHN -INPN (2015), *Espaces protégés* (database); SOeS (2014), *L'environnement en France*; Agence des Aires Marines Protégées, 2015.

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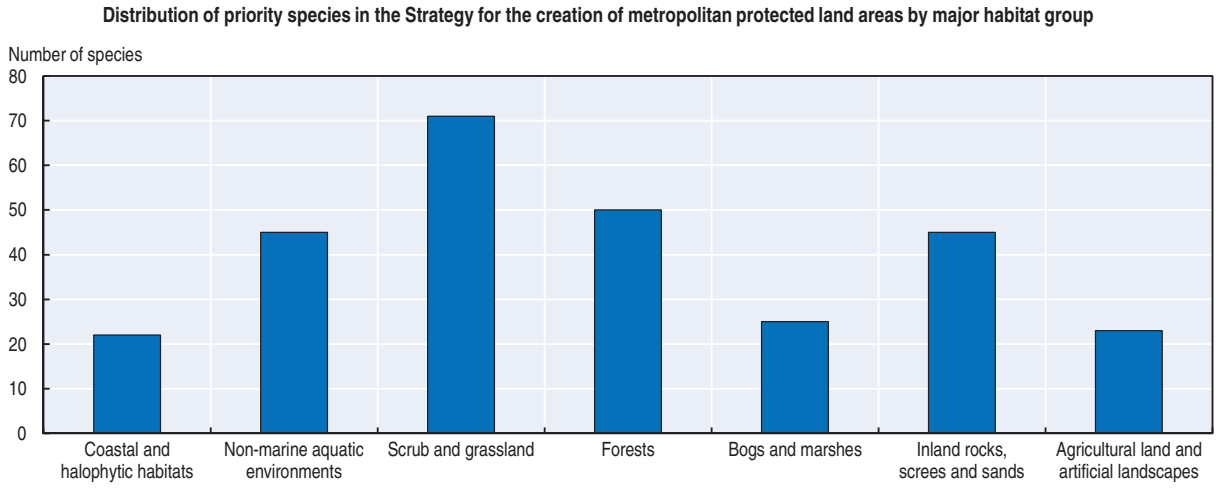
different environments (Figure 5.8), it will not be possible to meet the SCAP objectives to designate a single important site, including the future core of the Champagne and Bourgogne national forestry park, currently in preparation.

Figure 5.8. **Expansion of the protected areas network should be prioritised for species in open environments (scrub and grassland)**



Source: Coste, S. et al. (2010), *Stratégie Nationale de Création d'Aires Protégées - Première phase d'étude - Volet Biodiversité.*

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With respect to the national parks, negotiations on the now voluntary participation of municipalities in their objectives[25] called into question certain acquired rights concerning usage restrictions in peripheral areas. Three national parks have nevertheless been created since 2005 (in Guiana, Réunion and in Marseille's calanques [rocky inlets]), for which the partnership approach played a positive role in ensuring local authority participation.

Natura 2000

In Natura 2000 network areas, EU Member States undertake to maintain or restore the most threatened natural habitats and species (listed in Directive 92/43/EEC) so that they have a favourable conservation status. EU Directives impose a performance obligation with respect to the objectives to be achieved, while leaving it to each State to decide on the (largely legal) means by which to do so (regulatory or contractual).

Local stakeholder participation in implementing the network of natural protected areas was necessary to unveil the creation of the Natura 2000 network in France, the implementation of which from 1992 to 2005 generated considerable tension among rural private-sector stakeholders. Having been penalised on three occasions for failing to implement the Habitats Directive, France finally opted for consultation to implement Natura 2000. A steering committee bringing together the principle stakeholders had to be set up for each Natura 2000 site.[26] The committee was tasked in particular with validating the "document d'objectifs" (DOCOB) [management plan] of the site, which is ultimately validated by the competent Prefect[27]. France is one of the few EU Member States in which a management plan is obligatory.

This procedure proved its effectiveness. In 2013, 12.6% of the metropolitan area was classified as Natura 2000 sites, and the network was regarded as stable. On 1 January 2013, 1 277 Natura 2000 sites had a completed DOCOB (73% of sites) and DOCOBs for 280 land sites and 48 marine sites were under preparation (18%). Following legal proceedings brought by the European Commission, France met[28] the requirements of Article 6(3) and (4) of the Habitats Directive, which stipulate the circumstances in which projects with implications for the natural habitats and species that had justified the designation of a Natura 2000 site may be authorised.

Landowner stakeholders

The review of protected areas includes properties covered by the Coastal Protection Agency and Natural Area Protection Agencies (CEN). The CEN bring together several public and private stakeholders that manage natural sites at regional and departmental level. An approval recognising their action has been in force since 2011. In 2015, the 29 CEN managed a network of 2 921 sites covering 152 788 ha in metropolitan France and Réunion,[29] over 800 of which they own or rent on long-term leases (CEN, 2015a). The Protection Agencies are also involved in controlling usage, mainly by means of management agreements, and they may be involved in implementing measures to offset the impacts of planning projects (section 6.2). This raises the question of ensuring that this land is compatible with the achievement by France of its CBD commitments. Since mere ownership of the land remains a fragile means of protection in the long term, the Protection Agencies also enjoy regulatory protection[30] (35% of their sites have protection status), and the land can be assigned to dedicated endowment funds (CEN, 2015b) and thus made non-transferable.

The Coastal Protection Agency, meanwhile, is a state-run public administrative institution which acquires plots of land on the coast which are degraded or threatened by urban development. It holds over 160 000 ha on 700 sites, corresponding to 1 450 km of coast, i.e. 13% of the national shoreline. From 2009 to 2012, 13 426 ha of wetlands were acquired with water office support, over half of which are salt marshes in the Midi (Camargue), henceforth the property of the Coastal Protection Agency. The aim (established in 2009) was to acquire 20 000 ha of wetlands by 2019, a seemingly realistic target that in fact corresponds

to a mere 1% of the wetlands area in France, the protection and restoration of which must therefore be ensured by other means, particularly regulatory and contractual measures.

Marine protected areas

In 2015, marine protected areas (MPAs) covered almost 16.5% of waters under French jurisdiction (including the overseas territories), accounting for 1.68 million km^2 (Figure 5.7), representing 23% of metropolitan waters and 16% of overseas waters (MPA Agency, 2015a).

France has therefore exceeded the 10% target established by the CBD, though its own target had been 20% of French waters under protection by 2020. The surface area of marine protected areas must therefore be further extended. Since the possibilities for extension are mainly in the overseas territories, the policy set out through the MPA Agency to persuade the overseas authorities to contribute to the national effort should therefore be continued (Féral, 2011). On the basis of this co-operation, a marine natural park with an area of 1 291 000 km^2 was designated in 2014 in the Coral Sea, corresponding to the total maritime area of New Caledonia.[31] This French success in establishing a significant and vast MPA network was facilitated by the far from restrictive status of marine natural park, a recent innovation in terms of the protection status available to France.[32] Marine natural parks are defined by the 2006 law as "structures to ensure protection through the integrated management of a maritime area of particular interest for biodiversity and human activities", and their creation is not associated to any rules restricting rights of usage over the marine environment. They are, in fact, areas for consultation which allow local and decentralised ownership of national objectives that may eventually lead to the adoption of administrative regulations. On 1 January 2015, half of over three-year-old French MPAs had a management plan (ONB, 2015b), though few had a complete assessment system. France developed an MPA scoreboard to assess their individual effectiveness and contribute towards the national assessment of the French network.

4.2. Species conservation

France has strengthened the protection of certain flora and fauna species by protecting their habitats in particular. Several species also benefit from action plans that seek to restore or conserve their populations. Despite some success, however, these measures are not sufficient to ensure the conservation of species affected by intensive agriculture, and the country's capacity to conserve its major predators (wolf, lynx and bear) remains uncertain. In the overseas territories, despite initiatives targeting certain threatened and alien invasive species, species protection is still incomplete and disorganised.

Species protection schemes

The principal innovation in terms of protection was the action taken in 2007[33] to bring the exemption procedure into line with that provided for under Articles 12 and 16 of the 1992 Habitats Directive (92/43/EEC). Besides the specimens of species, some of their habitats are now protected under certain conditions,[34] and exemptions can be granted only if they do not lead to a decline in the conservation status of the respective species. The CNPN issues a consultative opinion on applications for exemptions, and in practice acts as an independent regulator for the developer and the environmental authority. This exemption procedure, introduced in 2007, was partly motivated by farmers' opposition to wolves, a protected species. The 2014 law on the future of agriculture, food and forestry relaxed the circumstances in which exemptions could be granted. This decision led, in particular, to the

authorisation to cull over 10% of the wolf population, which numbered fewer than 300 individuals in 2015.[35] France also submitted an official application to amend the status of the species through the Berne Convention and the European Commission. Some in the agricultural sector also objected to the conservation of the brown bear in the Pyrenees.

The regulation of hunting, meanwhile, has developed little but continues to generate heated public debate, particularly on dates for opening the hunting season for migratory birds, for which the State systematically issues judgments which are then invalidated by the Conseil d'État because they authorise hunting outside the periods defined by the 1979 Birds Directive. Hunters will, in the meantime, have enjoyed an extended hunting season. This highlights the political weight of hunting in France (1.2 million licence holders) (BIPE, 2015). Hunters are nevertheless involved in managing biodiversity, firstly through hunting reserves (defined jointly by the ONCFS and the hunting federations), and subsequently through the French Wildlife Habitats Foundation. The Foundation is funded by regional hunters' federations and owns almost 5 500 ha in 60 departments, which it manages in such a way as to maintain conditions favouring prey.

Since the establishment of protected species status in 1976, administrative practice has differentiated protection measures on an area basis by drawing up "regional" lists of protected species (for flora above all). This practice is also followed in the overseas territories, where these lists replace national lists (except for marine mammals[36] and sea turtles,[37] which are protected on national territory as a whole). The provisions in place are nevertheless incomplete and sometimes inconsistent (Stahl, 2011). The forest thrush, for example, is protected in Martinique but regarded as prey in Guadeloupe. The most threatened species, particularly strictly endemic species which are not present in France, should naturally be included on the national lists.

National action plans for threatened species

The national action plans are medium-term strategies which define the specific actions and deadlines for conserving and restoring threatened species. Although the initial plans were implemented in 1996, they developed rapidly after being strengthened by the Grenelle Forum in 2007 and included in the Grenelle I and II Laws (MEDDE, 2012a). Vultures, the European otter and the Alpine ibex illustrate the real progress made due to effective action by public authorities and nature protection associations in the framework of dedicated action plans (Box 5.6).

Despite significant efforts and notable successes, however, there is no action plan for the majority of threatened species (Figure 5.9). A report drawn up in 2014 by the Conseil Général de l'Environnement et du Développement Durable [General Council for the Environment and Sustainable Development] proposes to re-establish national action plans to strengthen their operational nature in a strongly developing institutional context with increasingly limited resources (Challéat and Lavarde, 2014). One of the proposed approaches is to bring together under the same actions species which share habitats and have similar ecological requirements.

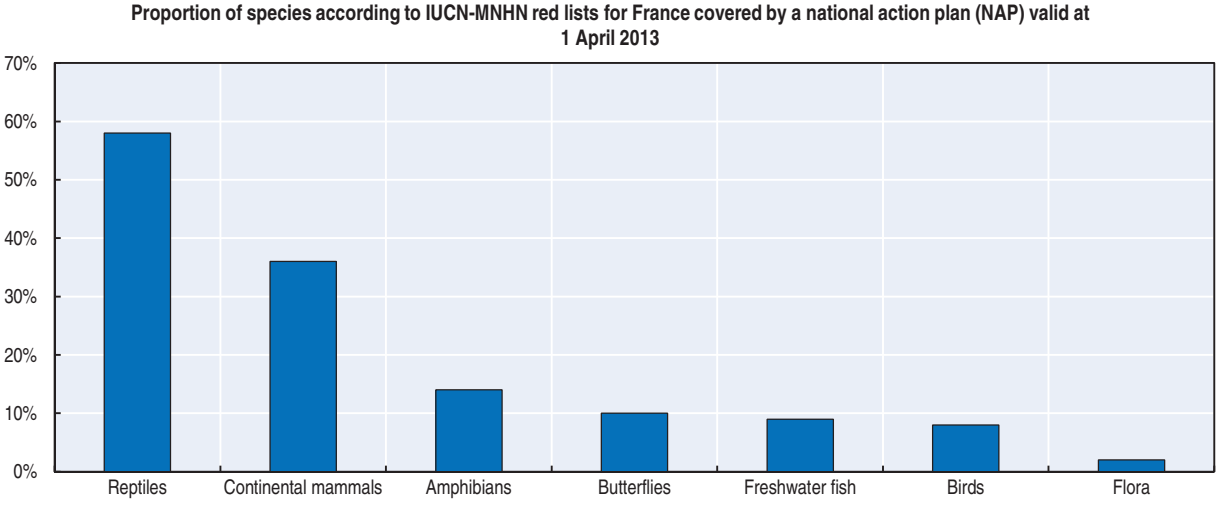
The overseas territories accommodate a large number of threatened species to which particular attention should be paid by mobilising the authorities concerned and sometimes neighbouring countries. The importance of regional co-operation in conserving overseas territory biodiversity[38] is illustrated by the action plans for the dugong in New Caledonia (2010-15) (MPA Agency, 2015b) and Mayotte (2012-16) (Pusineri and Caceres, 2012), under

Box 5.6. **The return of vultures: a continuing success**

France has been investing heavily in the conservation and reintroduction of vultures for over 30 years, with very encouraging results. The Griffon vulture was reintroduced successfully in the south of the Massif Central and the Alps, and its numbers have increased from 60 to almost to 1 000 nesting pairs in 30 years. The reintroduction of the black vulture in the Grands Causses, the Baronnies and Verdon has also been successful. Bearded vulture numbers are now estimated at 45 pairs in the Pyrenees, Corsica and the French Alps, where it was reintroduced after being driven to extinction in the 1930s. The species benefits from an action plan in effect from 2010 to 2020, one objective of which is to link the populations in the Alps with those in the Pyrenees. This work is the fruit of international co-operation, and French expertise is now in demand for the global conservation of these creatures, whose numbers had plummeted since the 1990s. The Egyptian vulture is a case in point, and France is one of the few European countries (together with the Canary Islands) to accommodate a growing population. A second action plan was launched for the period from 2015 to 2024 to ensure the sustainable preservation of the species.

Source: MEDDE (2015), *Deuxième plan national d'actions en faveur du vautour percnoptère (2015-2024)*.

Figure 5.9. **There is no action plan for most threatened species**



Note: Consideration of valid NAPs and taxonomic groups assessed at 1 April 2013 in metropolitan France and overseas.
Source: ONB (2015), *Indicateurs de biodiversité en base de données* (database).

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the 2007 Memorandum of Understanding on the Conservation and Management of Dugongs and their Habitats throughout their range (States signatory to the CMS, 2007).

Alien invasive species control plans

Alien invasive species are covered by a national strategy and a dedicated 2011 NBS objective. A particular facet of the strategy is an expertise and surveillance network and the possibility since 2009 (Grenelle Law, Article 23) of developing targeted control plans.[39] The plans currently in place, however, concern only a few species, and their effectiveness has yet to be assessed.

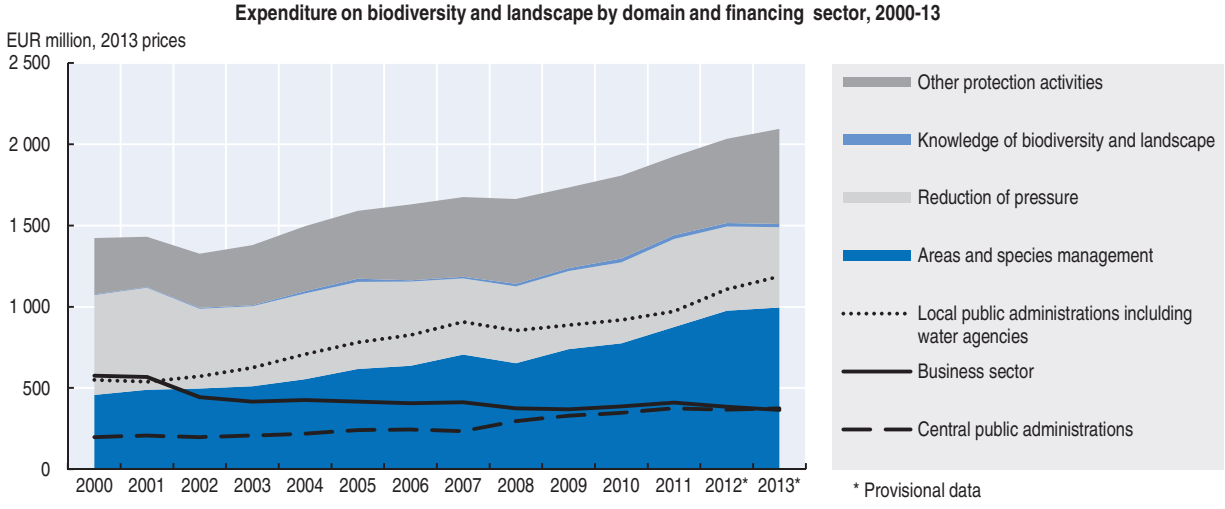
A special programme has been developed for the overseas territories, where the authorities have been brought together under an initiative fostered by the French committee of the IUCN (2005-08) (Soubeyran et al., 2015). Réunion, a partner in this approach, now has its own strategy (Parc National de la Réunion, 2010). These initiatives must be continued and, if necessary, put on a federal basis and co-ordinated at regional level, particularly under the European BEST 2.0 programme (Box 5.4).

5. Financing biodiversity

5.1. *General trends*

Expenditure on protecting biodiversity and landscapes in 2003 was estimated at EUR 2.1 billion (CGDD, 2015b), a figure that has increased by almost 50% since 2000 due to enhanced state support (Figure 5.10). Expenditure on managing areas and species represents over half the total spending and mainly covers aquatic environment maintenance and restoration by water offices and local authorities in implementing the Water Framework Directive. It also includes national park and nature reserve management as well as nature conservation association expenditure. Measures to reduce pressure on biodiversity by manufacturing activities, such as industry, agriculture (agri-environment measures) and road transport (wildlife underpasses), account for half the total expenditure. A further quarter is devoted to other biodiversity and landscape conservation measures taken by regional authorities (mainly departments and municipalities), the application of which cannot be determined. Public-sector stakeholders therefore finance three-quarters of biodiversity protection expenditure, compared to half in 2000.

Figure 5.10. **Expenditure on biodiversity and landscape protection has increased significantly**



Source: CGDD (2015), *Les comptes de l'environnement en 2013, Rapport de la Commission des comptes et de l'économie de l'environnement. Édition 2015.*

StatLink http://dx.doi.org/10.1787/888933406306

In addition to ministerial appropriations for public agencies and institutions, biodiversity protection is principally funded by allocated resources. These are firstly taxes levied by the water offices (Chapter 3), but also: the departmental tax on sensitive natural areas (TDENS), included since 2012 in the development tax, which finances the establishment and management of protected areas by departments; the annual vessel registration fee,

which finances the Coastal Protection Agency and allows it to purchase and manage land; angling and hunting licences which fund ONEMA and the ONCFS; and the tax on sea passengers travelling to natural protected areas, paid to the managing body of the respective site (CGDD, 2013c).

While the need to increase resources devoted to biodiversity is recognised by all stakeholders, the overall annual need remains to be specified (Pelosse et al., 2012). In 2013, the additional means to be applied by public-sector operators by 2020 were estimated at some EUR 400 million per year, an increase of over 25% in public expenditure on biodiversity (Michel and Chevassus-au-Louis, 2013). These resources could fund the green and blue infrastructure and the Natura 2000 network and could develop marine environment protection policy.

5.2. *Public subsidies harmful to biodiversity*

The reform of taxation in relation to natural heritage began with the Grenelle Forum. From 2009, the Grenelle I Law provided for the State to report on tax measures harmful to biodiversity and to propose new tools to adapt taxation to environmental challenges. It also ordered a review of taxation and financial incentives to limit the spread of man-made development and counter urban sprawl. In response to this requirement, in 2012 the Centre d'Analyse Stratégique (CAS) [Centre for Strategic Analysis] drew up an inventory of public subsidies harmful to biodiversity (grants, tax expenditure, non-internalisation of costs) (Box 5.7). The inventory highlighted a failure to take sufficient account of the impact of public policies on biodiversity. In a context of budgetary austerity, the inventory suggests redirecting existing support towards eco-efficient behaviour rather than increasing public expenditure. The 2012 and 2013 environmental conferences were invited to study the taxation of commercial and manufacturing uses of land and marine environment biodiversity in terms of damage caused.

Box 5.7. **Public subsidies harmful to biodiversity**

Public subsidies leading to natural habitat destruction and degradation:

- Contributing to urban sprawl: non-targeted subsidies for purchasing and building on new property according to location (urban/peri-urban); reduced local business tax rates [*contribution économique territoriale*] (formerly the *taxe professionnelle*) established by peri-urban municipalities, leading to overuse of space.
- Leading to practices that reduce the natural functions of agricultural habitats: incentives to intensify or maintain intensive crops (subsidies influencing the price of factors of production) and to simplify landscapes (subsidies fostering the maintenance or otherwise of semi-natural elements such as hedges, copses and ponds, and the choice of crops).
- Public funding of road, rail and inland waterway transport, or undercharging for their use, contributing to habitat fragmentation.
- Charges for services and for the use of the public domain that do not sufficiently factor in biodiversity costs.

Public subsidies leading to overexploitation of renewable natural resources:

- Contributing to changes in land use (converting grassland back to annual crops, making agricultural areas impervious) by influencing certain activities that use land, such as the extending of artificially surfaced areas (housing, recreational areas), transport infrastructure and other community amenities, or by promoting agrofuel development.

Box 5.7. **Public subsidies harmful to biodiversity** *(cont.)*

- Contributing to the intensification or maintenance of intensive practices which thereby diminish the carbon content of land (indirect measures encouraging production, mechanisation, use of inputs).
- Contributing to increased overexploitation of the sea and fish stocks: commercial fishing benefits from a number of subsidies, including exemption from domestic consumption tax (TIC) on petrol-based fuels.
- Likelihood of increasing the overexploitation of water and affecting the biodiversity of certain water systems: pricing scheme encouraging private-sector operators to use more; industrial uses exempt from usage charge; lack of spatial differentiation of the water use charge; grants or fiscal expenditure for hydroelectric production; non-incentive or non-internalising tax rates for agricultural uses.

Public subsidies leading to pollution:

- Insufficiently internalised taxes that provide little in the way of incentives in the areas of fossil energy and biomass use, industry and transport.
- Undercharging of water pollution: clear failure to internalise pollution by nitrates of agricultural origin.

Public subsidies leading to the introduction and spread of alien invasive species:

- External costs arising from invasions are not generally internalised, particularly in transport prices.

Source: CAS (2012), *Les aides publiques dommageables à la biodiversité*.

The reform of development taxation, introduced in 2010, partly included the challenges linked to land artificialisation by allowing better coverage of community amenity costs in development and construction projects (CAS, 2012). This initiative introduced two taxes: the development tax, to finance public amenities accompanying urban development (the municipalities could differentiate the taxes by local urban development plan sector); and the tax on low density development, allowing municipalities to introduce a minimum density threshold below which a payment is owed by building permit holders, thereby combating urban sprawl. A considerable number of exemptions were allowed by the development tax, however, particularly for public amenities, which take up large areas. In addition, only 34 municipalities had established a tax on low density development by 2013, while many initiatives facilitating access to ownership unduly favour new building over renovations (OECD, 2015b). The Environmental Taxation Committee recommended a systematic alteration of the development tax according to area used and broader application of the tax on low density development. It also suggested an extension of the development tax to major linear infrastructure (CFE, 2014).

A certain number of biodiversity-friendly tax provisions exist, such as exemptions from property tax on land in favour of Natura 2000 plots or wetlands, but few of these are used, and they were called into question in the 2016 Finance Act. This tax expenditure amounted to EUR 23 million in 2013 and mainly benefited organic farming.

The system of water charges does not reflect the pressure on this resource and is not very effective in reducing diffuse source pollution (particularly from agriculture) and restoring ecological continuity in aquatic environments (Levraut et al., 2013; Chapter 3). The charge for diffuse source pollution does not cover the health and environmental costs arising

due to water pollution by pesticides and nitrates. The revenue collected (EUR 41 million),[40] which funds the programme for reducing the use of plant protection products (Écophyto), is not very significant compared to the EUR 9 billion of Common Agricultural Policy (CAP) aid, highlighting the necessary greening of the latter (section 6.1) (Potier, 2014). Beyond water policy, the use of plant protection products must be reduced in view of their effects on human health but also on the environment, biodiversity and the ecosystem services which depend on them, e.g. pollinators.

There is no tax mechanism to internalise the environmental costs deriving from impacts on marine biodiversity (Charpin et al., 2013). Many activities use coastal and marine resources, yet the taxes and charges levied on these activities remain weak compared to the benefits obtained by the economic sectors concerned (fishing, shellfish production, sailing and scuba diving in particular). Beyond the 12 nautical mile limit the development of industrial activities in the exclusive economic zone (EEZ) or on the continental shelf is not subject to any tax provisions (except for oil-related resources and fishing activities). Prospects for making better use of charges in the public maritime domain nevertheless abound, and the respective principles could be extended to the EEZ as a whole. The potential resources for the State of such a change are estimated at EUR 150 million per year by 2020 (Miquel, 2014). They would allow France to respond better to its commitments to sustainable marine water management (Marine Strategy Framework Directive) and to finance the marine dimension of the future AFB.

5.3. Payments for ecosystem services

Payments for ecosystem services (PES) are voluntary transactions under which users or beneficiaries of an ecosystem service make a direct payment to offset the additional costs imposed for providing such services to individuals or communities whose land use or resource management decisions have an impact on ecosystem service provision (OECD, 2010). PES are marked by the fact that they are additional (they are additional to the legal obligations of providers and seek a benefit that would not have been forthcoming without them), conditional (performance obligation) and voluntary. Certain state support systems such as agri-environment measures or water office funding are similar to PES but are managed by a state intermediary, with poor traceability of the effectiveness of the system in relation to beneficiaries-payers. PES without intermediaries between ecosystem service beneficiaries and producers in France are few and far between. Vittel is one of the cases most often cited in the literature on the subject (Box 5.8). The regulatory and institutional framework facilitates the development of this type of instrument (CEV, 2015). Similar arrangements are used to implement compensation measures between developers and owners or managers of natural areas, though in this case they are linked to biodiversity degradation arising elsewhere. It is therefore problematic to regard them as PES.

5.4. Access to genetic resources and sharing of advantages

France is one of the few countries to be affected by biodiversity access and benefit sharing as a user (because of its agri-food, cosmetics and perfume industries) and holder of genetic resources (particularly in the overseas territories). The sharing of benefits deriving from biodiversity is a cornerstone of the CBD and was put forward as an innovative way to fund biodiversity.[41] France signed the 2010 Nagoya Protocol in 2011. In the framework of the CBD, this Protocol defines procedures for accessing and sharing the benefits of biodiversity. As yet, however, it has not ratified the Protocol. Since the EU adopted its own regulation on access and benefit sharing in 2014, France must now comply with the latter.

Box 5.8. **The experience of Vittel, an example of payment for ecosystem services**

The measures established to protect the quality of Vittel water is one of the rare cases of genuinely voluntary PES introduced in France. After identifying the risk posed by excess fertilisation in the spring water basin in 1988, the bottler introduced an innovative system whereby farmers in the water basin are remunerated for abandoning artificial pesticides and fertilisers in favour of mandatory compost-based fertilisation techniques (Perrot-Maitre, 2006). Farmers were encouraged to take part by offering to loan them, free of charge, land previously bought by the manufacturer, entitling them to additional milk quotas, income support to offset the consequences of abandoning previous practices, equipment grants and free technical support. The success of the system was due, in particular, to the limited number of farms initially involved (40 then subsequently 37 farmers involving 3 500 ha), with which Vittel was able to negotiate individually rather than collectively, and to a relatively clear legal framework in terms of rights of ownership and use. Vittel's experience inspired similar systems to protect other springs in France and abroad. This model could also be adopted to favour biodiversity in connection with environmental compensation sought from certain developers because of the impacts of their projects.

Source: Perrot-Maître, D. (2006), *The Vittel Payments for Ecosystem Services: A "Perfect" PES Case?*

The draft law on biodiversity preservation, currently being debated in Parliament, provides for reporting procedures – or authorisation procedures in the case of commercial objectives – for the use of genetic resources and the associated traditional knowledge, in line with the key principles of the Nagoya Protocol and the EU Regulation (Burelli, 2014). The challenge of the project proposed will be to resolve the problematic issue of the holders of the rights to the genetic material and to the traditional knowledge ("providers"). France does not recognise the particular status of "indigenous and local communities", as defined in the CBD. Instead, regional or departmental assemblies would be designated as signatories to the benefit-sharing contracts. The draft law, however, does not address their ability to grant effective access to resources on the ground, unlike the mechanism used in New Caledonia, according to which public or private-sector or "customary" owners of land have a well-defined role. The applicability of the system thus remains uncertain, particularly in the overseas territories where systems already exist. Some coherence in applying access and benefit sharing in the various overseas territories must be ensured (Burelli, 2013).

6. Integrating biodiversity into economic sectors

6.1. Integrating biodiversity into agricultural

Agriculture occupies over half the metropolitan land area and exerts great pressure on biodiversity (Chapter 1). Despite growing awareness of its impact, the instruments put in place to develop agricultural practices remain insufficient. Although these instruments are largely negotiated at European level, France has substantial room for manœuvre that could be used to the benefit of biodiversity.

Biodiversity in the Common Agricultural Policy

Biodiversity-friendly agricultural policies principally arise from the "further greening" of the CAP by means of agri-environment measures (AEMs) and the environmental conditionality of subsidies. Biodiversity has been gradually integrated into the CAP in France

since 2004 through direct or contractual aid for the voluntary implementation of AEMs, which allow farmers to receive subsidies in exchange for certain environmentally-friendly agricultural practices, some of which focus directly on biodiversity. Farmers must adhere to one or more measures for at least five years, their remuneration for doing so being dependent on the degree of constraint of the practices. In its agricultural programming for 2007-13, France introduced "regionalised" AEMs which allowed resources to be focused on areas with priority challenges, including biodiversity, notably in Natura 2000 sites.

Between 2007 and 2012, around 21 000 regionalised AEM contracts were signed, covering some 65 500 ha of agricultural land. The agri-environment payments, however, including those linked to Natura 2000, accounted for less than 5% of CAP expenditure in France from 2007 to 2014 (Agreste, 2015). Total public subsidies devoted to AEMs for 2014 to 2020 will be doubled compared to 2007-13. The AEM mechanism was also strengthened in the French agri-environmental project "Produisons autrement" [Produce differently].

"Conditionalities" have been imposed on direct aid since 2003. The most recent CAP reform, operative since 2015, provides for making around 30% of subsidies (EUR 2.2 billion per year) conditional upon three environmental criteria: maintenance at regional level of the ratio between permanent grassland and agricultural areas; diversity of crop rotation, with three annual crops as a general rule; and maintenance of "areas of environmental interest" on holdings. These may be topographic features (trees, hedges, ponds) or areas (buffer zones, or nitrogen-fixing crops such as vegetables). They are often refuge habitats for cultivated landscape biodiversity.

The green payment, in effect since 2015, also seeks to maintain permanent grassland by controlling the ratio between the latter and usable agricultural area (UAE) at regional level. If the regional ratio declines by more than 5%, the Government may ask certain farmers to replant new grassland. Some grasslands are classified as "sensitive" because of the presence of heritage species identified by the MNHN and cannot be reconverted. The scheme for "areas subject to environmental constraints", provided for in the draft law on biodiversity, must ensure the legal means for imposing these objectives.

Organic farming and the ecological intensification of agriculture

Organic farming brings together a range of practices that exclude the use of synthetic chemical inputs (fertilisers, pesticides). Despite their potential consumer health benefits, these practices have less impact on biodiversity. Organic farming still constitutes a very small minority in France, covering less than 5% of the agricultural area, though it is currently expanding after stagnating from 2003 to 2007 (Agence Bio, 2015). Demand has developed more rapidly than supply, which means that 30% of the organic produce consumed has to be imported (Quelin, 2010).

The Grenelle I Law sought to expand the area devoted to organic farming from 2% of the UAE in 2004 to 6% in 2012 and 20% in 2020. In 2013, the area given over to organic farming represented a mere 4% of the UAE, suggesting that the target for 2020 is out of reach. According to a survey in 2010, farmers cited economic difficulties, the administrative burden of the aid, lack of technical expertise, problems in organising product lines and poor acceptance by neighbouring producers as barriers to setting up in organic farming (Quelin, 2010).

The "Ambition Bio 2017" programme seeks to overcome these barriers and to double the proportion of areas under organic farming between 2013 and 2017 (Minagri, 2014).

Funded by the second pillar of the CAP up to an average of EUR 160 million per year (European and ministerial credits) from 2014 to 2020 (compared to EUR 90 million in 2012), the programme provides aid for converting to and maintaining organic farming, in combination with product line organisation, marketing, R&D promotion, training and regulatory adjustments.

Measures to promote organic farming fall within the 2012 French agri-environmental project (Minagri, 2012). The aim of this project, reflected in the 2014 law on the future of agriculture, food and forestry, is to reconcile the economic and environmental performance of agriculture by 2025 on the basis of a variety of action plans, including: the teaching of links between agronomic sciences and ecology, the development of a farmer support service bringing together economic, environmental and social performance factors (Box 5.9), and financial support for farmers moving towards agri-environmental practices by increasing start-up and investment aid (Minagri, 2015).

Box 5.9. **DEPHY: reducing the use of pesticides by spreading good practices**

Since 2009, the DEPHY network of demonstration farms (DEPHY Ferme) and test farms (DEPHY Expe) verifies, develops and rolls out agricultural techniques and systems for reducing the use of crop protection products. At the end of 2014, 1 900 farms were voluntary members of the DEPHY Ferme network, and 41 DEPHY Expe projects had been conducted on 200 test sites.

All the sectors in the DEPHY network have managed to reduce their use of crop protection products while maintaining very good productivity levels. Between 2012 and 2014, the average number of treatments fell by 10% for field crops and mixed crop-livestock farming, by 12% for orchards and vineyards, by 15% for vegetable crops, by 38% for horticulture and by 22% for sugar cane.

The 2015 Ecophyto II Plan aims to increase the number of farms in the DEPHY network to 3 000 and to share their practices by supporting 30 000 farms in their transition to systems with little reliance on plant protection products.

Source: MAAF (2016), *Écophyto, Note de suivi 2015, Tendances du recours aux produits phytopharmaceutiques de 2009 à 2014*, Ministry of Agriculture, Agrifood and Forestry.

6.2. Integrating biodiversity into land use planning, infrastructure and urban development

France has a complex range of planning documents which endeavour to limit land take and the fragmentation of natural environments. Awareness of biodiversity challenges in the regions continues to be very mixed, as shown by the limited success of attempts to ensure the voluntary participation of local elected officials in relation to wetlands or municipal biodiversity atlases (Box 5.10). Conversely, the establishment of TVB, piloted jointly by the State and local authorities, has raised these officials' awareness of urban development projects and documents, as has the application of the "avoid, reduce, offset" (ARO) sequence, reinforced with respect to offsets in particular on conclusion of the Grenelle Forum.

Urban planning documents

Since 2013, the various plans and programmes, particularly urban planning documents, have been subject to the ARO sequence,[42] yet the treatment of biodiversity continues to be mixed. The regional consistency schemes (SCOT, intermunicipal strategic planning tools

Box 5.10. **Factoring wetlands into land use planning**

The case of wetlands clearly illustrates the difficulty of factoring biodiversity into regional planning. Since 2004, urban planning documents (SCOT, PLU, municipal charters) have had to be compatible with water planning and management schemes (SAGE), though in June 2014 the latter covered only 51% of French territory (including the overseas territories) (Couraud et al., 2014). The possibility that the State would define "wetlands of particular environmental interest", which may include "strategic areas for water management", was barely raised, except for a small number of SAGE. The assessment of the national wetlands plan (2010-13) suggested that they should be abandoned to ensure simplification, while not forgetting that each SAGE had to identify its priority wetlands (Lavoux et al., 2013).

These disappointing results show that, despite legislative progress, factoring wetlands into land use planning depends largely on how the general interest is defined at local level, according to commitments validated and disseminated by the dominant political stakeholders in the regions concerned (Barone, 2012). Consequently, outside protected areas with a designated manager, wetlands conservation is generally factored in only by default in connection with planning project assessments. The requirement to apply the ARO sequence to projects that have an impact on wetlands, established in many water planning and management master plans (SDAGE), could raise elected officials' awareness of the value of better anticipation and planning of wetlands management at their regional level. The updating of the SDAGE has preserved that objective. The 2014 MAPAM law, meanwhile, provided for the management of aquatic environments, including the respective wetlands and neighbouring woodlands, to be gradually entrusted to intermunicipal authorities, dedicated public institutions [EPTB] and public water planning and management institutions [EPAGE]).

Source: Lavoux, T. et al. (2013), *Évaluation du Plan national d'action pour les zones humides 2010-2013*.

introduced in 2000) include a sustainable planning and development project that may encompass biodiversity in the event of a challenge identified by local elected officials. Failing this (still the majority of cases), biodiversity continues to be addressed at project level, particularly with respect to wetlands or protected species.

Mirroring the poor mobilisation with respect to wetlands, the programme to develop local biodiversity atlases, launched in 2010, did not significantly raise local elected officials' awareness of the subject[43] (MEDDE, 2015). The preparation of SRCE, on the other hand, which government services (DREAL) contributed to with the regions, did raise their awareness of biodiversity challenges thanks to the TVB, which all urban planning documents must factor in[44]. The drafting of TVB thus corrected the lack of involvement of local elected officials and authorities in the Grenelle Forum. This positive outcome has, at times, been achieved to the detriment of the relevance and accuracy of the proposed environmental mapping, but the principal criticism of SRCE is that they are "non-binding". Many regions already have an SRCE, and all regions should have one by the end of 2015.

The "avoid, reduce, offset" (ARO) sequence

The ARO sequence, a feature of French environmental law since 1976, seeks to ensure that land use planning and infrastructure projects do not entail net losses in environmental quality. The sequence requires developers to avoid and reduce the negative impacts of projects before offsetting their residual impacts. Offset measures should be long-lasting and implemented close to the affected site and should maintain or improve

the environmental quality of the natural environments concerned at the relevant regional scale (MEDDE, 2012b). Offsetting also includes a biodiversity funding mechanism which mobilises private-sector funds.

Despite the long history of the ARO sequence in France, offsets have been overlooked or poorly applied for some time. Since the reform of exemptions from the strict protection of certain protected species in 2007 and the reform of the impact study in 2012, monitoring requirements and the effective implementation of the sequence have been strengthened (Quétier et al., 2014). In this context, the French Government published further information on the ARO sequence in the form of a legal principle (MEDDE, 2012b) and guidelines (MEDDE, 2013).

The requirements of these documents are consistent with good international practices, such as those in the Business and Biodiversity Offsets Programme, and are underpinned by an international comparison carried out by the MEDDE (Morandeau and Vilaysack, 2012). The "no net loss" objective also mirrors the EU objective set out in its 2011 biodiversity strategy, which involves halting biodiversity loss and ecosystem service degradation by 2020 and restoring them as far as feasible.[45]

In practice, the ARO scheme is still beset by significant weaknesses (Quétier et al., 2015; de Billy et al., 2015): the ability to achieve the objective of no net loss of biodiversity is often poorly assessed, and the legal and financial arrangements for putting compensation into effect are often weak. It is frequently criticised for lack of transparency, and applications for exemptions for protected species have been available for public consultation only since September 2013. A committee to monitor the implementation of the sequence was established in updating the law on the environment (2013-14). Its findings feed debate in Parliament on the draft law on biodiversity.

Besides technical issues, the institutional framework still does not allow offsets to be implemented effectively. Offsets must help to minimise the impacts of development on biodiversity and must fund sustainable environmental restoration action. At the moment, the performance standards and criteria according to which measures are conceived and followed up remain very mixed, and the residual impacts of projects are addressed on a case-by-case basis. The draft law on biodiversity now outlines a number of solutions (Pirard et al., 2014), such as the creation of "natural asset reserves" (a forecasting and pooling mechanism drawing on American or German clearing "banks"), an offset trader status and real environmental obligations (a legal mechanism to protect the environmental value of land). These developments are underpinned by the piloting of "on demand" offsets, available since 2008 (Box 5.11).

Box 5.11. **The piloting of "on demand" compensation: The Cossure natural asset reserve**

The coinciding of private initiatives and political thinking gave rise in 2008 to the first French natural asset reserve (NAR) (Calvet et al., 2015). The project, realised in Cossure in the Crau plain (south-east France), is run by CDC Biodiversité, a subsidiary of Caisse des Dépôts et Consignations (CDC) [public financial institution].

After acquiring a bankrupt industrial orchard, the undertaking took measures to rehabilitate 357 ha of dry open grasslands providing habitats for La Crau steppe birds and enhancing environmental links between protected areas through the Coussouls de Crau

Box 5.11. **The piloting of "on demand" compensation: The Cossure natural asset reserve** *(cont.)*

national nature reserve. Offsets in connection with this project have the advantage of being foreseen in advance and therefore implemented before the impacts arise, and the action taken has a strong additionality. The project also allowed certain developers to implement offset schemes that had been suspended because appropriate measures had not been identified. With regard to the no net loss objective proposed by the 2012 national legal principle, however, the environmental outcome is more debatable. The NAR was, in fact, used to offset impacts on species that had not been targeted at the outset by ecological restoration actions.[46] The use to be made of the land restored, moreover, beyond the commitment of CDC Biodiversité to protect it for 30 years, remains unresolved at the time of writing.

The operation has been monitored from the outset by MEEM, and exchanges between CDC Biodiversité and developers with offset obligations are connected to the authorisations issued to them by the administration. The latter ensures respect for the requirements of the national legal principle relating to the ARO sequence. Several other operations of this kind have been initiated recently and are also monitored by MEEM.

Source: Calvet, C. et al. (2015), "La réserve d'actifs naturels. Une nouvelle forme d'organisation pour la préservation de la biodiversité en France?", in *Restaurer la nature pour atténuer les impacts du développement. Analyse des mesures compensatoires pour la biodiversité*.

Recommendations on biodiversity

- Review and update the National Biodiversity Strategy, insuring that it incorporates:
  - quantitative targets and indicators for the government and its partners;
  - prospects in terms of regulation, funding and governance.
- Rationalise biodiversity governance and management by bringing together all relevant bodies, including the National Hunting and Wildlife Commission, and setting up a single national consultative body; reform the National Nature Protection Council to concentrate scientific expertise there; roll out the model at regional level.
- Improve the effectiveness of instruments integrating biodiversity into land use planning policies (e.g. the green- and blue-belt network, agri-environment measures, the mitigation hierarchy) through results-based indicators and strengthened governance inspired, for example, by the national action plans for endangered species.
- Gradually eliminate support measures which are harmful to biodiversity and redirect tax instruments towards behaviour which favours the conservation and sustainable use of biodiversity; in particular:
  - eliminate exemptions from the development tax for public infrastructure, which encourage land take, and adapt the rate according to location;
  - encourage municipalities to use the low-density tax;
  - reform the system of charges for using the maritime public domain to better internalise the cost of impacts on marine biodiversity.
- Promote agroecology as a solution to environmental challenges (circular economy, reduction of inputs, renewable energy production, biomaterials, carbon storage); pursue the implementation of support measures (information, training, research and funding) to facilitate the transition to sustainable methods of production; ensure linkage between the various agroecology initiatives and promote synergies between them.

Recommendations on biodiversity *(cont.)*

- Improve the effectiveness of the mitigation hierarchy by promoting the use of ecological outcome indicators in the design and evaluation of solutions proposed by developers and by centralising and circulating feedback on the rollout of offsetting measures; strengthen the role of the mitigation hierarchy in the development of planning tools; create a framework for extending the application of biobanking, clarifying the requirements of ecological equivalence (in its qualitative and quantitative dimensions), commitment periods and expected guarantees concerning the financing and ecological vocation of land set aside for offsetting. In socio-economic assessments, effectively integrate the costs of the mitigation hierarchy into project expenditure.
- Promote a culture of economic efficiency for biodiversity policies, for example by developing *ex post* economic evaluation indicators shared between actors; continue the French Assessment of Ecosystems and Ecosystem Services and foster the use of valuation methods.
- Ratify the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD.

Notes

1. To be classified as megadiverse, a country must have at least 1% (3 000) of the world's endemic vascular plant species. New Caledonia is largely responsible for the inclusion of France among these countries.
2. "Hotspots" are the most vulnerable biodiversity-rich places on the planet: they are eco-regions containing at least 1 500 endemic vascular plant species which have lost at least 70% of their original habitat. The overseas territories and Mediterranean regions account for the importance of France in this respect.
3. Considering the non-native species assessed.
4. The 2014 Écophyto Report did not allay doubts regarding the definitive nature of declared sales, and therefore of the representativity of data provided at the time of writing compared to real uses and their development.
5. As a signatory to the 1979 Berne Convention, France has undertaken to strictly control the introduction of non-native species (Article 11.2.b of the Berne Convention).
6. The species concerned include the tiger mosquito and ragweed.
7. The NBS comprises 10 sectoral action plans: agriculture, international co-operation, transport infrastructure, the sea, natural heritage, urban development (2005), forests, research (2006), tourism (2009) and overseas territories (introduced between 2005 and 2009; the scheme consists of a cross-cutting action plan and 10 local action plans, *i.e.* one per department or overseas community).
8. Decree No. 2012-219 of 16 February 2012 on national marine and coastal strategy and strategic seaboard documents.
9. It will be noted that the wording "green and blue infrastructure" has replaced the initial proposal, "ecological network", which was deemed to be too close to the "Natura 2000 network", the introduction of which was strongly contested. Source: Vimal, Mathevet and Michel (2012).
10. Other operational committees have worked on pollenisers (bees and bee keeping), forests, overseas territories, etc.
11. In addition, mechanisms favouring the inclusion of sustainable development and environmental protection, as well as the social responsibility of public-sector purchasers, have gradually been included in French public procurement law, particularly in applying Directive 2004/18/EC on the co-ordination of procedures for the award of public works contracts, public supply contracts and public service contracts. Criteria specifically focusing on biodiversity, however, are more often than not absent from the criteria for awarding public contracts or subsidies.

12. The IPBES, established in 2012, is an independent intergovernmental group which assesses the situation of the planet's biodiversity, ecosystems and services. It is equivalent to the Intergovernmental Panel on Climate Change (IPCC).

13. The DGALN comes under the dual supervision of the Ministries responsible for the Ministry of Ecology and Housing.

14. Order of 11 January 2012.

15. In terms of EPIC [*établissement public à caractère industriel et commercial* – state-funded industrial and commercial undertakings], autonomous ports and the major maritime ports are also managers – by delegation – of natural environments of special interest, particularly in the estuaries and coastal wetlands (Seine estuary, Golfe de Fos, etc.). State-funded property management undertakings are tasked with supporting local authorities in their planning projects by establishing land reserves to foster biodiversity preservation, among other things.

16. In particular by the *Agence Nationale de la Recherche* [National Research Agency] and by EU programming, in a context of a net reduction in MEDDE and state-funded research expenditure.

17. Collective scientific expertise on relationships between agriculture and biodiversity, finalised in 2008 under the NBS 2004-10 action plan for agriculture, is an example of the successful mobilisation of research. The latter, however, benefited from strong links between the INRA, which co-ordinated the expertise, and the Ministry of Agriculture, which piloted the action plan, though some participants were frustrated by the failure to fulfil the results of the expertise in practice.

18. Besides the role of organising biodiversity research, the FRB also assists the Secretariat of the French committee of the IPBES, in support of the Ministry of Foreign Affairs.

19. Like US *trustees*, or even the US Environmental Protection Agency, which can apply a right of veto to certain authorisations given by other agencies, such as USACE (United States Army Corps of Engineers), concerning the destruction of wetlands.

20. Between 2007 and 2010, over 25 000 articles focused on one of the facets of the Grenelle process. In June 2010, almost two million Internet pages citing the Grenelle Forum were consulted. A total of 128 reports were also produced. This proliferation of written matter may sometimes appear to be redundant, but it helps to inform the largest number of people and contributes to the development of opinions. Source: Boy, D. et al. (2012). Le Grenelle de l'environnement: acteurs, discours, effets. Armand Colin. See also: *http://concertation-environnement.fr/documents/cs/rf/RF_Grenelle.pdf*.

21. SINP data are forwarded to the *Global Biodiversity Information Facility* (and vice versa) where relevant.

22. Many administrative regions have set up their own SINP, which contributes to the national SINP, to manage relations with stakeholders in connection with the proper use of their data.

23. The MEDDE seeks to propose methods to integrate ecosystems into national compatibility (in line with Eurostat expectations under the EU Biodiversity Strategy).

24. Decree 2005-475, together with Circular DCE 2006/17 on the formulation, content and scope of programmes of measures.

25. Law of 14 April 2006 on national parks, natural marine parks and natural regional parks.

26. Law of 23 February 2005 on regional development.

27. Since Order No 2001-321 of 11 April 2001, the designation and management of Natura 2000 sites has been covered by Articles L. 414.1 to L. 414.7 of the Environmental Code. An Order of 19 April 2007 subsequently amended the list of birds that could justify the designation of special protection areas (SPAs).

28. Law 2008-757 of 1 August 2008.

29. After a long gestation period beginning in 2000, a CEN was created in New Caledonia in the form of a public interest group (GIP) bringing together the State, local authorities and national institutions (New Caledonia, the three provinces and the Customary Senate), the MPA Agency, NGOs such as the WWF and Conservation International, the two mayors' associations and the "*Ensemble pour la Planète*" environmental association.

30. Outside any regulatory prerogative, the sites managed by Natural Area Protection Agencies correspond to IUCN Categories IV and V.

31. In 2008, France also registered 16 000 km^2 of reefs, herbaria, mangrove swamps, algae colonies and sandy or muddy seabeds in New Caledonia's lagoon as world heritage (UNESCO).

32. Article L 334-1 of the Environmental Code specifies that marine protected areas comprise: "national parks with a marine section (Article L. 331-1); natural reserves with a marine section (Article L. 332-1); biotope protection orders with a marine section (Article L. 411-1); marine natural parks (Article L. 334-3); Natura 2000 sites with a marine section (Article L. 414-1); maritime areas covered by the Coastal and Lake Shore Protection Agency".

33. Article 86 of Law 2006-11 of 5 January 2006, Implementing Decrees of 19 February 2007 and Administrative Decision of 29 October 2009.

34. Many species which are protected under French law are not listed in Annex IV of the Habitats Directive. For the latter, only the specimens are protected, not their habitats.

35. Despite a public consultation in which a majority opposed wolf culling, an Administrative Decision taken in July 2015 authorised the culling of 36 animals.

36. Administrative Decision of 27 July 1995, as amended, establishing the list of marine mammals protected on national territory.

37. Administrative Decision of 14 October 2005 establishing the list of marine turtles protected on national territory and the means for their protection.

38. In this context, reference will also be made to the creation in 2012 of the Agoa sanctuary for marine mammals in the French Antilles, recognised by virtue of the Cartagena Convention in 2012.

39. In 2005, the French regulatory framework thus foresaw the requirements of EU Regulation No. 1143/2014, which came into force in 2015.

40. The 2012 Finance Act set a ceiling of EUR 41 million per year for the part of the payment for diffuse pollution to finance measures under the Écophyto 2018 Plan. Broadening the base of the payment to all active substances classified as category 2 carcinogenic, mutagenic and reprotoxic by Decree of 6 October 2014 expands the Plan's financial envelope from EUR 41 million to around EUR 70 million per year from 2016.

41. Access and benfit sharing, however, has not been retained in the OECD study on *Scaling-up Finance Mechanisms for Biodiversity* (2013).

42. Decrees 2012-616 and 2012-995.

43. Only 300 municipalities had signed up at the time of writing.

44. In addition to not very binding factoring-in, case-law distinguishes between much more demanding compliance and compatibility, which assumes that the provisions of a document are no obstacle to the application of provisions in a higher-ranking document.

45. In this context, the European Commission announced an initiative corresponding to Objective 2 of the strategy: "ensure there is no net loss of ecosystems and their services (*e.g.* through compensation or offsetting schemes)" (COM/2011/0244 final).

46. In the USA, the difficulties of developing NAR focusing on species (conservation banks), compared to those focusing on wetlands (mitigation banks) corroborate this analysis: species need to develop equivalence systems as much as species systems, while wetland banks can be supported by more general methods adapted to large ecosystem categories.

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This report is the third Environmental Performance Review of France. It evaluates progress towards sustainable development and green growth, with a focus on energy transition and biodiversity.

Contents

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