

Energy Efficiency Policies and Measures in France

ODYSSEE- MURE 2010

Monitoring of EU and national energy efficiency targets

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1 Executive Summary and key messages

- Over the period 1990-2010, the final energy consumption has grown up by 12% or 0.6%/year. Only the final energy consumption of industry has decreased (-7%) since 1990. Transport and services have considerably increased their final consumption by respectively 31% and 23%. Household and agriculture consumptions have also increased (6% and 5% respectively), but since 2000, the trend for these two sectors, decrease slightly.

- The final energy intensity (final consumption per unit of GDP) (with climatic correction) has decreased by 17.5% or 1%/year since 1990. Due to the economic crisis, in 2010, the final intensity has slowed down to only -0.1%. The trend isn't in line with the target of the French energy law (-2%/year until 2015). In 2010, only services and transport intensities have decreased with respectively -1.6% and -0.6%. Industry intensity has considerably increase (7%) and household intensity has remained quite steady (0.2%).

- In 2010, overall ODEX shows improvement by 21% of energy efficiency since 1990; all sectors participated in a different ways to the efficiency progress: 21% improvement in industry, 25% for households and 14% in transport. In 2010, ODEX has gained 0.6% compared with 2009 indicating small energy savings. The impact of the crisis has slow down the trend of the ODEX, but the general trend is in line with the indicative target of the ESD (1.05%/year).

- Direct CO₂ emissions have remained constant since 1990 in France (-0.01%/year). This decrease is only due to industry and agriculture. Indeed, industry emissions have felt by 19.6% since 1990 and agriculture emissions have decreased by 2.2%. On the contrary, the emissions of transport, household and services have increased respectively by 9.4%, 5.3% and 6.6%.

- France must continue its efforts to reach the national and European commitments in force. A lot of efforts will be necessary to reach the target "3 X 20" and reach a decrease of 20% of the energy consumption and a decrease of 20% of CO₂ emissions.

- In 2010, the first assessment of the Environment Round Table's goals shows all targets won't be achieved. It's especially true for the reduction of greenhouse gas emissions and the report modal shift of goods transport. On the contrary, in the household, the target of the unit primary energy consumption should be achieved through the future huge refurbishment plan and the new building code.
- A new thermal regulation, the **2012 Thermal Regulation (RT)** strengthens requirements concerning the thermal performance of new buildings: all new buildings with a building permit lodged after 1 January 2013 must have primary energy consumption below a threshold of 50kWh_{ep}/m²/year. This requirement must be applied early, from 28 October 2011, in the case of public and service buildings and dwellings built in an ANRU¹ zone. The 50kWh_{ep}/m²/year requirement concerns consumption of heating, cooling, lighting, domestic hot water produced and auxiliary equipment (pumps and fans).
- In 2010, the most important measures are the ones which have been implemented in 2007, such as the bonus malus for new cars, the sustainable building training scheme, the sustainable development account, and the zero rated eco-loans.

¹ Dwellings built in zones reserved for access to property by low-income households and eligible for a VAT rate of 5.5%, instead of 19.6% (ANRU: National Urban Renewal Agency).

2 The Background to Energy Efficiency

2.1 Overall economic context

Small economic revival of the economic growth since the crisis in 2008-2009

The real effect of the crisis was in 2009. At this date, only the private consumption didn't decrease. In 2010, the economic growth measured by the GDP increased slowly compared with 2009 (1.5%).

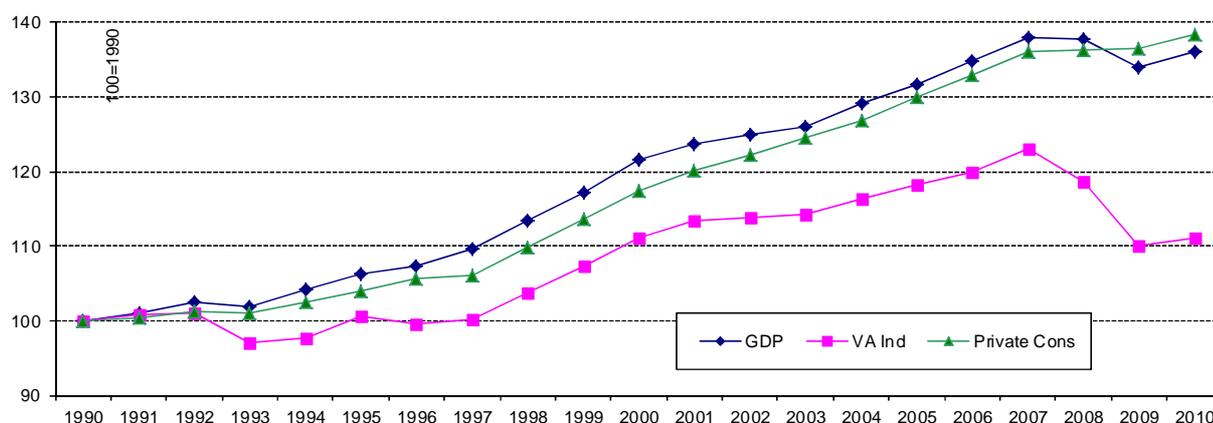
In 2010, the households' expenditures (measured by the private consumption) have a rate close to the GDP economic growth (1.3% for the private consumption compared to 1.5% for the GDP) whereas the annual growth rate of industrial activity (as measured by the value added at constant price) is lesser than the GDP (1%) (Table 1).

Since 1990, the average economic growth has been 1.6%/year. Between 1990 and 1996, the average growth rate was lower with the recession in 1993. On the contrary, between, 1996 and 2001, the growth was high (about 3%). Since 2001, the growth rate was 1.1% due to the crisis in 2008.

Table 1 :Economic and industrial annual growth rate in France

%/year	1990-2010	1990-1996	1996-2001	2001-2010	2009-2010
GDP	1,6%	1,2%	2,9%	1,1%	1,5%
Industry	0,6%	-0,1%	2,6%	-0,2%	1,0%
Private consumption	1,7%	0,9%	2,6%	1,6%	1,3%

Figure 1 : Macro-economic developments in France : 1990-2010



2.2 Energy consumption trends: by fuel and by sector

Strong increase of energy consumption in 2010 in industry due to the revival

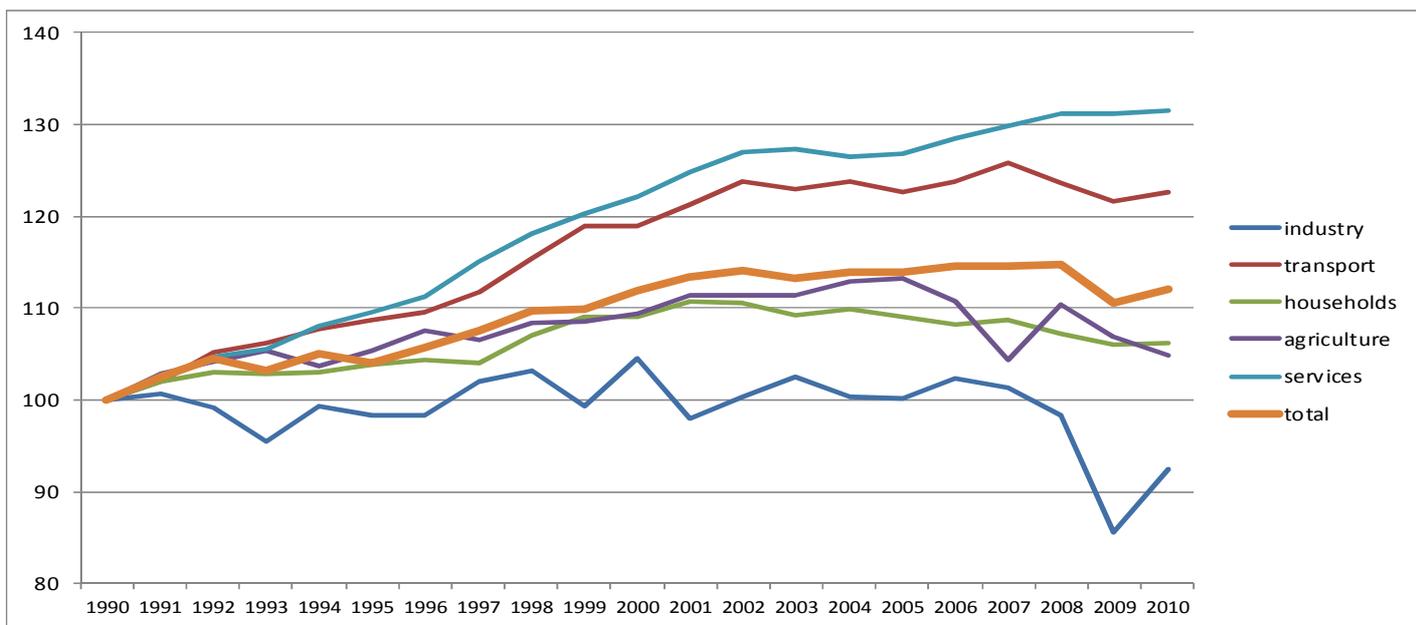
Over the whole period 1990-2010, the final energy consumption has grown up by 0.5% per year (at normal climate). All sectors increased their consumption except the industry (Table 2). Since 1990, the final consumption has increased by about 13.7 Mtoe and reached 152 Mtoe. The peak of the consumption was in 2007 before the crisis. Between 2007 and 2009, the consumption has decreased of 9 Mtoe. It was the first time since 1990, there was such a huge decrease (Figure 2).

The growth in the final energy consumption was the most dynamic for industry, 8% however the consumption since 1990 has been remained steady. The two sectors which have a rise are transport and services (respectively 1% and 1.4%).

Table 2 : Evolution of the final consumption by sector

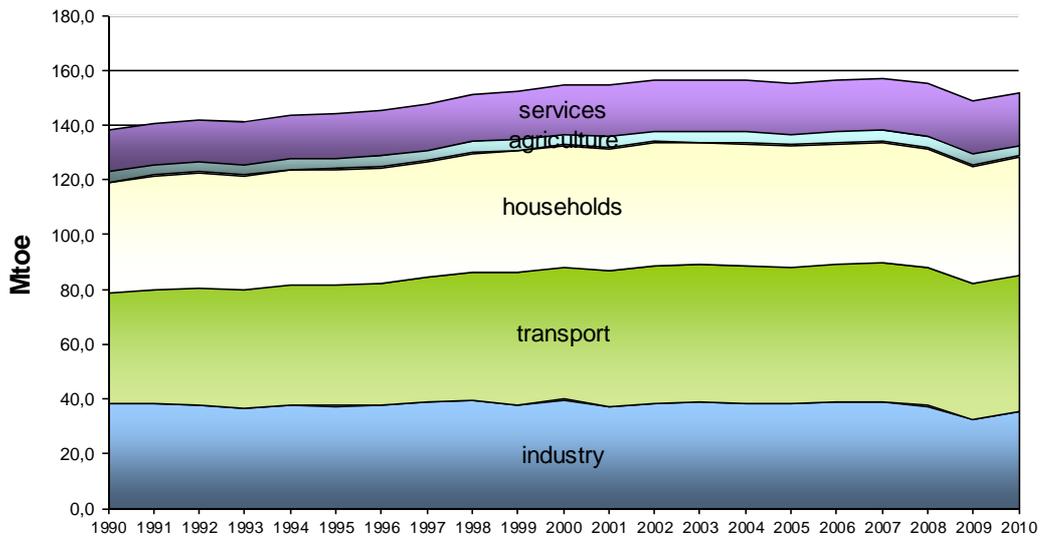
	1990-2010	1990-1996	1996-2001	2001-2010	2009-2010
Industry	-0,4%	-0,3%	-0,1%	-0,6%	8,0%
Transport	1,0%	1,5%	2,0%	0,1%	0,8%
Households	0,3%	0,7%	1,2%	-0,5%	0,2%
Agriculture	0,2%	1,2%	0,7%	-0,7%	-1,9%
Services	1,4%	1,8%	2,3%	0,6%	0,3%

Figure 2 : Evolution of the final consumption by sector since 1990 (normal climate).



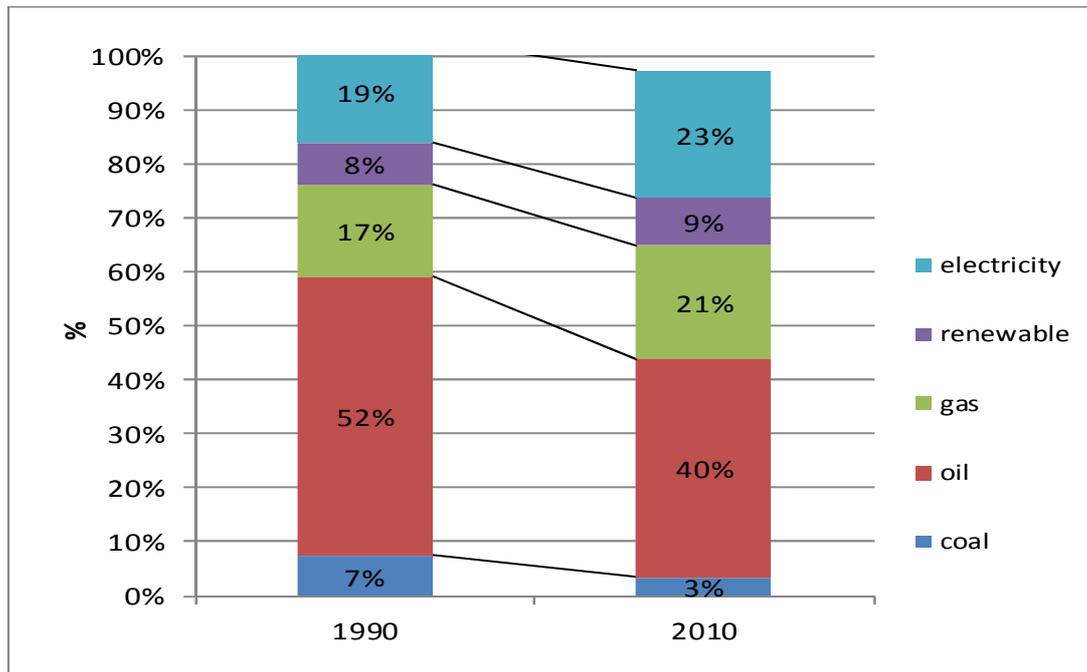
With respect to the breakdown of the final energy consumption by sector (non energy uses excluded), the most important feature is the increasing role of transport, from 29% in 1990 to 33% in 2010 and the decreasing contribution of industry from 27% in 1990 to 23% in 2010. Services grow up from 11% to 13%. Households and agriculture remain quite stable over the period (29% and 3% respectively) (Figure 3).

Figure 3 : Final energy consumption by sector in France



The market share of electricity in the final energy consumption is continuing its progression, from 19% in 1990 to 24% in 2010 (Figure 4). The share of natural gas is also steadily progressing (from 17% in 1990 to 21% in 2010). Coal continues its recession with 3% of the final consumption in 2010 against 7% in 1990. The share of oil decreases slightly from 52% to 40% in 2007. Renewables (mainly biomass -wood) increase slightly around 9%.

Figure 4: Final energy consumption by energy



2.3 The policy background to energy efficiency

- ADEME is the national agency in charge of implementing RUE, RES and environmental policies. It operates within a 4 years agreement with the government (2009-2012). Implementing France's national policy on the rational use of energy is one of ADEME's key missions.
- An energy law has been adopted in 2005 including several measures and targets related to energy efficiency
- A National Programme against Climate Changes (PNLCC) has been adopted in January 2000 and reinforced in 2004 and 2006 with the Climate Plan. The climate policy is described in the Climate Plan 2004-2012, national French action plan in order to respect their commitments for Kyoto protocol.
- France's Environment Round Table so called "Grenelle de l'Environnement" was organised in 2007 in order to define the key points of government policy on ecological and sustainable development issues for the coming five years.
- The second energy efficiency action plan assesses the policies and measures implemented by France in terms of energy savings.
- The Future Investments programme has a budget of €35 billion to finance innovative measures.

The Environment Round Table: « le Grenelle de l'environnement »

Preparation for the Environment Round Table³ took place between July 2007 and November 2007. It involved all stakeholders: State, territorial authorities, trade unions, businesses and associations. Its aim was to debate environmental issues and define a roadmap for sustainable ecology, development and planning. Organised around six working groups, one of which dealt with combating climate change and managing energy demand, it resulted, at the end of October 2007, in an action plan consisting of 20 concrete and quantifiable measures with the broadest possible participant agreement.

Following this national consultation, 33 operational committees (COM-OP), bringing together all stakeholders, were set up to refine the roadmap and define, for each theme identified as key, a list of targets, as well as specific actions and recommendations to be implemented. In appropriate cases, these operational committees indicated measures not approved by all stakeholders and possible alternatives. They then drew up public overview reports to be used as a subsequent basis for policy decisions.

The topics dealt with by the operational committees included, in particular, improving the performance of buildings (COM-OP 1, 2 and 3), the Exemplary State (COM-OP 4) and improving transport (COM-OP 5, 6, 7 and 8).

- Implementation of the Round Table commitments is actual, in particular through:
 - the Programme Law of 3 August 2009 implementing the Environment Round Table, known as Grenelle 1, formalising the Round Table commitments from a legislative viewpoint;
 - the Law of 12 July 2010 making a national environmental commitment, known as Grenelle 2, implementing most of these commitments in operational terms;
 - the various Finance Laws adopted since 2007, which have put in place the financing needed for some Round Table measures;
 - the Decrees implementing the Grenelle 1 and Grenelle 2 laws.

- Two very ambitious targets have been set by the Environment Round Table:
 - For new build, widespread development of low consumption buildings (BBC) by 2012 and positive energy buildings to 2020;

- For existing building stock, a 38% reduction in primary energy consumption in 2020. The target is to achieve primary energy average consumption of 132 KWhep/m²/year, compared with a current average of 213 KWhep/m²/year.

Round Table commitment agreements

Round Table commitment agreements are a form of specific commitment made by the professional sectors within the framework of the Environment Round Table. They mobilize the sector across a range of given thematic areas. The targets set in these agreements match the Round Table commitments or even go beyond them. The type and content of actions specified in an agreement depend on the specific features of the sector concerned. The following are a few examples of agreements concluded since 2008:

- Agreement on withdrawal of incandescent bulbs from sale and promotion of low-energy bulbs (December 2008),
- Agreement with the Loans and Consignments Fund (*Caisse des Dépôts et Consignations*) to encourage growth of eco-industries and renewable energies in France (March 2009),
- Agreement on the part of actors involved in design, implementation and maintenance of road infrastructure, the road system and urban public space (March 2009),
- Agreement on the part of actors involved in engineering (February 2010), in the field of renewal of existing building stock, ecodesign of cities and 'sustainable travel services,'
- Agreement on reducing energy consumption linked to lighting in the service sector (September 2010).

The assessment of the Environment Round Table indicators has been carried out and the results are described in the Table 3.

The indicators 1 to 4 should achieved the target. From 5 to 7, the result is good but the trend isn't sufficient. For indicators 8 and 9, the result is very far away from the target.

Table 3 : Results in 2010 of the Environment Round Table indicators.

Indicators	2006 reference	Target	Result in 2010
1-Primary energy consumption of household stock	212,9 kWh/m ² /year	132,0 kWh/m ² /year in 2020	196,7 kWh/m ² /year
2-Annual emissions of greenhouse gases by transport	119,5 MteqCO ₂ Réf 1990 140,2 MteqCO ₂ in 2006	119,5 MteqCO ₂ in 2020	132,5 MteqCO ₂ in 2011 (peak at 142,9 MteqCO ₂ in 2002)
3-Energy consumption in transport	50,0 Mtoe 40.8 Mtoe Ref 1990	50 Mtoe	50 Mtoe in 2011
4-Modal part of collectif transport in internal terrestrial passenger transport	14,5 %	> 14,5 %	16 % in 2011
5-Share of buildings « Low Consumption Buildings » in new (primary energy consumption < 50 kWh/m ² /year)	7 % in 2010	100 % in 2012	49,2 % (first quarter 2012)
6-Average emissions of new cars	149,8 g CO ₂ /km	120 g CO ₂ /km in 2012	127,7 g CO ₂ /km in 2011
7-Final energy consumption – return between final consumption and the baseline scenario (before Grenelle)	161,1 Mtoe (trend 2020)	128,9 Mtoe in 2020	148 Mtoe
8-Share of non road and non air freight transport in total freight transport	12,6 % (19,2 % in 1995)	15,75 % in 2012 and 25 % in 2022	11,7 % in 2011
9-Greenhouse gases emissions	index 100 in 1990 (563 MteqCO ₂)	index 80 in 2020 (450 MteqCO ₂) And index 25 in 2050 (140 MteqCO ₂)	index 93,4 (526 MteqCO ₂)

The second energy efficiency action plan

The second energy efficiency action plan aims to assess the policies and measures implemented by France in terms of energy savings. Directive 2006/32/EC of 5 April 2006 on energy end-use efficiency and energy services (ESD) sets a 9% energy savings target to 2016 compared with average final energy consumption between 2001 and 2005. France has also undertaken to comply with the terms of the 'Energy/Climate' Package adopted in December 2008 under the French Presidency of the European Council, which provides in particular for a 20% improvement in the European Union's energy efficiency in 2020.

Demand management occupies a predominant position to achieve these various targets particularly through the Energy Efficiency Certificate (EEC) mechanism.

The construction sector accounts for 44% of France's final energy consumption and, as such, is a major challenge for energy efficiency policies.

Introduction of the 2012 Thermal Regulation makes it possible to achieve the BBC standard for new constructions. Sustainable Development Tax Credit and the zero-rated eco-loan are two major measures supporting development of the stock.

The transport sector accounted for 32% of French final energy consumption in 2009. Measures implemented in this sector mainly seek to support modal shift and greater efficiency of the modes of transport used. The ecological 'bonus-malus' enabled France to have, in 2009, the new vehicle fleet with the lowest carbon dioxide emissions in the European Union and, according to the latest statistics, the operating fleet with the second-lowest emissions.

In industry, France's energy efficiency policy is based, in particular, on European Directive 2003/87/EC establishing a market for emission permit trading within the European Union, as well as on financial incentives, regulatory measures, support for standardization processes and support for development of the most efficient technologies, in particular through the Future Investments mechanism.

The State and territorial authorities also play a very important part in energy efficiency, not just through managing their assets and their direct activities, but also when exercising their responsibilities (for example, with regard to urban development, in the case of authorities). As regards State services, an initial review of implementation of the 'Exemplary State' circular for 2009 shows initial concrete results, in particular in terms of energy audits and purchase of energy-efficient vehicles. In the case of local authorities, they are encouraged to develop territorial climate plans providing a genuine local climate and energy policy within their specific areas of responsibility: more than 200 have now been developed or are being developed. The Grenelle laws also strengthened the provisions allowing urban development master-plans to manage space, resources and energy efficiently by developing levers for demand-side management, the fight against urban sprawl and promotion of the sustainable city.

The agricultural sector is also implementing a significant number of measures to improve energy efficiency, including, in particular, introduction of the Energy Performance Plan for agricultural holdings 2009-2013 (energy savings and conversion to renewable energies).

Lastly, prevention of waste production may make it possible to reduce energy consumption throughout sectors linked to production and marketing of goods, particularly

industry and transport. It also allows a reduction in energy consumption linked to waste treatment.

In horizontal terms, major importance is attached to raising general public awareness with regard to energy savings. This awareness-raising involves two main types of action:

- Awareness-raising actions, such as the ADEME (Environment and Energy Management Agency) public campaigns '*réduisons vite nos déchets, ça déborde*' ('let's reduce waste now, it's overflowing') and '*économies d'énergie faisons vite, ça chauffe*' ('energy savings: let's act now, the heat is on!');
- Information actions to direct the behaviour of economic operators, for example via the Energy Performance Diagnoses (DPEs) required in metropolitan France by both private individuals and professionals since 1 November 2006 when any dwelling or building is sold; or through the Energy Info Sites (EIE), which are a valuable source of information and advice on energy efficiency for individuals and businesses.

In addition, a trial of environmental advertising on high-volume consumer products will start in summer 2011.

Future Investments

On 14 December 2009 the President of the Republic launched '**Future Investments**'. The Future Investments programme, allocated an overall budget of €35 thousand million, allows financing of profitable assets and infrastructure for research and innovation of benefit to France's economic growth.

Five 'priority' strategic axes have been identified (higher education and training, research, industrial branches and SMEs, sustainable development, and SMEs) and will enable France to increase its growth potential.

From the €35 thousand million in appropriations allocated to Future Investments by the Amending Finance Law for 2010, particular provision for energy efficiency is made for:

- €1 thousand million for the 'Thematic institutes of excellence for decarbonised energies' programme, managed by the National Research Agency (ANR),
- €2.8 thousand million split between a number of programmes managed by ADEME, concerning demonstrators and experimental platforms in the field of transport (€1 thousand million), the circular economy (€250 million), renewable energies and green chemistry (€1.35 thousand million) and smart energy networks (€250 million),

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- Within the 'Digital economy' thematic area, €2.25 thousand million for the 'Innovative digital uses, services and content' action, managed by the Loans and Consignments Fund (CDC), which covers, in particular, the digital city and smart transport systems,
- €1.5 thousand million for the 'Urban development and housing' thematic area, split between €1 thousand million for the 'City of tomorrow' programme, managed by the Loans and Consignments Fund (CDC), and €500 million for the 'Thermal renewal of housing' programme ('Live Better'), managed by the National Housing Improvement Agency (ANAH).

The main aim of the programmes being followed by the Government is to speed up the development of decarbonised technologies (renewable energies, CO₂ capture and storage, green chemistry, recycling) and different modes of future transport (road, rail, sea and air), firstly, to meet the challenges of reducing greenhouse gas emissions and the coming exhaustion of natural hydrocarbon resources, and, secondly, to strengthen the competitiveness of the associated industrial branches. For all of the actions, greater involvement of businesses is sought.

3 Overall Assessment of Energy Efficiency Trends

To clean energy efficiency indicators from the influence of climatic variations, all the indicators are calculated with climatic corrections. An indicator with climatic corrections represents the theoretical value of that indicator corresponding to a normal winter.

Over the period, climatic variations have played an important role. Since 1990, winters were about 10% warmer than normal winters (Figure 5).

In 2010, the winter was particularly cold.

3.1 Overall trends in energy intensity

Two indicators are generally used to characterise the relationship between energy use and economic growth: the primary energy intensity (i.e. the ratio primary energy consumption over GDP), and the final energy intensity (ratio final consumption over GDP²).

Between 1990 and 2010, the primary intensity decreased slower than the final intensity: -0.6%/year on average compared to -1% /year (Table 4).

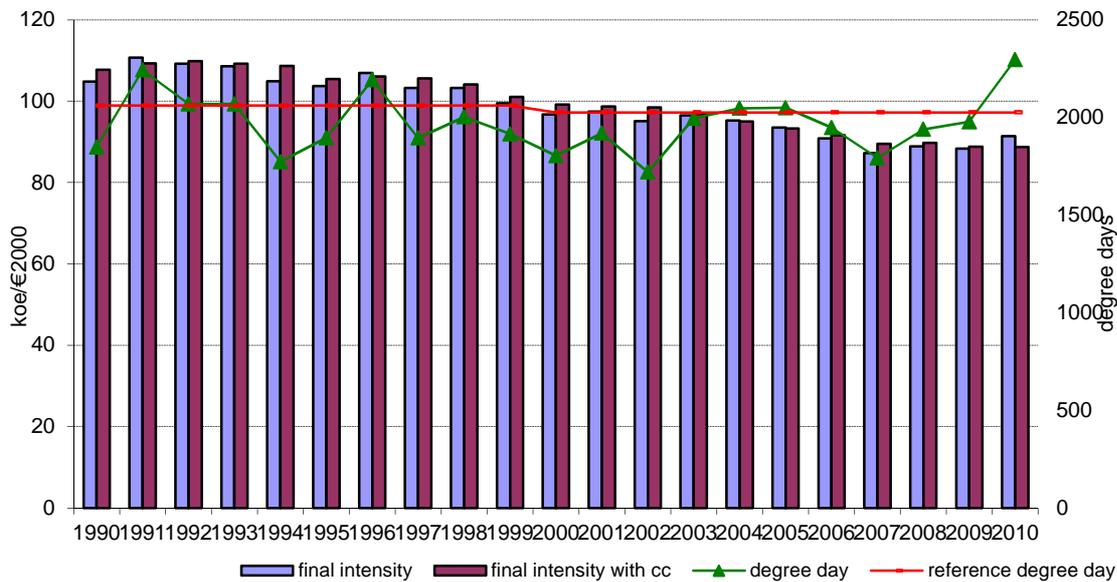
In 2010, the final energy intensity decreased by 0.1% compared with 2009. Surprising enough is the stronger increase of the primary intensity in 2010.

Table 4: Variations in primary and final energy intensities (normal climate)

	1990-2010	1990-1996	1996-2001	2001-2010	2009-2010
Final	-1,0%	-0,3%	-1,4%	-1,2%	-0,1%
Primary	-0,6%	1,0%	-2,0%	-0,9%	2,3%

² Excluding energy uses

Figure 5: Final energy intensity actual, with climate corrections and degree days.

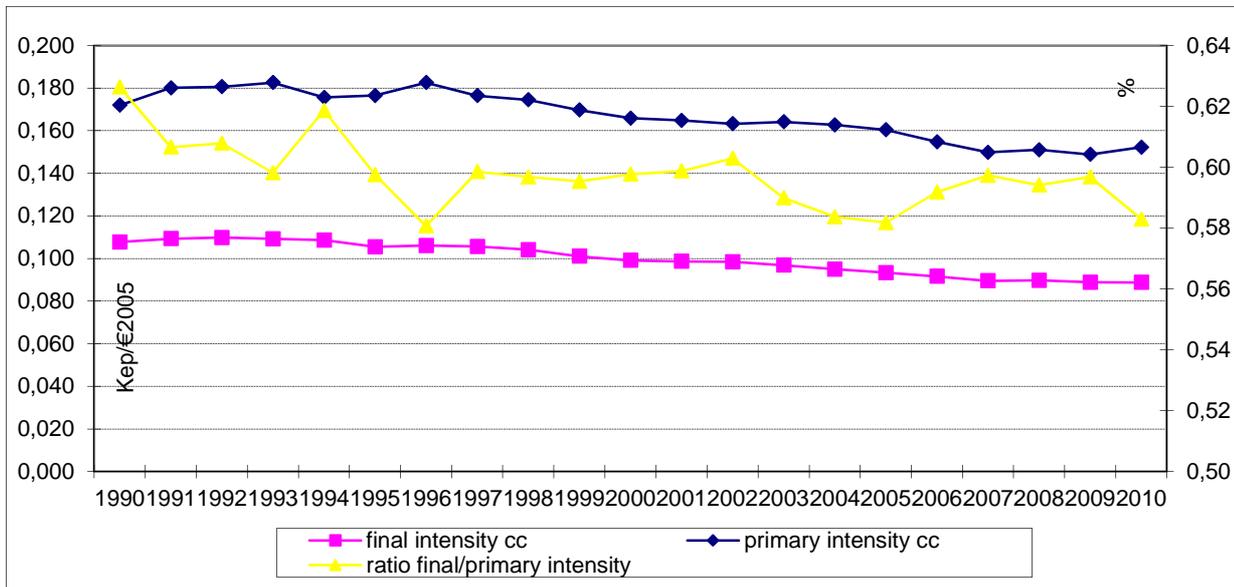


The different variations between primary and final intensities are captured by the ratio final to primary intensity (Figure 6). This ratio has regularly decreased from 61% in 1990 to 58% in 2010. This means that an increasing share of the primary energy consumption is not going to final consumers: it is consumed in energy transformations, mainly in the electricity production.

The main reason for these different trends is the rapid penetration of electricity, from 18% of the final consumption for energy uses in 1990 to 23% in 2010, which had two consequences on these intensities.

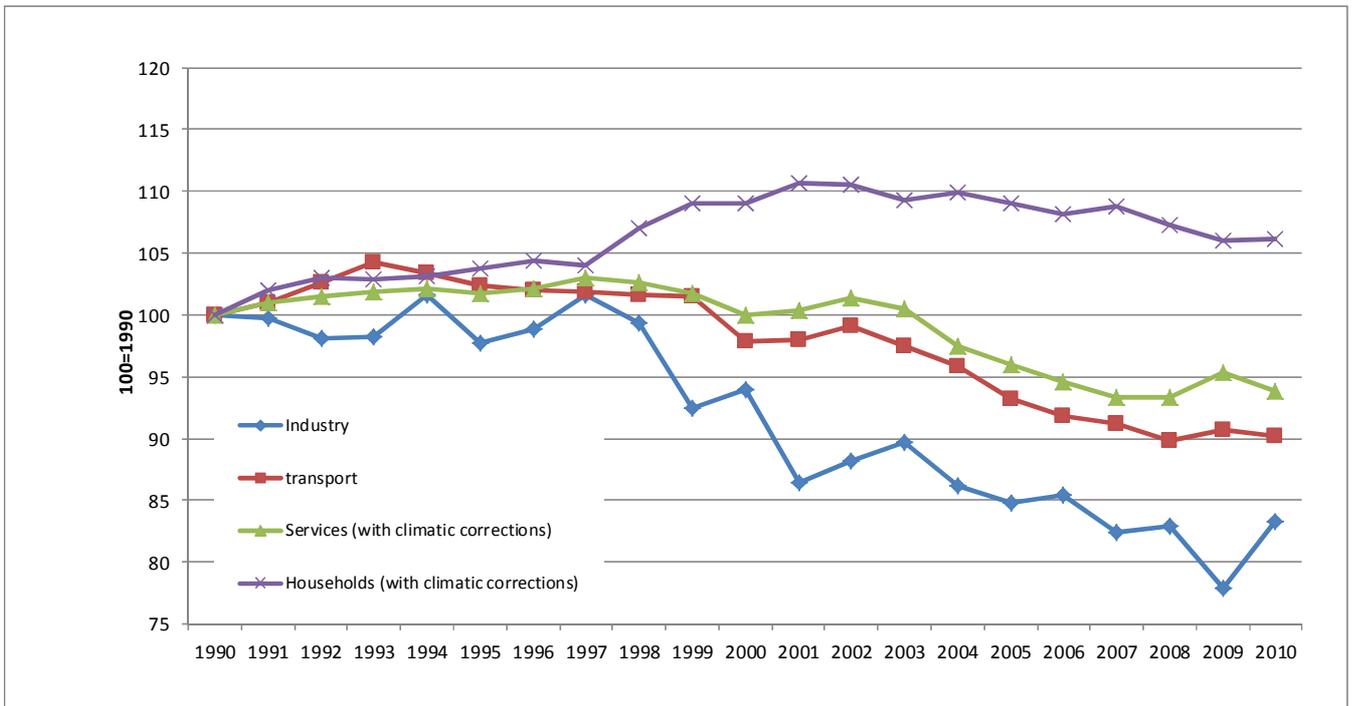
- Lower the final energy demand growth, as the substitution of electricity with fossil fuels generate energy savings at the level of final consumers (electricity is converted into toe assuming a 100% end-use efficiency);
- Increased losses in the transformation sector because an increased electricity production, all things being equal, that is dominantly produced from nuclear with a low efficiency (33%).

Figure 6 :primary and final energy intensities 1990-2010 (normal climate)



In details, the energy intensity for three sectors decreased since 1990 with a heterogeneous way (Figure 7). The trend of energy intensity of industry (ie. ratio final energy consumption over value added of the sector) is very irregular and decreased by 16.5% since 1990. For transport, the energy intensity slightly decreased by about 10% since 1990. For energy intensity in services (ie. ratio final energy consumption with climatic correction over value added of the sector) we can observe a little decrease of 6% since 1990. Over the period 1990-2010, these three energy intensity trends are steadily decreased contrary to the energy intensity of household. Energy intensity of household (ie. ratio final energy consumption with climatic correction over private consumption of household at 2005 price) has increased by 6% since 1990.

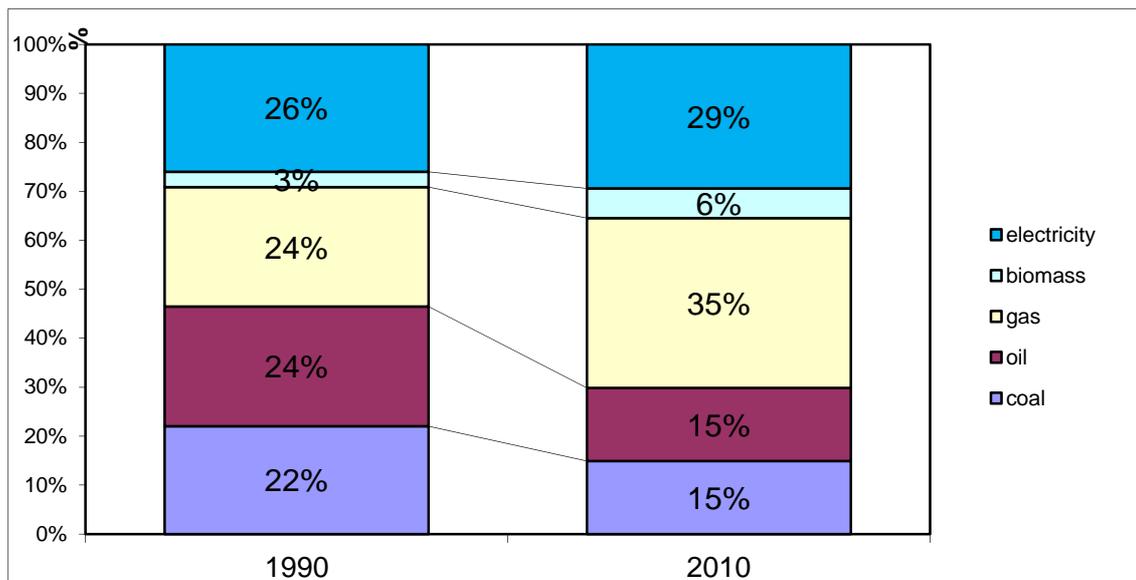
Figure 7 :Energy intensity trends by sector since 1990



3.2 Industry

Since 1990, the consumption of coal and oil decrease regularly. Gas and electricity increase in the same time to reach 64% of the total consumption (Figure 8).

Figure 8 : Distribution of energy consumption by fuel type since 1990



Although the value added growth of industry (euro 2000) improved by 26% since 1990, the final consumption has slightly decreased by 7.5% since 1990 (38.5 Mtoe against 35 in 2010). Consequently, the energy intensity has decreased by 17.6% since 1990 with an annual average growth rate of 0.9%/year.

In 2010, the energy intensity has decreased by 3.5%. However the energy intensity varied drastically according to the branches (see below Figure 9 and Figure 10).

Only one branch improved its energy intensity, food and tobacco industry (1.3%/year). Until 2006, the energy intensity of primary metals has increased considerably, although the crisis has caused a huge drop in 2009. Paper industry has also suffered of the crisis between 2008 and 2009.

Figure 9 : Branches of industry with a positive or a quite constant energy intensity between 1990 and 2010

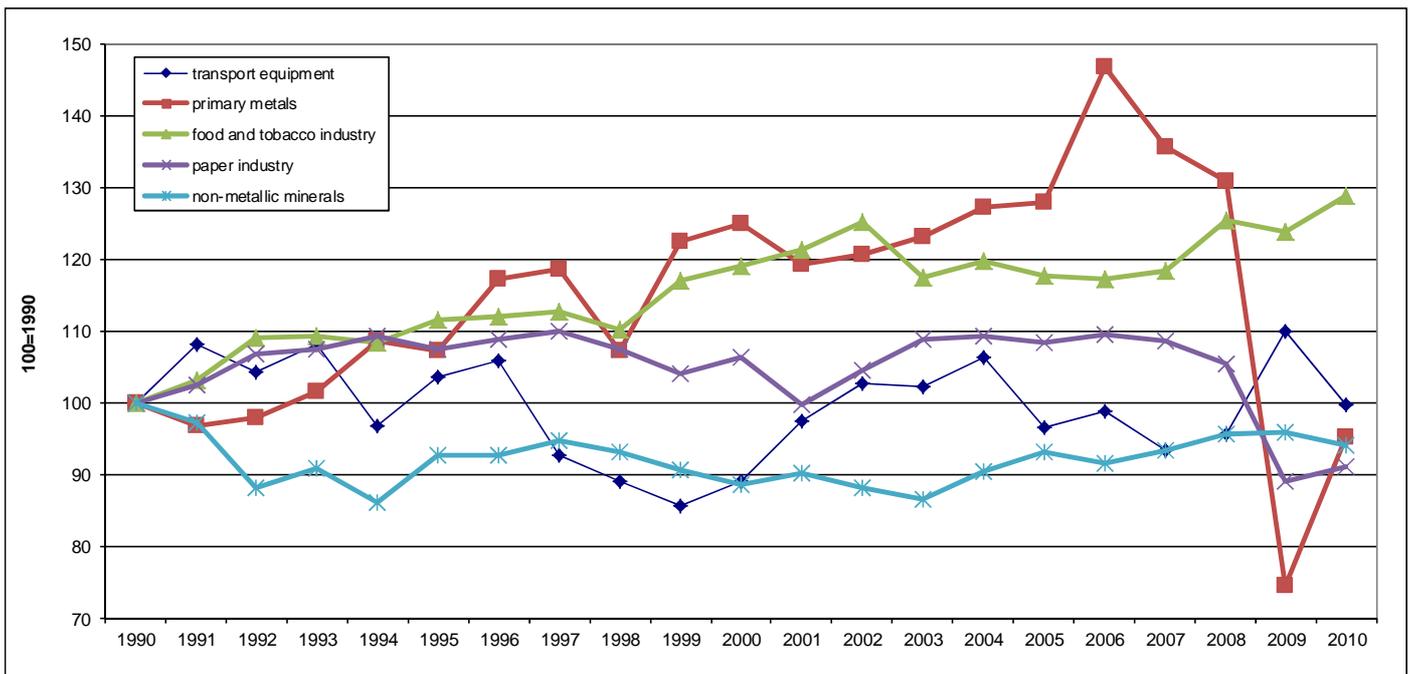
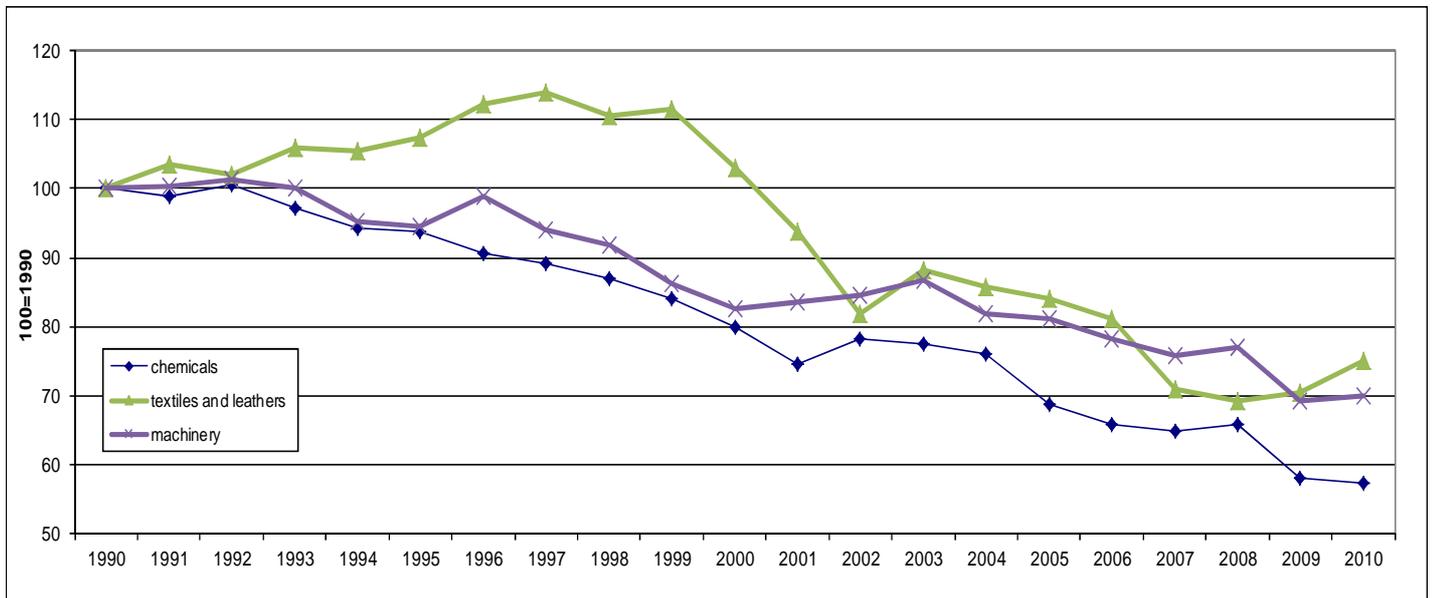


Figure 10 : Branches of industry with a decreasing energy intensity between 1990 and 2010

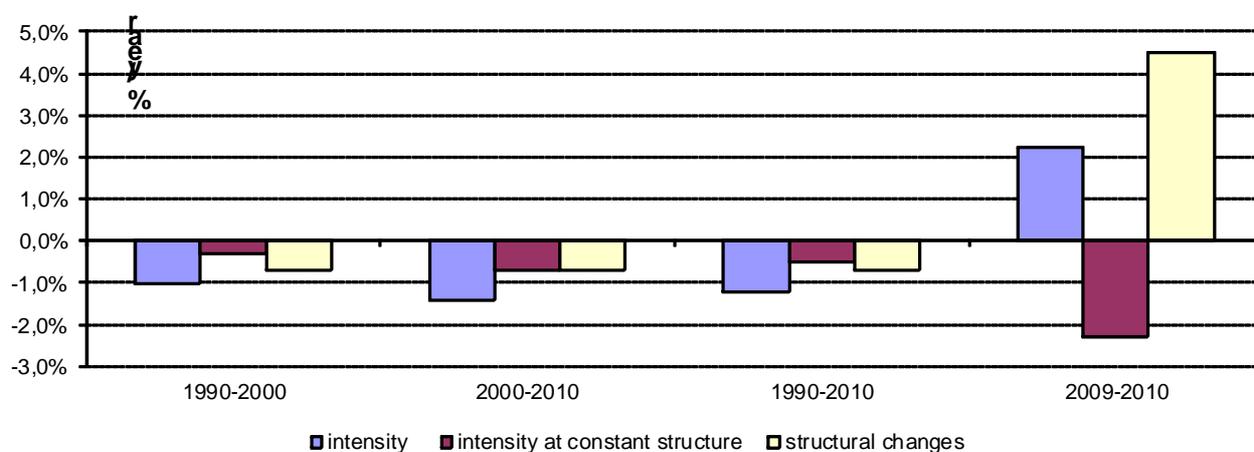


Three branches are their energy intensity which has decreased persistently since 1990, textiles and leathers, machinery and chemicals, with respectively -1.4%/year, -1.8%/year, -2.7%/year.

Structural changes were fully responsible of the energy productivity decrease since 1990.

The energy intensity in manufacturing industry has decreased by 1.2%/year since 1990 and by 1.4%/year since 2000. This trend is explained by two factors: a decrease in the energy intensity at the level of each sub-sector (branches) and structural changes (i.e. changes in the share of each branch in the total value added). Without structural changes the energy intensity would have deteriorated (Figure 11).

Figure 11: Energy intensity in manufacturing and structural changes

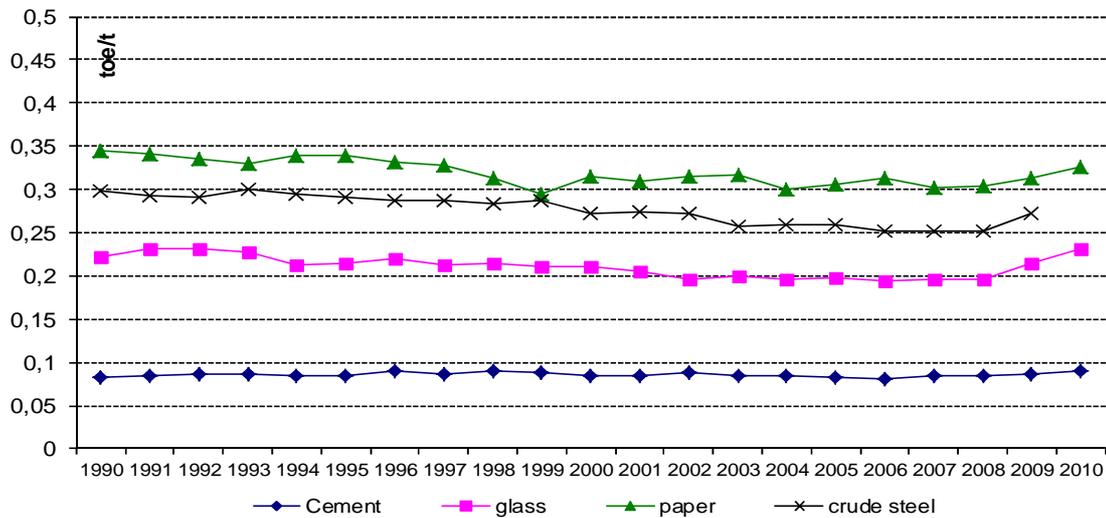


In 2010, the structural effect towards more energy intensive industries has been very important (4.5%) and has mainly contributed to the deterioration in energy intensity. In other words, without structural changes the energy productivity of the industry in 2010 would be improved.

Energy efficiency trend

The unit consumption (toe/t) of most energy intensive products remained stable over the period, -0.5% for crude steel, -0.3% for paper, 0.2% for glass and 0.4% for cement. In the recent year, there was a slight increase of unit consumption for glass (Figure 12).

Figure 12: Unit consumption trends of energy intensive products

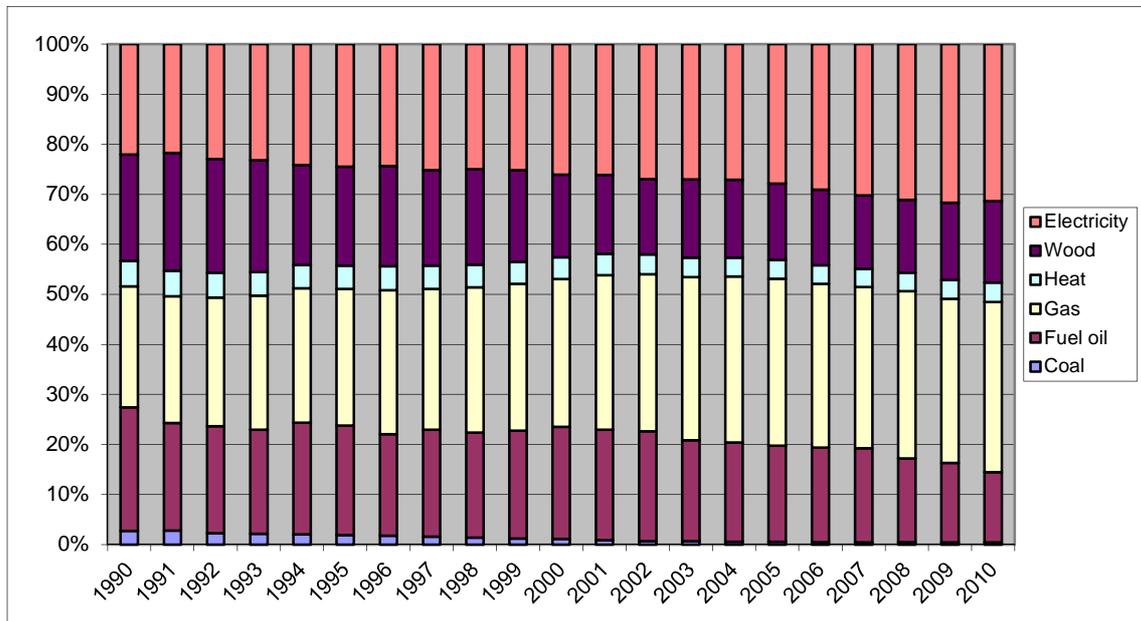


3.3 Households

The final energy consumption with climatic corrections has increased by 6% between 1990 and 2010 (40.5Mtoe to 43Mtoe). This rise wasn't steady over the period. Between 1990 and 2001, the final consumption has increased by 11% and between 2001 and 2010 this consumption has decreased by 4%. The decrease is partially due to the crisis. Since 2008, the final consumption is quite remained.

Since 1990, the trend of the different energies market share is continued. In 2010, the two dominant energies are gas and electricity with their respective shares of 33% and electricity 30% (against 24% and 21% in 1990). Wood and oil decreased respectively by 5% and 10% during the same period. The consumption of coal was insignificant (Figure 13).

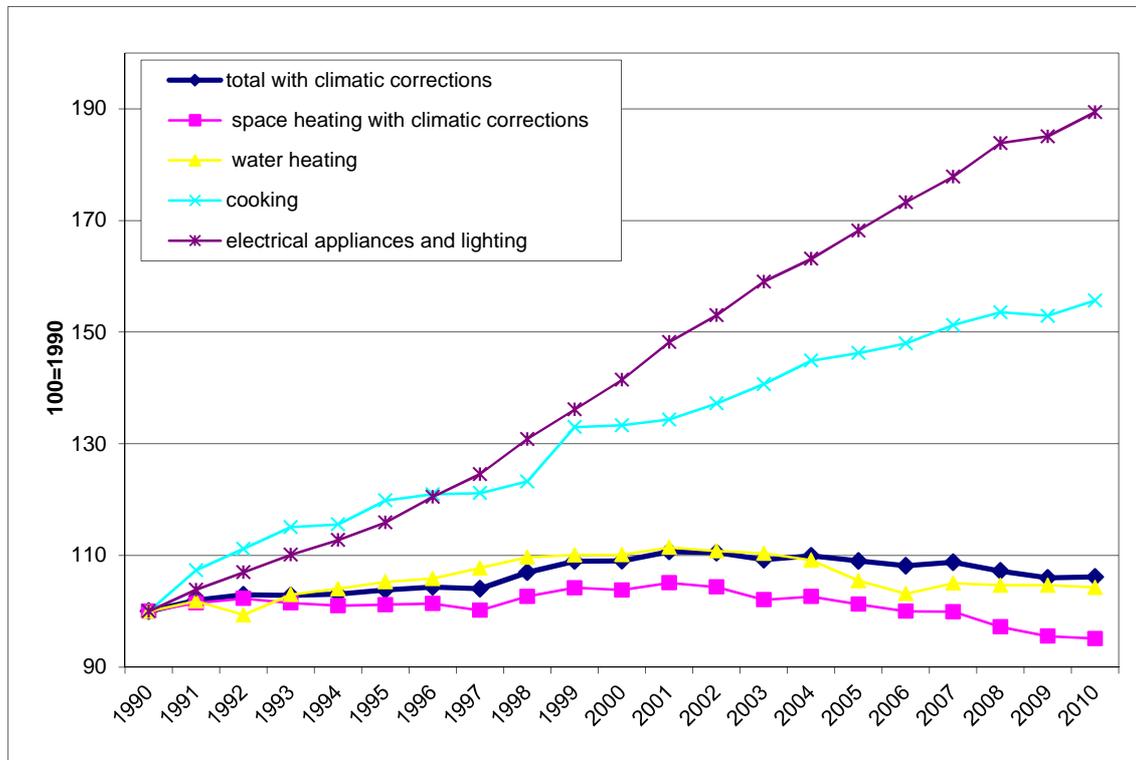
Figure 13 : Breakdown of the different energies in the consumption of dwellings



Except for space heating, the most dominant end uses, all the final consumptions by end-use have increased. The strongest rate of growth was for electricity consumption of electrical appliances and lighting (+89%) followed by the cooking (+56%) (Figure 14).

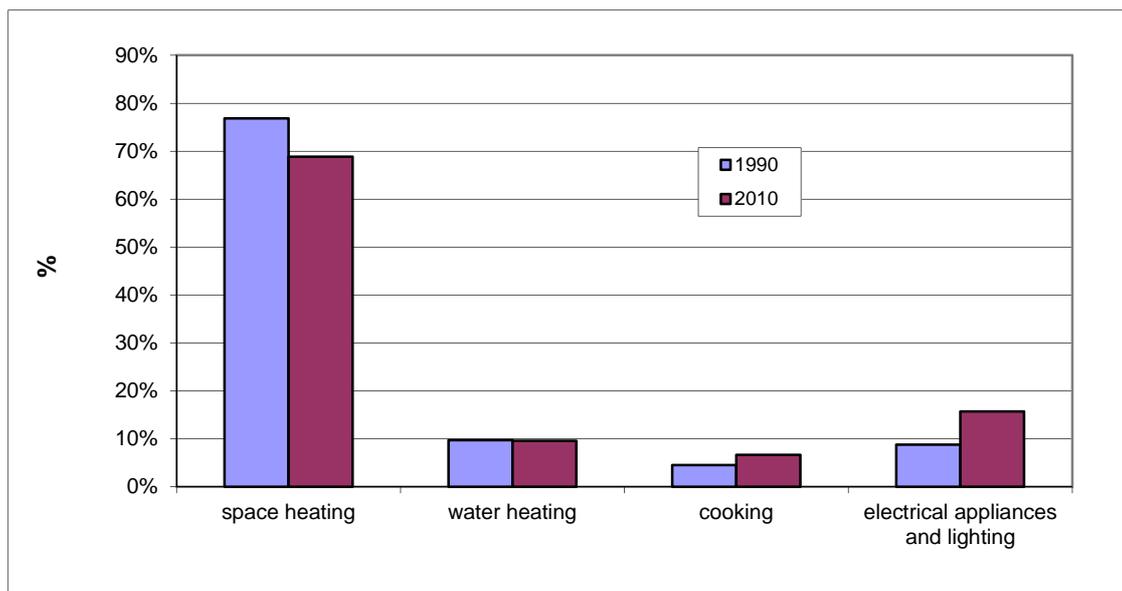
In 2010, no particular evolution can be observed and no impact of the crisis can be observed.

Figure 14 : Evolution of the final consumption of household by end-use



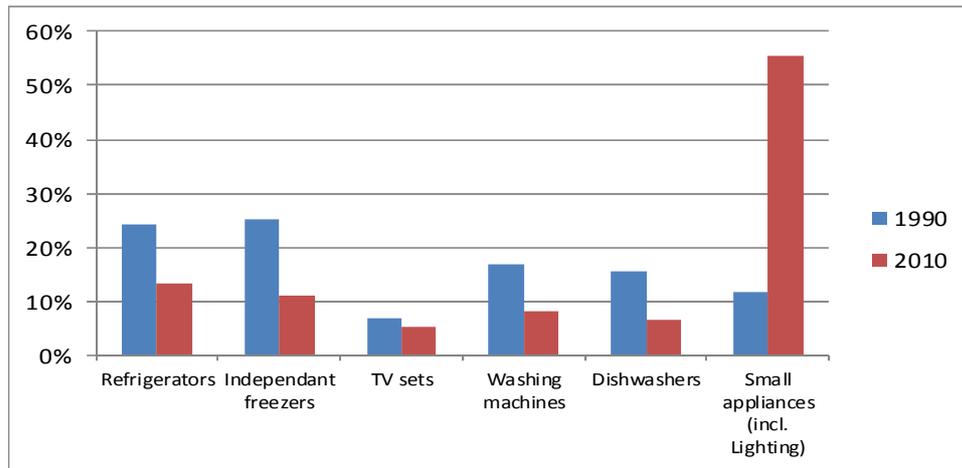
In the meantime, the share of the energy consumption by end-uses showed a drop for space heating 69% in 2010 against 77% in 1990. Oppositely the trend of the electrical appliances is increasing by 7% (Figure 15).

Figure 15 : Share of the consumption by end-use



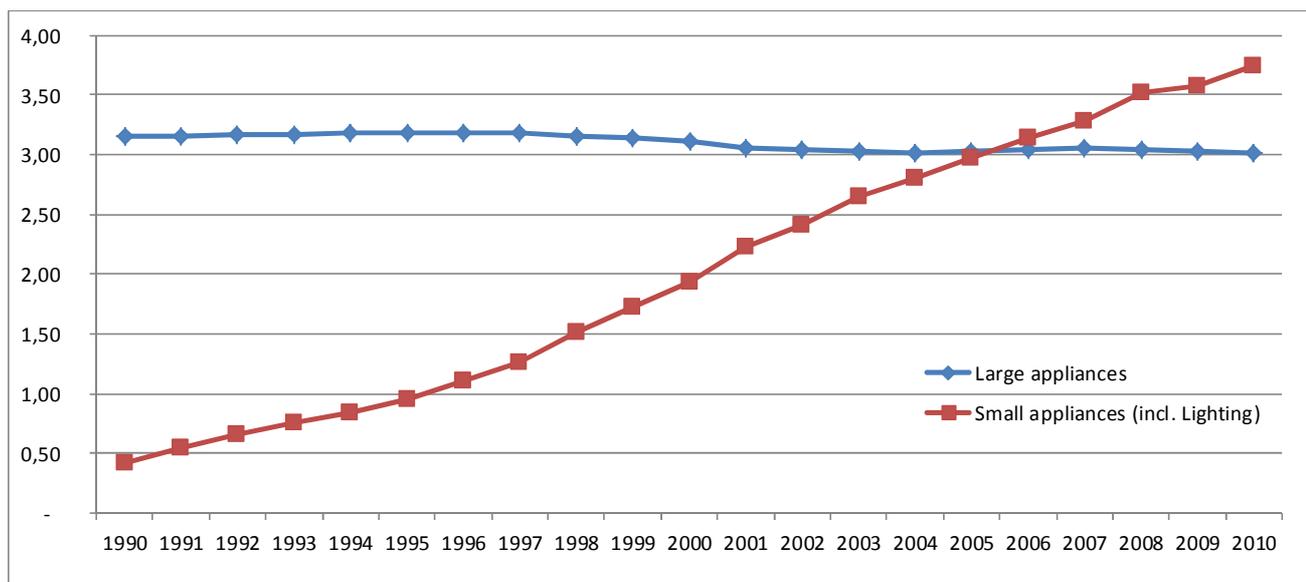
Since 1990, the consumption of electrical appliances and lighting has increased by 78% (3.6 Mtoe in 1990 and 6.8 Mtoe in 2010) corresponding to a market change of 9% to 16%. In details, the shares of the consumption of all the large appliances have decreased whereas the share of small appliances (incl. lighting) has grown up (Figure 16).

Figure 16 : Share of consumption of appliances



We certainly observe a saturation of energy consumption for large appliances due to the impact of labelling of large electrical appliances implemented from 1994. Since 2005, the consumption of small appliances was higher than the consumption of large appliances (Figure 17).

Figure 17 : Consumption of large and small appliances since 1990 (Mtoe).



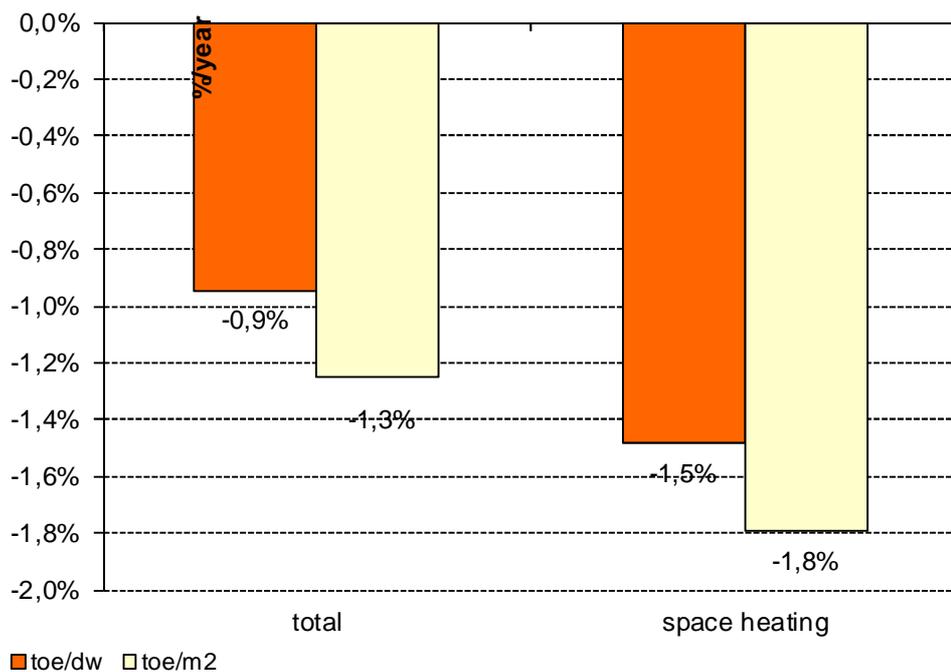
Energy efficiency trend

The increasing size of dwellings tends to offset the energy efficiency progress

The unit energy consumption of households related the square meter of floor area (toe per m²) is decreasing more rapidly than the energy consumption per dwelling (toe/dwelling), because of the growing size of dwellings (from 86 m² in 1990 to 92 m² in 2010). This is especially true for space heating.

The unit energy consumption per m² for space heating decreased by 1.8%/year, compared to 1.5%/year for the energy consumption per dwelling (Figure 18). The increase in the average size of dwellings has offset 17% of the energy efficiency improvement (measured in terms of a decrease of the energy consumption per m²).

Figure 18 : Unit consumption trend in total and for space heating between 1990 and 2010



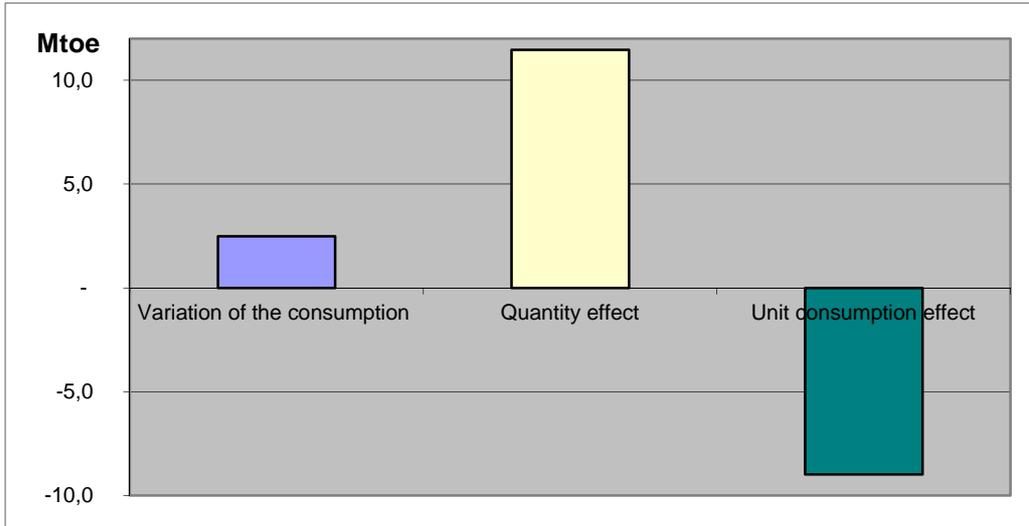
Energy savings

Due to energy efficiency, 9 Mtoe has been saved since 1990.

Since 1990, the final energy consumption increase by about 0.3%/year to reach 43 Mtoe in 2010. The savings due to the decrease of unit consumption were offset by

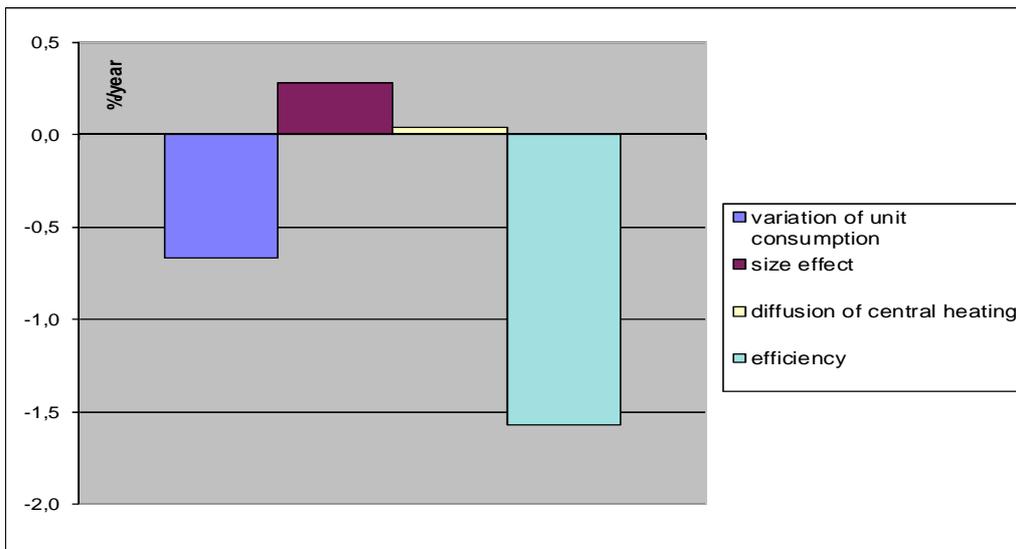
the rise of stock of dwellings (+28% between 1990 and 2010). The unit consumption per dwelling with climate corrections has nevertheless fallen by 17% between 1990 and 2010 (respectively 1.87 toe/dw and 1.54 toe/dw) and has generated 9 Mtoe of energy savings.

Figure 19 : Effects of stock and unit consumption changes on the energy consumption between 1990 and 2010



At a glance, the unit energy consumption effect can be explained by four other factors (Figure 20). Without the energy efficiency, the unit consumption would have increased by 0.32%/year between 1990 and 2010 due to respectively the diffusion of central heating (0.04%/year) and the increase of size dwellings (0.28%/year).

Figure 20: Explanatory factors of the unit energy consumption variation



3.4 Services

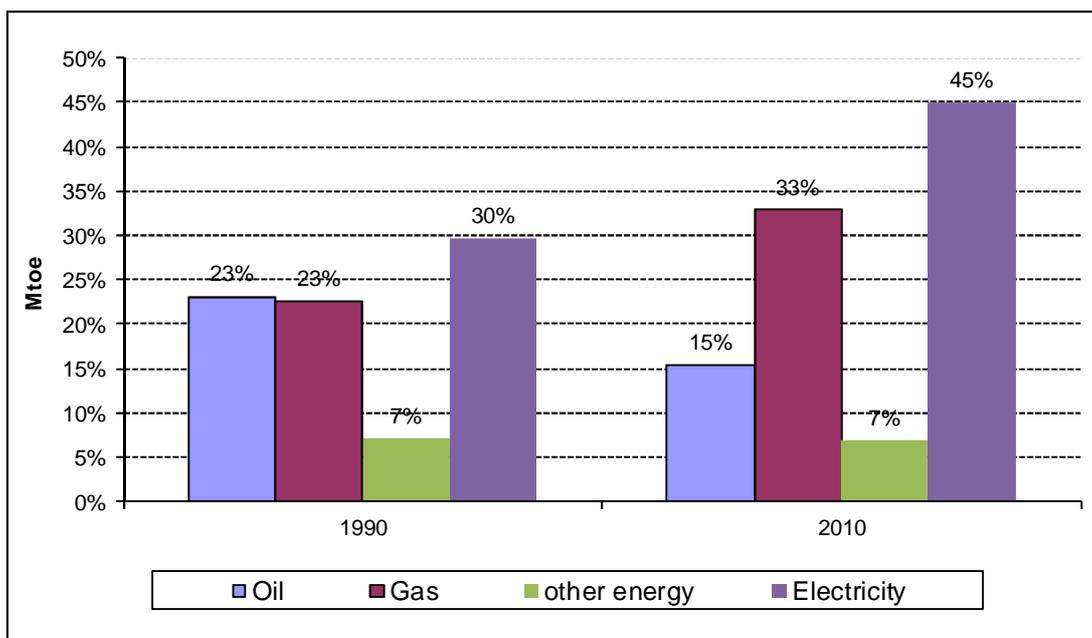
Energy consumption trends

The final consumption has increased by 1.4%/year since 1990 or 31% in total (14.7 Mtoe with climatic correction in 1990 against 19.4 Mtoe in 2010).

In 2010, final consumption with climatic correction is remained stable (0.26%). The crisis hasn't had any negative impact on the final consumption.

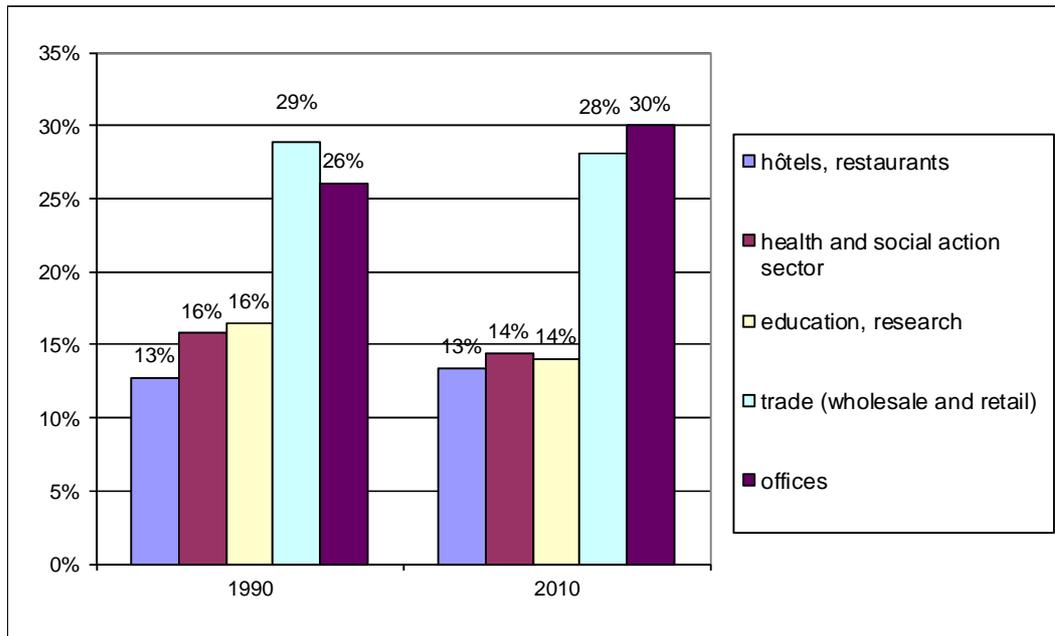
Since 1990, the fuel mix in the services has really changed. In 2010, electricity and gas were the main sources of energy corresponding to respectively 45% and 33% of the market shares. The consumption of oil has considerably decreased reaching 15%. The share of the other energies (renewable, coal) has the same. (Figure 21).

Figure 21: Energy by type in service sector



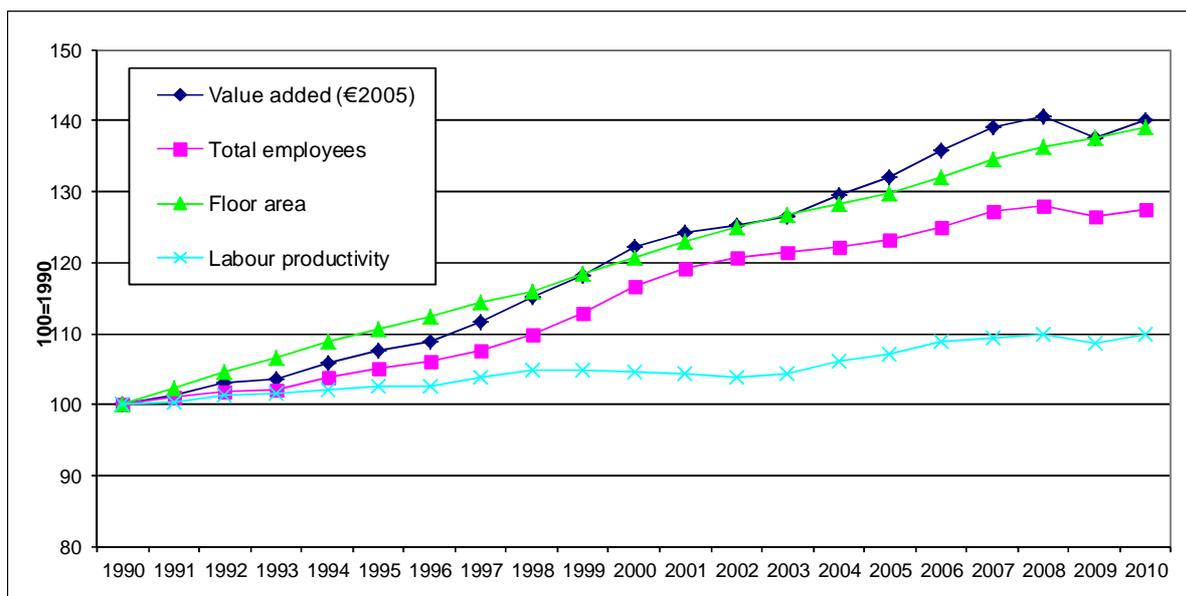
All sub-sectors have increased their consumption: about 0.5%/year for education, research, 0.9%/year for health and social action sector, 1.2%/year for trade, 1.6%/year for hotels, restaurants and 2%/year for offices. The breakdown of the energy consumption has almost not changed since 1990 (Figure 22) except for offices. They represented now 30% of the consumption of the services.

Figure 22 : Breakdown of the energy consumption by sub-sector



The services sector experienced a strong growth of activity. Since 1990, the value added has increased by 40%, the employment has grown up by 28%, the surface of building has risen by 39% and the labour productivity (value added divided by the employees) has increased by 10% (Figure 23). In 2010, the rising trend for these four indicators of activity has almost continued except in 2009 due to the impact of the crisis.

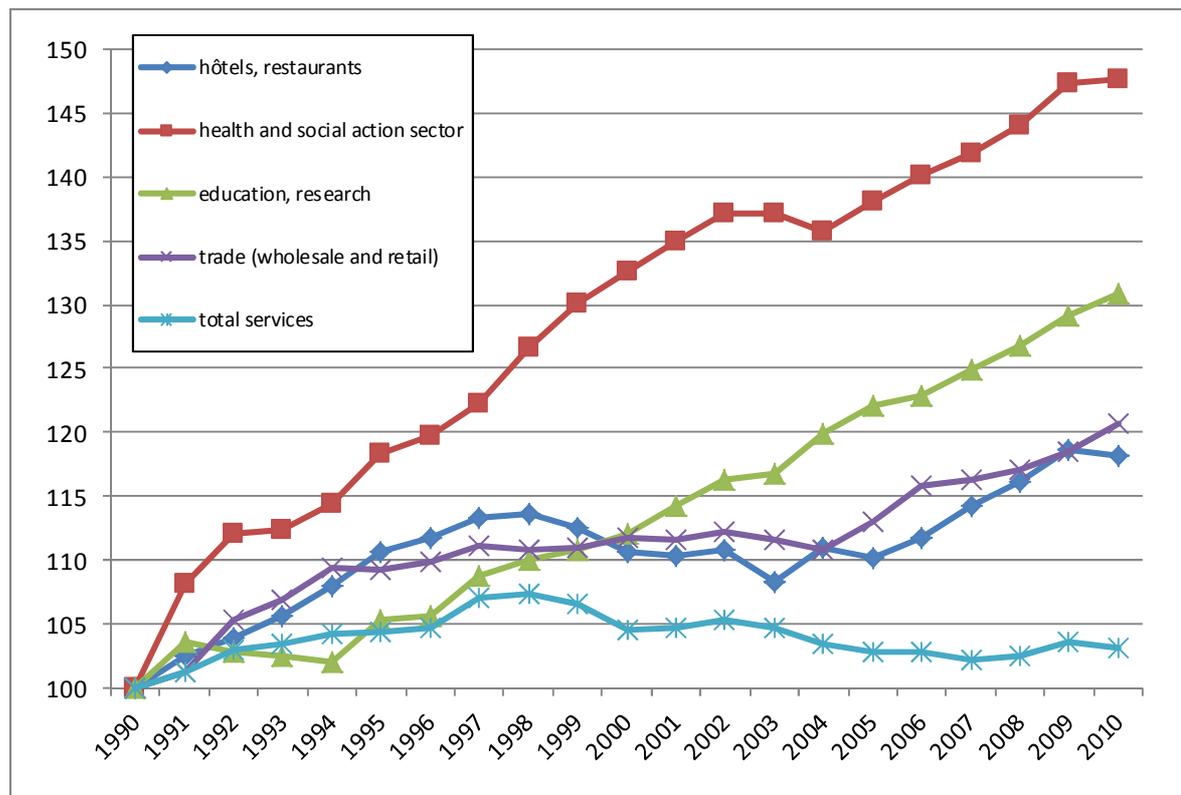
Figure 23 : The main indicators of activity in the services



Energy efficiency trends

All unit consumptions by branch have increased. The branch with the largest increases was health and social action (48%) (Figure 24). Then, education, research has also an important increase of 31%. The unit consumption of the other branches has risen by about 20%. Unit consumption per employee in the services was very irregular since 1990 and has grown up on average by 0.2%/year.

Figure 24 : Evolution of the unit consumption (toe/emp) since 1990



3.5 Transport

Overall context

Between 1990 and 2010, total energy consumption in the transport sector grew by about 24% (from 41 to 50 Mtoe). The consumption has steadily grown up during the 90's. Between 2001 and 2007, the trend was stayed stable. Due to the crisis, the consumption has little fallen in 2008 and 2009. In 2010, the consumption has risen by 1%.

Since 1993 the total energy intensity (energy demand in relation to the GDP in constant prices) decreased regularly by 0.6 %/year. This decoupling is even reinforced since 2003 with a decrease of the intensity by 1.9%/year from 2002 to 2007. In 2010, energy intensity decrease by 1%.

Energy consumption trend

Road transport represents 81% of the consumption in 2010 (87% in 1990) (Table 5). The share of air transport is 15%, against 10% in 1990. The consumption of rail transport is rather stable. The share of inland navigation is negligible.

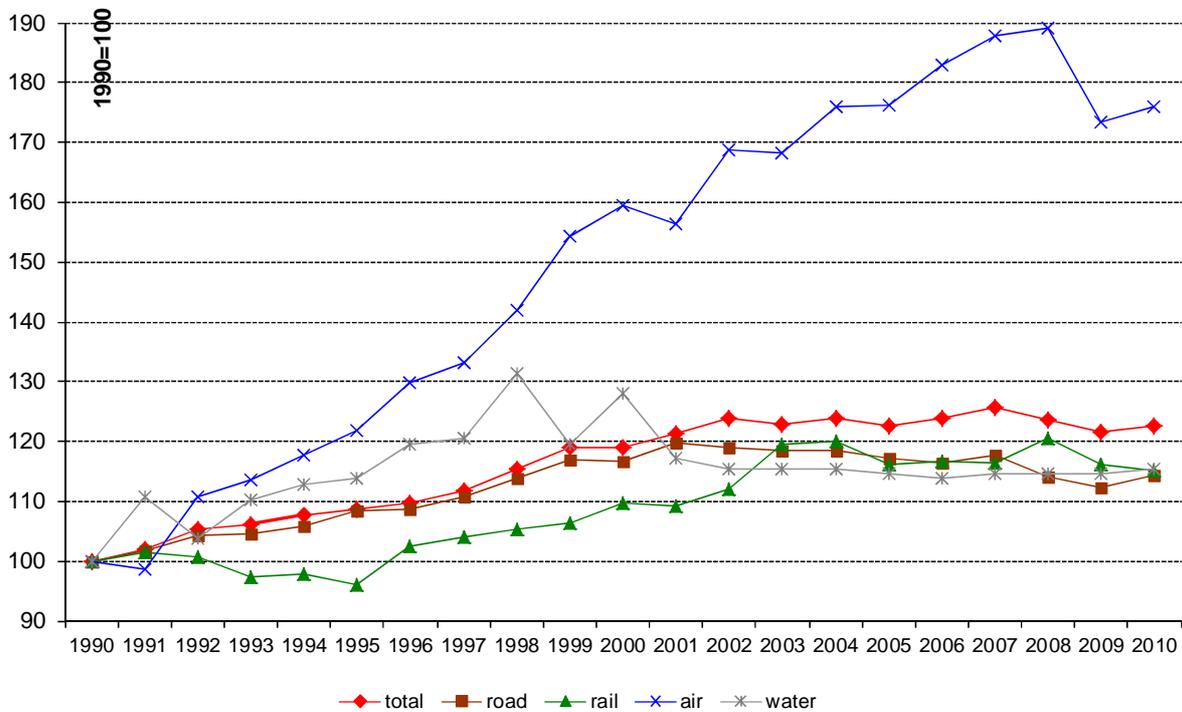
Table 5 : Transport energy consumption by mode

	1990	2010
road	86%	81%
rail	3%	3%
air	10%	15%
water	1%	1%

The overall consumption of the transport sector grew by 20% from 1990 to 2000 and is quite stable since 2000.

Road transport consumption increased by 14.5% since 1990, but remained stable since 2000 (Figure 25). This new trend is mainly the result of the sharp increase in oil price in 2000 and the result of the enforcement of speed limits via radar speed traps. Penetration of fuel efficient vehicles has also played an important role. Air transport consumption increased by almost 76% since 1990. This trend was irregular: rapid growth until 2000, decrease from 2001 to 2003, increase until 2008, drop in 2009 and in 2010 a little rise.

Figure 25 : Evolution of the transport consumption by mode (1990-2010).



Energy efficiency

Transport activities become less energy intensive since 1993, and have improved by about 10% in 20 years.

The unit consumption per tonne-km shows the impact of the two crises in 1993 and in 2008. It decreases since 1990 by 21% or 1.2%/year.

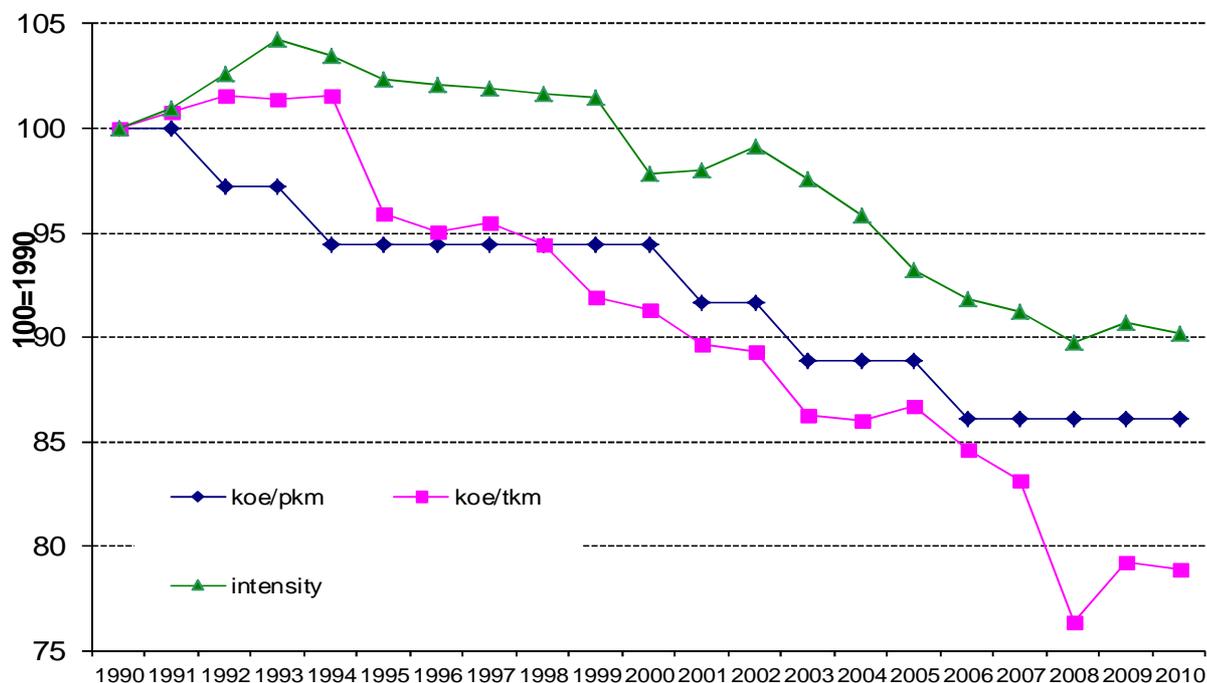
At a glance, the unit consumption for rail transport has greatly increased (180% since 1990), whereas unit consumption for road transport of goods has decreased by 21%.

The unit consumption/passenger/km is decreasing constantly since 1990 (-0.7%/year).

Between 1990 and 2010, the unit consumptions of domestic air transport and rail have decreased respectively by 0.7%/year and 3.2%/year.

Since 2000, the unit consumption per tkm tends to increase contrary to the unit consumption per pkm, which continues decreasing (Figure 26).

Figure 26 : Energy intensity, unit consumption per passenger-km and tonne-km in transport



Road transport activity

The share of different types of vehicle in the energy consumption has slightly changed. The car consumption share has decreased by 3% since 1990 representing now 61%, whereas the share of light vehicles has increased by 4%. The share of trucks has slightly decreased (22%) and the one of bus and motorbikes were still insignificant (Table 6).

Table 6 : Trend of road consumption by vehicle

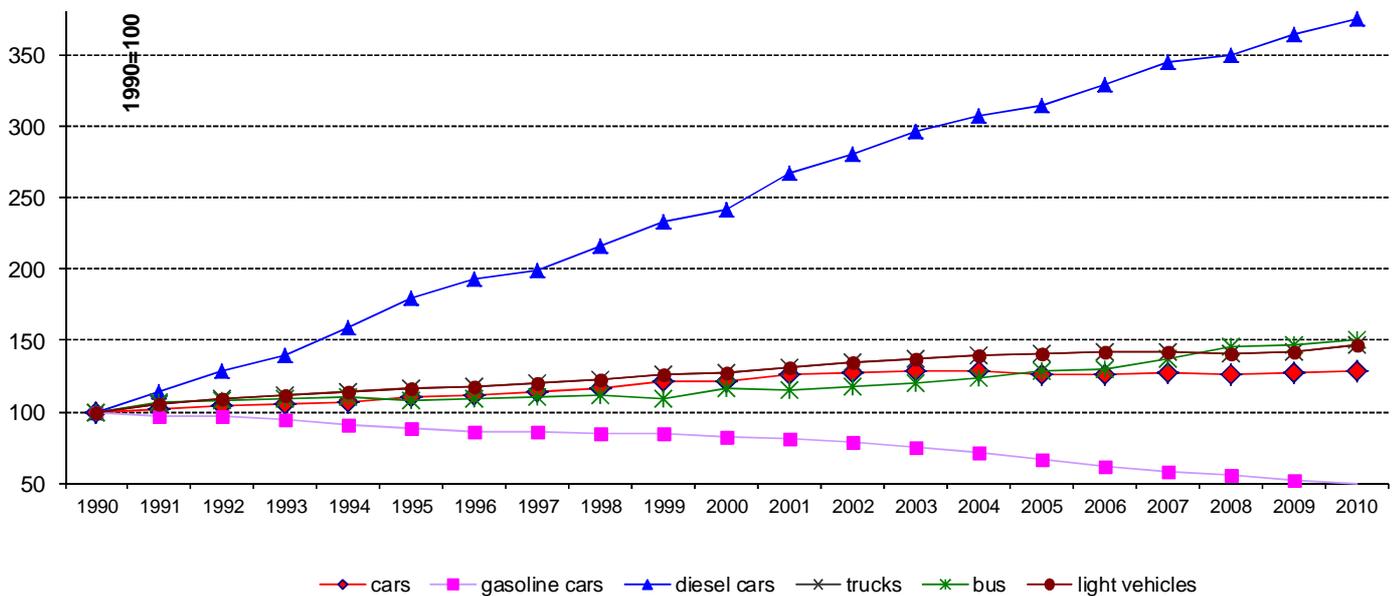
	1990	2010
cars	64%	61%
motorbikes	1%	1%
bus	2%	2%
light vehicles	15%	19%
trucks	18%	16%

The increasing trend of energy consumption in road transport is mainly driven by cars traffic, measured in vehicle kilometres. Since 2003, this car traffic has stopped increasing (Figure 27). The traffic of diesel cars increases considerably whereas the traffic of

gasoline cars decreases in the same time. For light vehicles and trucks, there is a constant progression of the traffic.

In 2010, the car yearly mileage was 2.2% less than the level of 1990. Over the period, the stock of car has grown up by 1.5%/year or 34%. However, the situation varies drastically between fuel type since the stock of diesel car has increased by 8.4%/year since 1990 and it decreased for the stock of gasoline car by 1.9%/year.

Figure 27 : Evolution of the traffic of road vehicles (in vehicle kilometre)



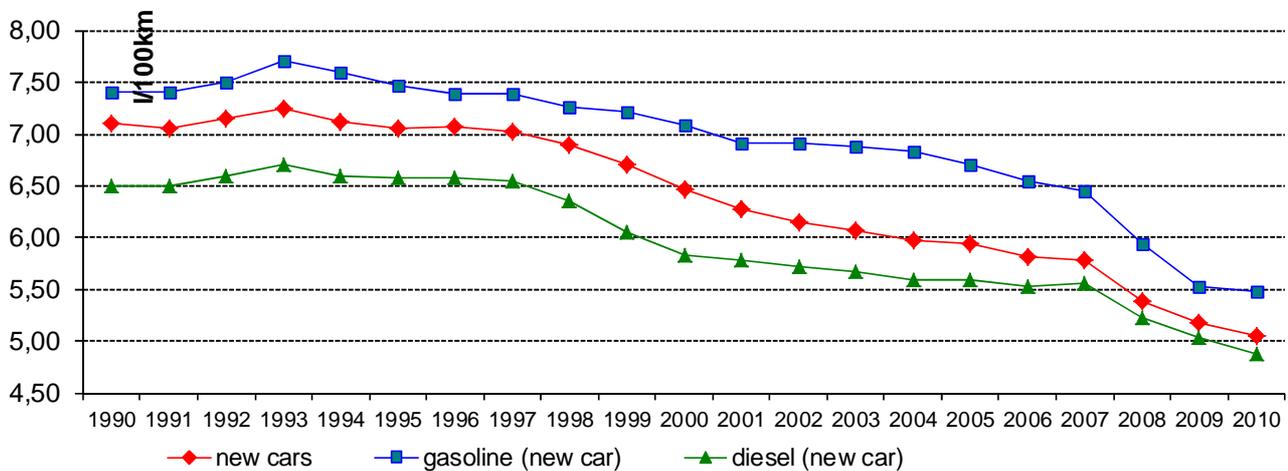
The share of diesel vehicles in the car stock continuously increases, 11% in 1990 against 57% in 2010. Diesel vehicles are since 2007 the most important component of the car stock and are responsible of 71% of the distance travelled.

Energy efficiency

Continuing technological improvement since 1997 particularly visible for gasoline in the recent years.

Due to lack of statistic, it's difficult to separate in the trend the impact of sales structure changes towards more powerful cars and the impact of the technological improvement. However in total, the specific consumption of car sales on the French market has decreased by 15.6% since 1990. For new car, the specific consumption has decreased by 29% (Figure 28).

Figure 28 : Evolution of tested specific consumption of new cars.



The evolution of the overall performance of the car stock results of three causes: recent decrease in gasoline car, stabilization for new diesel car and substitution towards diesel car. Translated in term of gCO_2/km , the performance of the French market sales is slightly above the EU voluntary agreement commitment (ACEA) ($149 \text{ gCO}_2/\text{km}$). For the French car alone, PSA Peugeot Citroën and Renault has already reached the objective of the agreement ($125 \text{ gCO}_2/\text{km}$). They have also reached the European threshold of $130 \text{ gCO}_2/\text{km}$ fixed for 2015 on the French market.

A decrease in the distance travelled per car since 1999 has reinforced the effect of more efficient vehicles.

Between 1990 and 2010, the unit consumption of car has decreased by 1% due to the improvement in specific consumption and to the increase of the distance (Table 7). The reduction is mainly observed for gasoline cars stock with a decrease of the specific consumption from 8.3 to 7.8 l/100 km, whereas for diesel cars the reduction was more modest, from 6.7 to 6.5 l/100 km. Since 1999, the average consumption per car (toe/car) decreased rapidly, by 1.5%/year. This trend is explained by a reduction in the average distance travelled by car of around 1000 km and in the specific consumption of cars, from 7.5 to 6.9 l/100km (-0.8%/year).

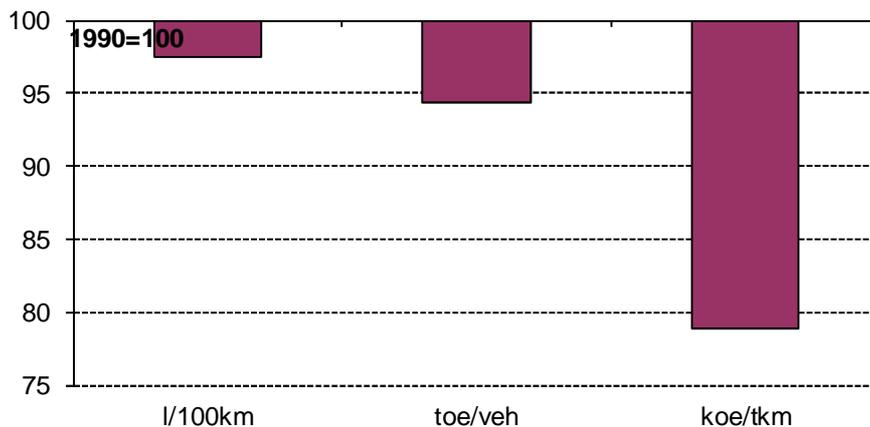
Table 7: Evolution of the unit consumption and specific consumption of the car stock since 1990

%/year	1990-2010	1990-1999	1999-2010	2009-2010
Unit consumption (toe/car)	-1,0%	-0,3%	-1,5%	0,0%
On road specific consumption (liters/100 km)	-0,8%	-0,9%	-0,8%	-0,3%
Influence of mileage	-0,1%	0,6%	-0,7%	0,3%

An increasing use of trucks

The specific consumption of trucks (in l/ 100km) remained stable over the whole period and the unit consumption per vehicle (in toe/vehicle) has decreased by 0.3%/year since 1990 (Figure 29). On the other side, the overall energy efficiency of the transport of goods by road has greatly improved, as the unit consumption of goods vehicles per ton kilometre has decreased by 1.18%/year since 1990. These three trends reflect an improvement of the utilisation of trucks, certainly due to optimization measures, better logistics, better filling of the trucks...

Figure 29: Unit consumption and specific consumption of trucks between 1990 and 2010



3.6 Assessment of energy efficiency/savings through ODEX: total and by sector

France has achieved a 21% energy efficiency improvement since 1990

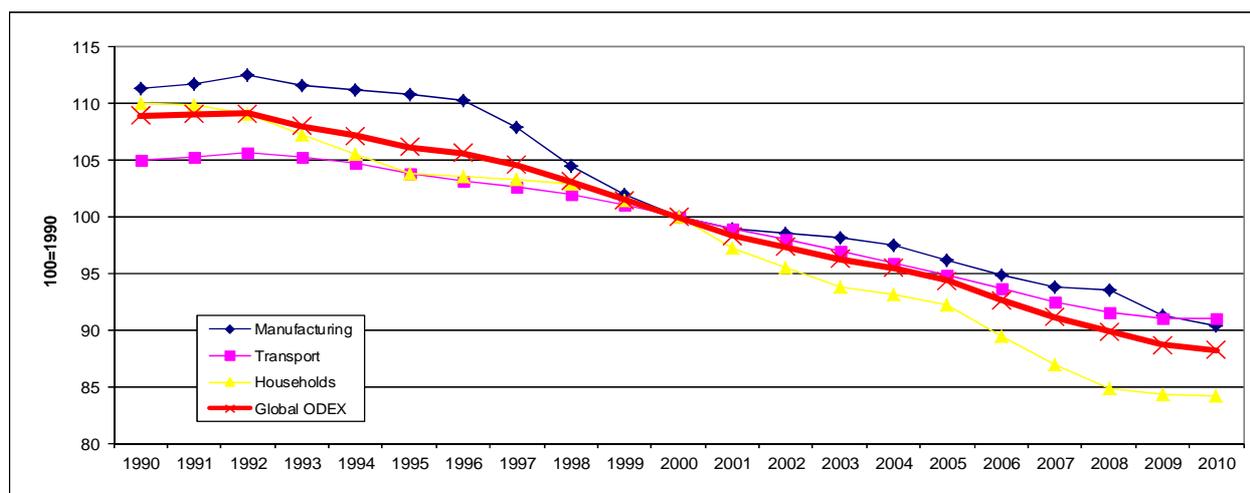
Overall trends

The final energy intensity is often used to describe energy efficiency trends for final consumers. But in fact the evolution of the final energy intensity can be caused by many factors which are not related to energy efficiency, such as structural changes in the economy, changes in lifestyles (e.g. more dwellings, bigger cars). These factors have to be separated to have a better overview of the real energy efficiency gains.

An aggregate energy efficiency indicators (ODEX) has been developed in Odyssee. It is based on 21 end-uses. It provides an overall perspective of energy efficiency trends by sector and combines the trends of indicators by end-use or sub-sector. It represents a better proxy to evaluate energy efficiency trends at an aggregate level (e.g. overall economy, industry, households, transport, services) than energy intensities, as it is cleaned from structural changes and from other factors not related to energy efficiency.

In 2010, overall ODEX shows improvement by 21% of energy efficiency since 1990; all sectors participated in a different ways to the efficiency progress: 21% improvement in industry, 25% for households and 14% in transport (Figure 30). In 2010, ODEX has gained 0.6% compared with 2009 indicating small energy savings. The impact of the crisis has slow down the trend of the ODEX, but the general trend is in line with the indicative target of the ESD (1.05%/year).

Figure 30 : Energy efficiency index by sector

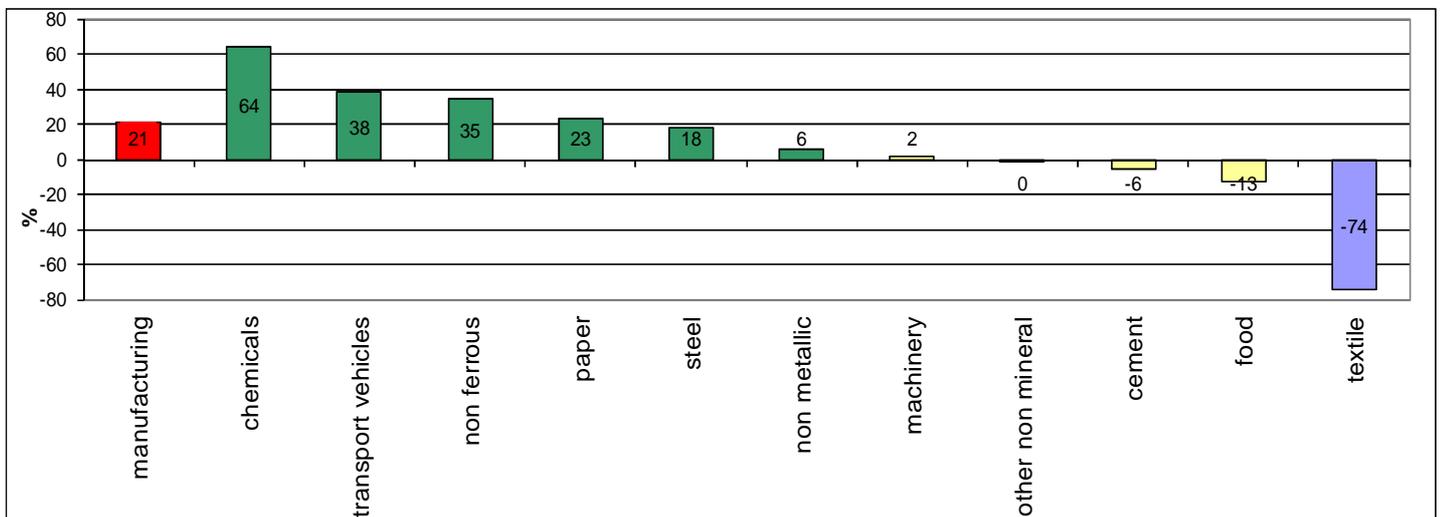


Industry

Overall energy efficiency improvements of 21 % since 1990

For industry, the energy efficiency index (ODEX) is calculated at the level of 10 branches (in terms of energy used per production index or per ton). Between 1990 and 2010, energy efficiency improved by 21% in industry as a whole. The main improvements are registered in the chemicals, non ferrous and transport vehicles industries : 64%, 35% and 38% respectively (Figure 31). On the other hand, other branches, such as cement, food, and especially textile had poor performances.

Figure 31 : Energy efficiency gain in Industry since 1990.



Transport

Energy efficiency improved by about 14% in transport since 1990

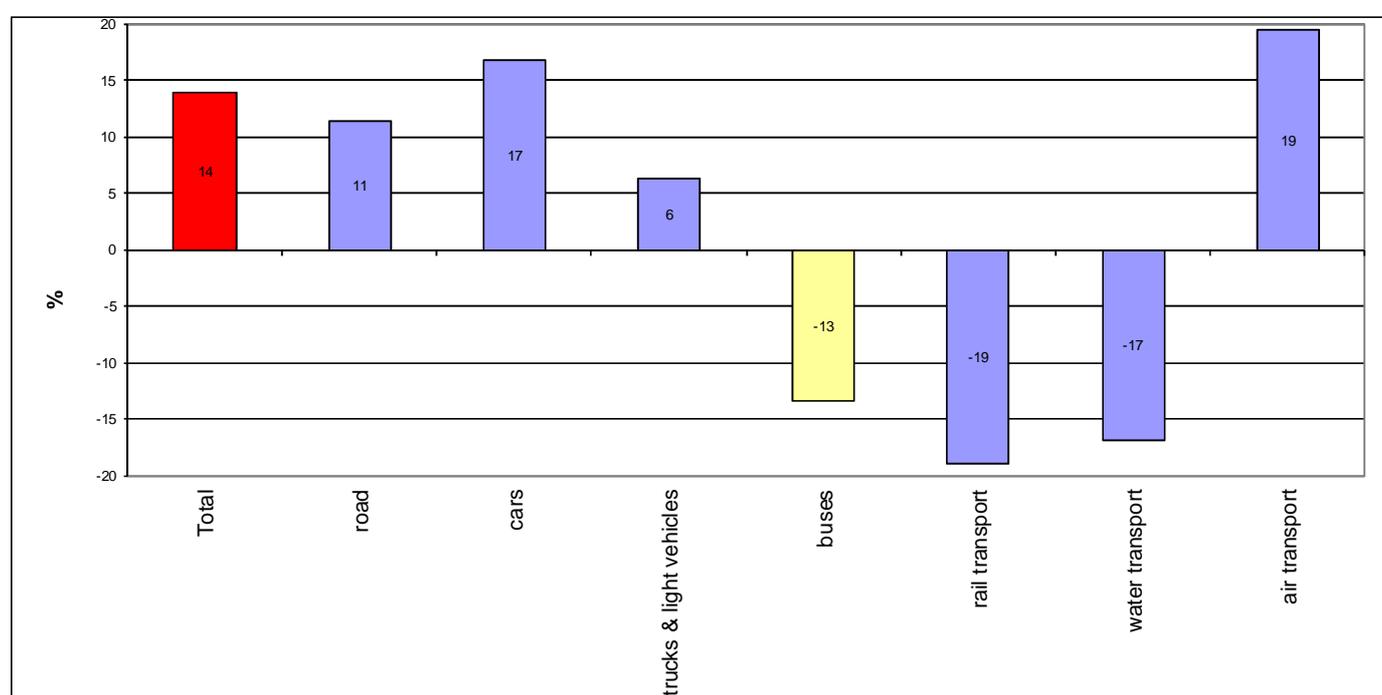
For transport, the energy efficiency index (ODEX) is calculated at the level of 7 modes or vehicles types (cars, trucks & light vehicles, buses, motorbikes, rail, water and air transport) and aggregated. Energy efficiency improved by 14% in the transport sector between 1990 and 2010; most of the progress achieved came from cars (17% improvements), and air transport (19%) (Figure 32). Trucks and light vehicles registered modest gains in energy efficiency (6%). The energy efficiency for buses, rail transport, water transport and motorcycles was negative (respectively -13%, -19%, -17%, and -60%).

We can note that, between 1993 and 2006, almost all traffic indicators tend to show a slowdown of the energy demand growth of transport compared to the economic activity, except for rail and buses. Since 2006, water transport didn't have any gain in energy

efficiency and since 2007 due to the crisis, trucks and light vehicles have lost 7% of energy efficiency.

For cars, the efficiency progress is due to the decrease of the specific consumption (-0.85%/year). For trucks and light vehicles, the unit consumption per ton-km, which is the indicator used to assess energy efficiency, decreased (1.18%/year), as the consumption per vehicle (in toe/veh) which has felt over the period (-0.3%/year).

Figure 32: Energy efficiency gain in transport since 1990



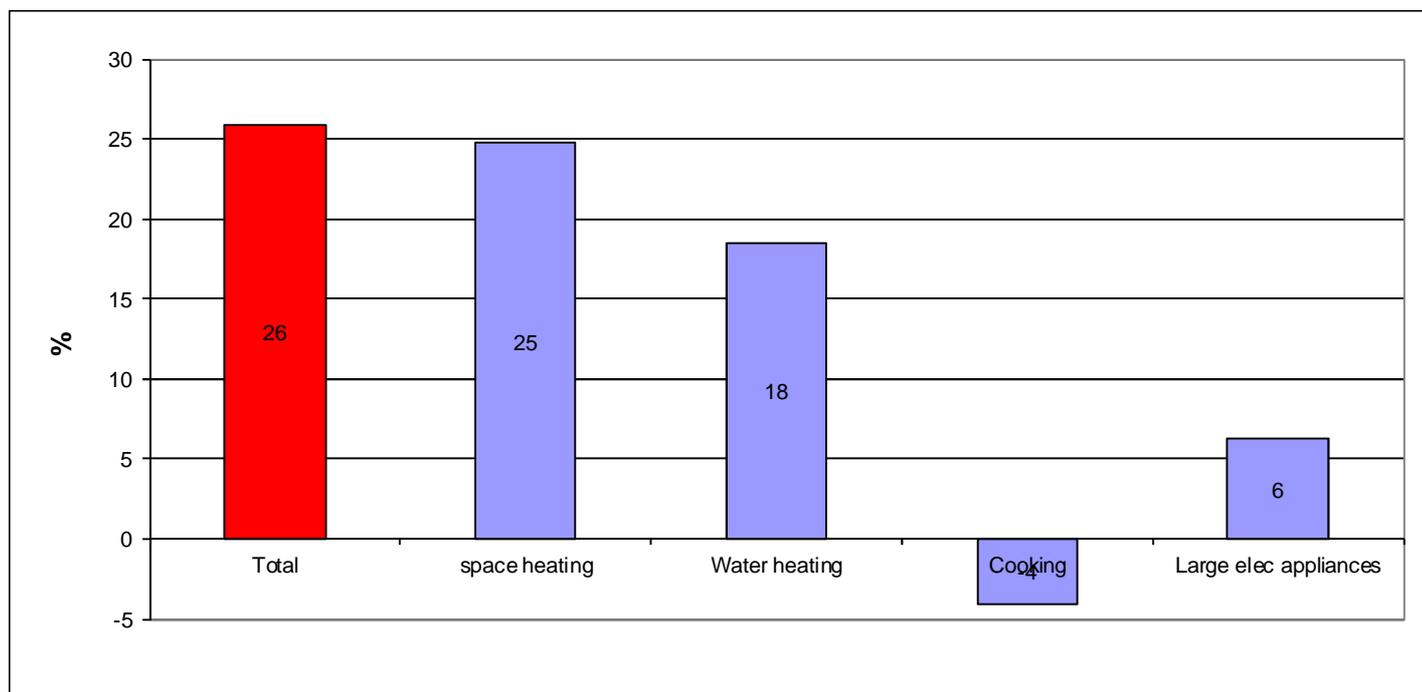
Households

Energy efficiency improvements of 25% since 1990

For households, the energy efficiency index (ODEX) is calculated at the level of 4 end uses: space heating, water heating, cooking and large electrical appliances, according to 5 appliances (refrigerators, freezers, washing machines, dishwashers and TV).

The energy efficiency in the households sector has improved by 25% over the period 1990-2010. The improvement is mainly due to space heating and water heating, with an increase of about 25% and 18% of their energy efficiency respectively (Figure 33).

Figure 33 : Energy efficiency gains for households since 1990



3.7 CO₂-emissions trends

In ODYSSEE, two types of emissions are considered: direct emissions and total emissions.

Direct CO₂ emissions correspond to emissions generated at level of the consumers by the combustion of oil, gas and coal. They correspond to the definition used in the official inventories in national communications to UNFCCC or EEA.

Total CO₂ emissions, includes in addition to the direct emissions the indirect emissions generated at the level of power plants by the production of electricity consumed in each end-use sectors. Total emissions show the responsibility of each end-use sector in the total emissions of the country.

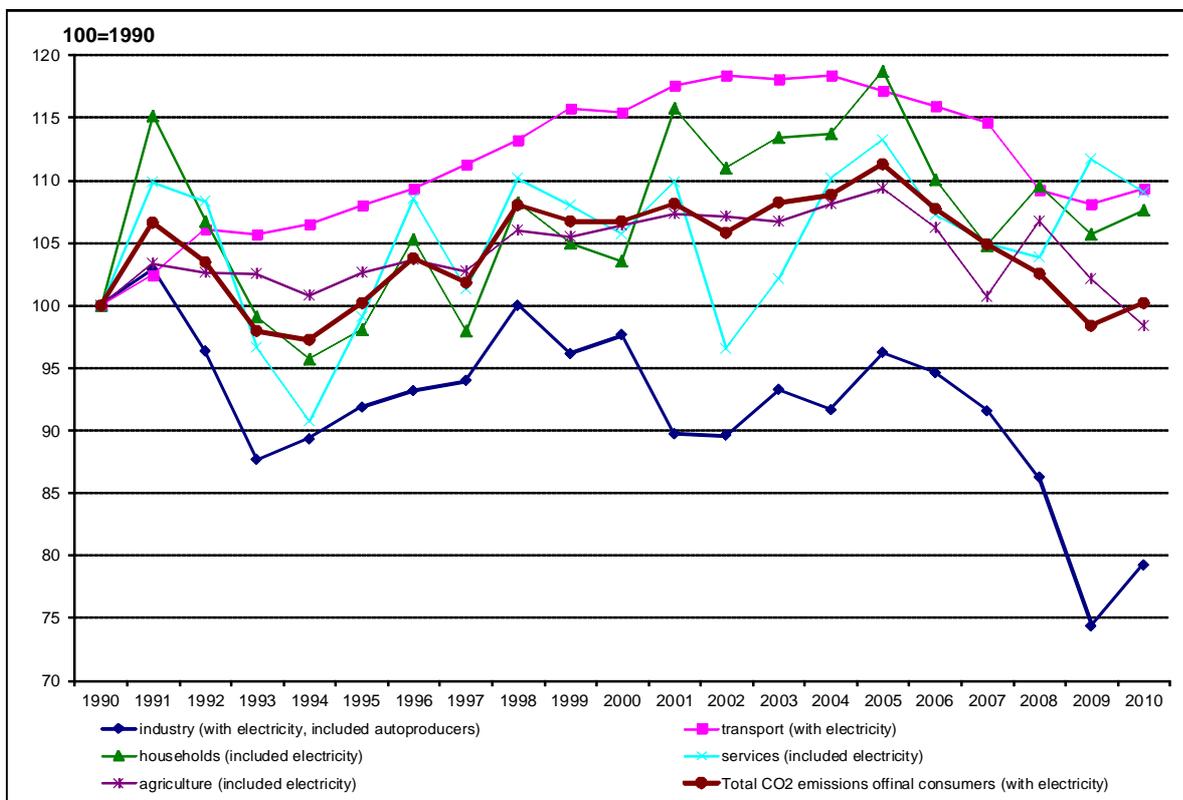
Direct CO₂ emissions

Direct CO₂ emissions have remained constant since 1990 in France (-0.01%/year). This decrease is only due to industry and agriculture. Indeed, industry emissions have felt by 19.6% since 1990 and agriculture emissions have decreased by 2.2%. On the contrary, the emissions of transport, households and services have increased respectively by 9.4%, 5.3% and 6.6%.

Total CO₂ emissions

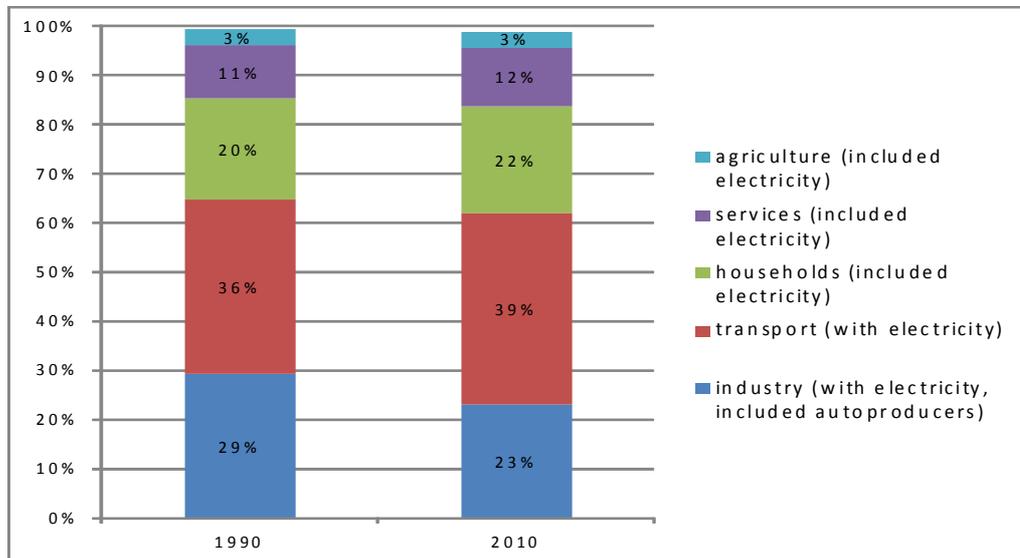
Change in total CO₂ emissions, including indirect emissions, have a similar trend by sector than direct emissions due to the stability of the electricity generation mix. Since 1990, the total CO₂ emissions (final consumers with electricity) has stayed steady (0.01%). We can observe the huge impact of the crisis on the industry which causes the global trend (Figure 34).

Figure 34 : Trend of total CO₂ emissions by sector



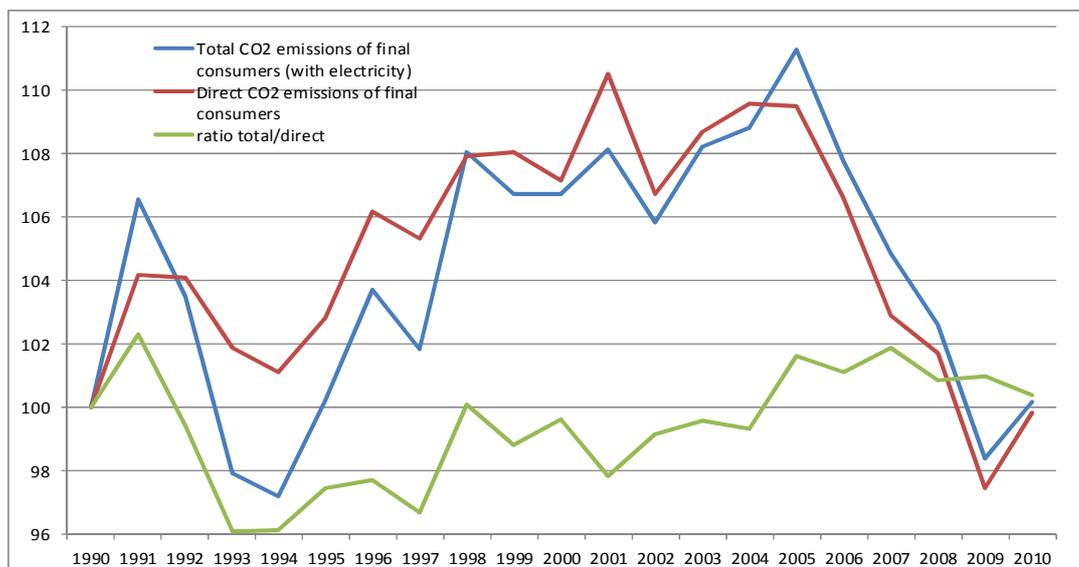
Between 1990 and 2010, the share of transport sector in the total of CO₂ emissions has increased by 3% whereas the share of industry has decreased by 6%. The share of households, services and agriculture has remained quite stable over the period (respectively about 22%, 12% and 3%) (Figure 35).

Figure 35: Evolution of the share of the different sectors in the total of CO₂ emissions between 1990 and 2010



Since 1990, the difference between total CO₂ emissions and direct CO₂ emissions is really obvious in households, industry and services. In the transport and agriculture, by definition, the difference is insignificant. In 2010 this difference is about 41 Mt CO₂. The glance is represented in the Figure 36.

Figure 36 : Difference between total CO₂ emissions and direct CO₂ emissions



4 Energy efficiency measures

4.1 Recent Energy Efficiency Measures

Residential Sector

A new thermal regulation, the **2012 Thermal Regulation (RT)** strengthens requirements concerning the thermal performance of new buildings: all new buildings with a building permit lodged after 1 January 2013 must have primary energy consumption below a threshold of 50kWh/m²/year. This requirement must be applied early, from 28 October 2011, in the case of public and service buildings and dwellings built in an ANRU³ zone. The 50 kWh/m²/year requirement concerns consumption of heating, cooling, lighting, domestic hot water produced and auxiliary equipment (pumps and fans). This threshold will also vary according to geographical location, altitude, nature of use of the building, average surface area of the dwellings and greenhouse gas emissions.

Sustainable Development Tax Credit (CIDD): since 2005, and the Programme Law establishing energy policy guidelines, private individuals have been eligible for a tax credit to purchase the most efficient materials or equipment in the area of energy saving (for existing build only) or of production of energy from renewable sources (for new and existing build). Following the Environment Round Table, the draft Finance Law for 2009 renewed this mechanism until the end of 2012 and extended it to social landlords. Since it was introduced, the list of equipment eligible for Sustainable Development Tax Credit and the rates applied have been regularly revised in order to speed up the pace of 'minor' thermal renovations and encourage use of the most efficient technologies. Between 2005 and 2010, it benefited 8 million operations (insulation, fuel shift...etc). In 2011, the most important budget for the government is the tax credit, €1.9 billion.

Implementation of Sustainable Development Tax Credit enables annual final energy consumption to be reduced by 0.32 Mtoe in 2009, 0.57 Mtoe in 2010, 1.28 Mtoe in 2016 and 1.43 Mtoe in 2020.

Zero-rated eco-loan (eco-PTZ): available since 1 April 2009, it is designed for owner-occupiers or landlords to finance major renovation work. It includes three options:

³ Dwellings built in zones reserved for access to property by low-income households and eligible for a VAT rate of 5.5%, instead of 19.6% (ANRU: National Urban Renewal Agency).

1. Implementation of a 'mix of works';
2. Achievement of a minimum 'overall energy performance' level for the dwelling;
3. Renewal of a 'non-public sanitation' system using a non-energy-consuming mechanism.

This loan finances up to €30 000 of work to improve the energy efficiency of a dwelling over a period of 10 years (which may be extended to 15 years by the bank, without, however, being eligible for tax credit relating to non-charged interest between years 10 and 15). Until 31 December 2010 it was possible to aggregate zero-rated eco-loans and Sustainable Development Tax Credit subject to availability of resources. A flagship measure for the 'Construction' strand of the Environment Round Table, zero-rated eco-loans were intended to contribute to the renovation of 200 000 dwellings over the period 2009- 2010, and 400 000 dwellings a year from 2013. As at 31 December 2010, there have been an estimated 150 000 eco-loans issued since it began, for work with an average cost of €19 200. The cost of the measure to the State is estimated at €75 million for 2009-2011.

Other recent measures

In addition, Grenelle 2 (Article 3) introduced a **requirement to carry out works to improve energy performance** for existing buildings used for service purposes or in which a public service activity is performed between now and 2020. The provisions implementing this measure, specifying how it will operate, will be published during 2011.

Lastly, since 1 January 2008 new buildings with a net floor area of more than 1000 m² must undergo a **feasibility study of the various energy supply solutions**, and in particular the use of renewable energies and the most efficient systems.

The '**Live Better**' program should permit 300 000 refurbishments between 2010 and 2017 (see innovative measures for more details).

Transport Sector

The "Grenelle of Environment" has set an objective of reduction of CO₂ emissions in transport by 20% in 2020 and of a decrease of the average emissions of the car stock from 176 gCO₂/km to 130 gCO₂/km. Two million of electric and hybrid cars are planned in 2020. The main measures for cars are the compulsory labelling scheme and an eco-

logical bonus since January 2008.

The 'ecological **bonus malus**': this mechanism, based on the CO₂ emissions per km of new vehicles, rewards purchase of vehicles with the lowest CO₂ emissions and penalizes acquisition of vehicles with the highest emissions. The mechanism has been highly successful and enabled average emissions of new vehicles registered in France to fall from 150 g of CO₂/km in 2008 to 128 g of CO₂/km in 2011 (-15%), while the historically-based decline, before introduction of the bonus-malus, was around 1.5 g of CO₂/km/year. Thus, the average emissions of new vehicles sold in France in 2009 was the lowest in Europe.

For the transport of goods, the main measure is the voluntary agreement "CO₂ objective" which is very successful. In 2012, 600 companies have signed the charter (representing 62 000 trucks). The potential of savings is estimated at 423 kteq CO₂/year.

Industrial Sector

The most challenging operation in industry was the implementation of the CO₂ National allocation plan amounting to 132.8 Mt CO₂ between 2008 and 2012.

Specifically intended for the industrial sector and introduced under Future Investments, the '**Green loans**' mechanism, put in place in July 2010 with a budget of €500 million, makes SMEs and industrial mid-caps eligible for loans at subsidised rates (total budget of €300 million) and loan guarantees (SMEs only - total budget of €200 million) for investment to increase the competitiveness and energy and environmental performance of their process or products. This mechanism is managed by OSEO, a public undertaking, the role of which is to finance and support innovation and growth among businesses. Since 2010, 2600 M€ of green loans was proposed to industrial companies to allow them to be more environmentally friendly (in their process and products) in order to be more competitive.

Tertiary Sector

The recent energy efficiency measures are described in details in the residential sector above (thermal building code, energy performance assessment, and sustainable building training scheme).

Cross-cutting measures

The **Energy Efficiency Certificate (EEC)** mechanism, created by Programme Law No 2005-781 of 13 July 2005 establishing energy policy guidelines (POPE law) is based on a three-yearly obligation to make EEC energy savings imposed by government authorities on energy suppliers (the 'liable entities'). The latter are thus encouraged to promote energy efficiency among their clients (households, local authorities or professionals). EECs are awarded, under certain conditions, by services of the Ministries responsible for energy, to eligible actors (liable entities, but also other legal entities) that undertake energy-saving operations or, in some cases, development of renewable energies, and may be traded. At the end of a period, energy-selling liable entities must demonstrate, on pain of a discharge penalty of two euro cents per missing kWh, that they have met their obligations by holding certificates for an amount equal to these obligations.

The national energy savings target for the first period of the mechanism (from 1 July 2006 to 30 June 2009), was set at 54 TWh Cumac (lifetime cumulated and discounted) and divided between the liable entities in line with their energy sales volumes and tax-inclusive prices. This target was exceeded, with almost 65 TWh Cumac of certified energy savings as at 1 July 2009, more than 86% of which were made in the residential sector. For the period 2010-2013, the energy saving obligation scheme for utilities has a target of 345 TWh cumac. At the end of 2011, 15 TWh of annual energy savings (232 TWh Cumac), had been certified, mainly in the household and service sectors. Since 2011, the scope was extended to oil companies.

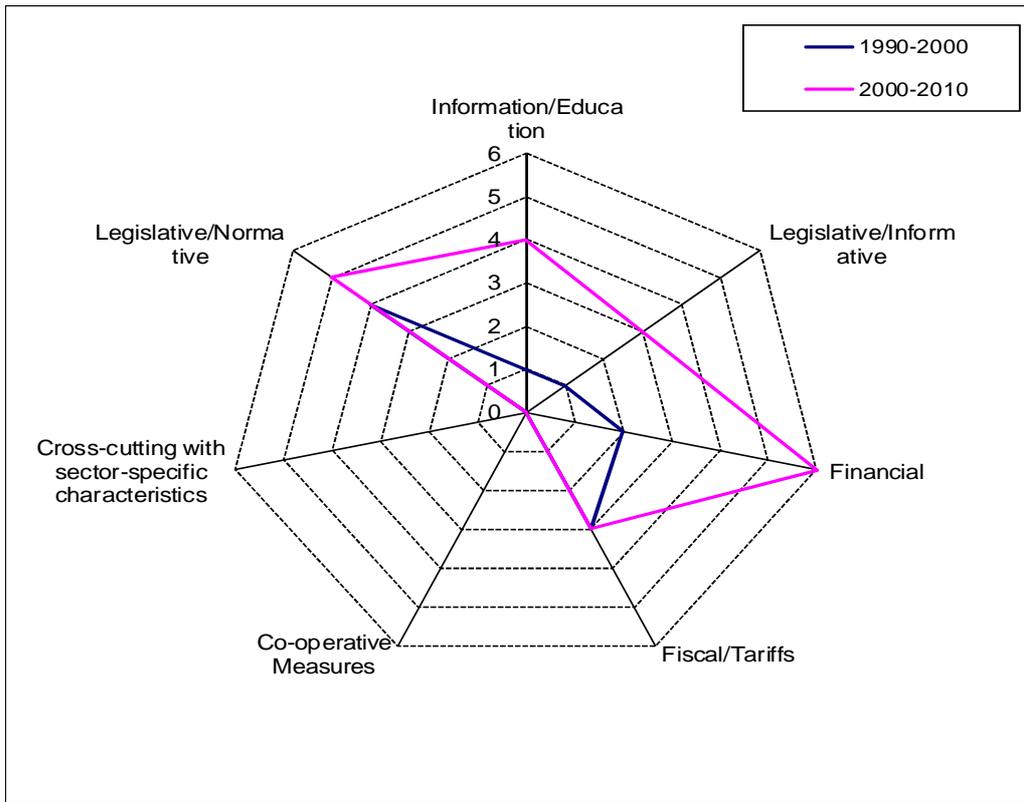
4.2 Patterns and Dynamics of Energy Efficiency Measures

Residential Sector

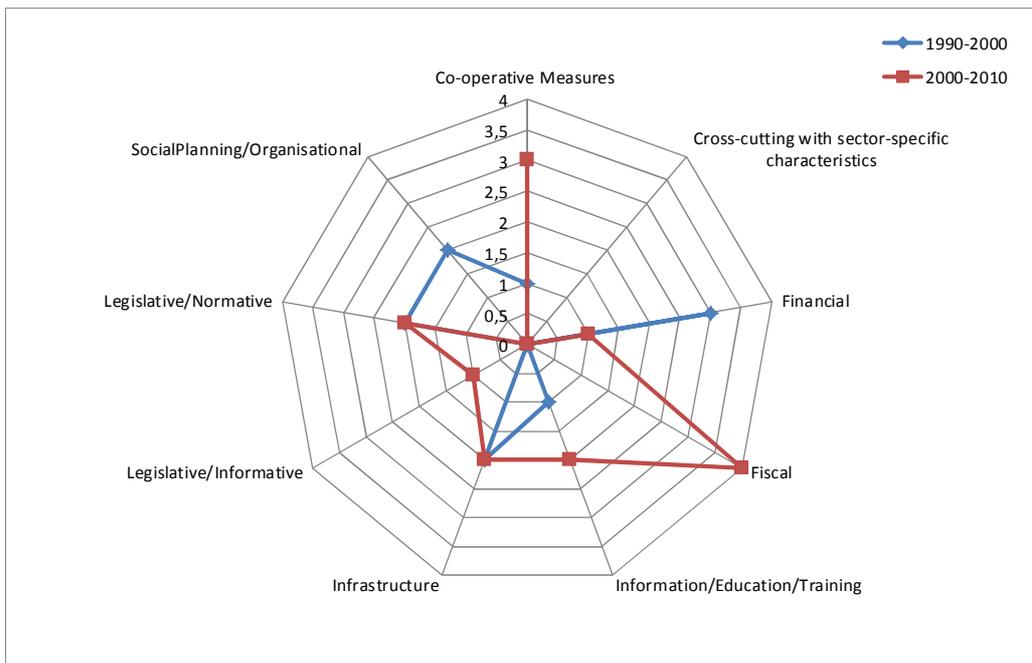
28% of the measures has been implemented before 2000, essentially normative (buildings code), financial and fiscal /tariffs measures.

The main measures implemented since 2000, are financial (green loan, tax credit...), information/education type and legislative/normative type as energy performance audits. Since 2006, 20 new measures were implemented essentially due to the "Environment Round Table". In 2010, there are 36 measures in this sector.

Energy Efficiency Policies and Measures in France in 2012



Transport Sector

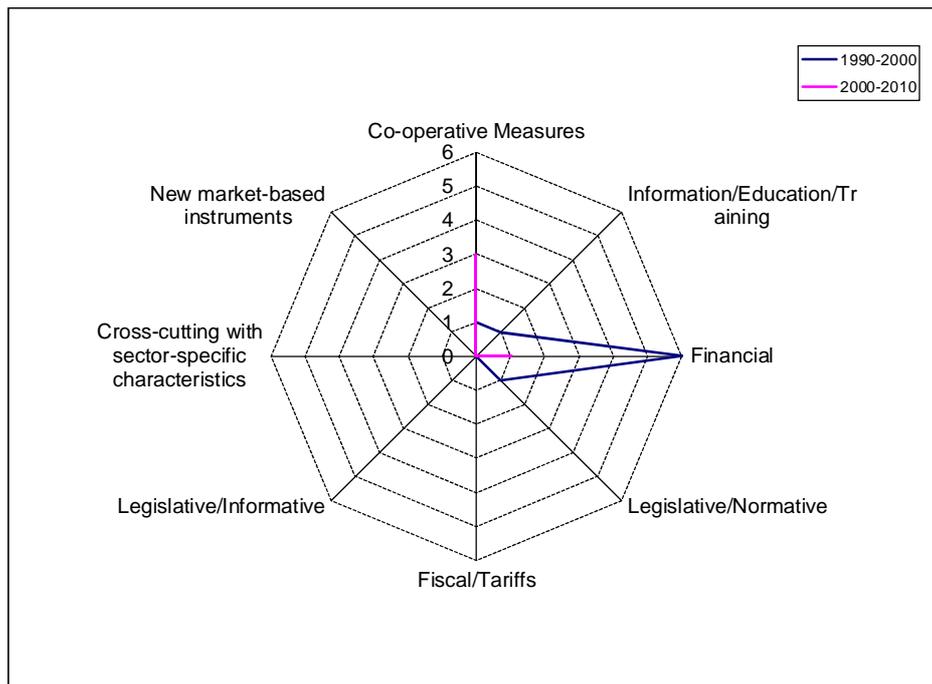


Between 1990 and 2000, the majority of type of measures were social planning/organisational, financial, infrastructure and normative. Since 2000, fiscal measures were dominant. There is also a diversity of type of measures that have been implemented excepted financial and social/organisational type.

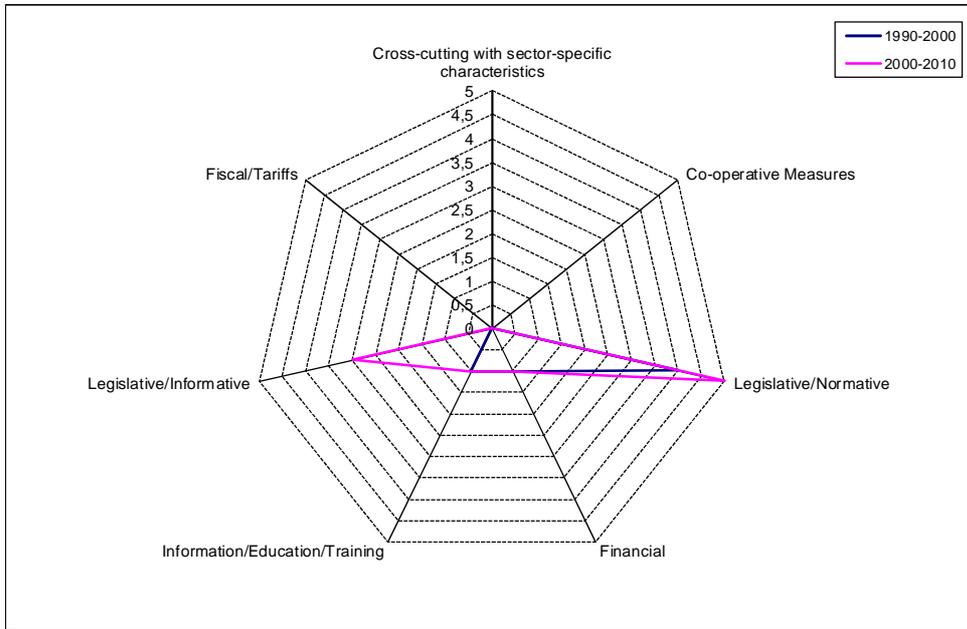
Since 1990, all type of measures has been implemented excepted cross cutting with sector specific characteristics.

Industrial Sector

Before 2000, the measures were essentially financial. After 2000, co-operatives measures, such as voluntary agreements, were majority. We can notice that there are only two types of measures implemented in the industrial sector since 1990. However, the emission quota system is the major tool in that sector. No particular important policy is specifically targeted towards the SMEs.

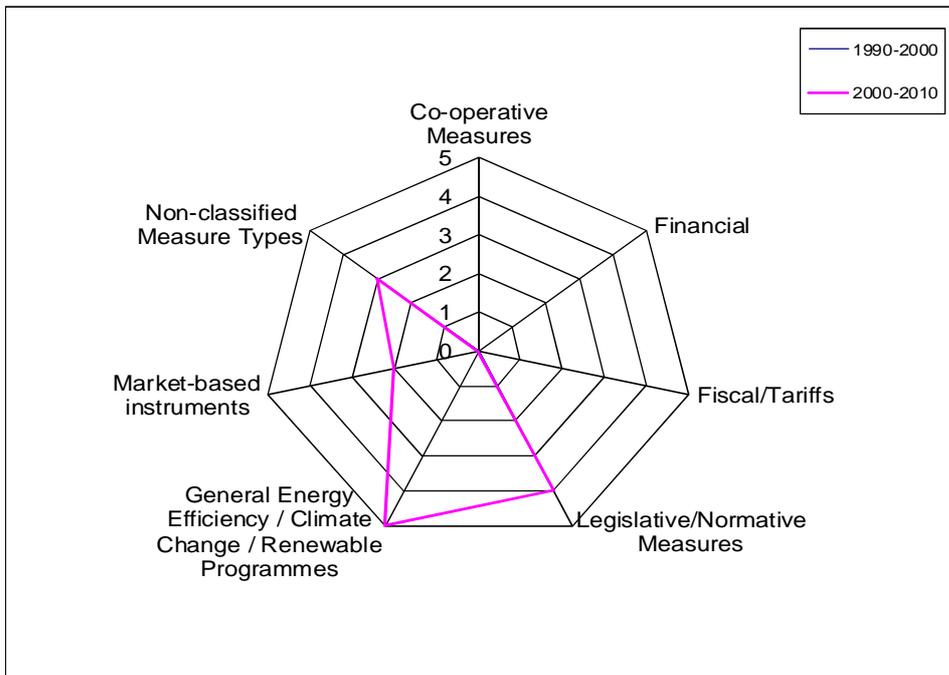


Tertiary Sector



Before 2000, the main measure types were legislative/normative, and also financial. Since 2000, normative and informative measures are dominant (energy performance audits, minimum efficiency standards, high energy performance label...)

Cross-cutting measures



Before 2000, none measure were been implemented. Since 2000, four types of measures were taken: general energy efficiency as building programme or mobility programme of the environment round table, normative measures like building codes and market based instruments as energy savings certificates. The non classified measures types are new measures like “Reform of the Urban Development Code” or “Smart grids and smart meters”.

4.3 Innovative Energy Efficiency Measures

Live better programme

During the last few years, social funds to support energy management work have been put in place in a number of Departments. Amending Finance Law for 2010 No 2010-237 rolls out this mechanism by establishing a national programme to support thermal renovation of housing. The ‘**Live Better**’ programme, managed by ANAH⁴, has been given €500 million from Future Investments, which will be supplemented by ANAH financing estimated at €850 million. It allocates aid additional to that provided by ANAH to low-income owner-occupiers (aid of between €1 100 and €1 600) carrying out work that enables an energy gain of at least 25%. It also provides for specific support, with a subsidy of between €300 in a programmed sector and €430 spread across sectors to support owners’ contracting role. The ‘Live Better’ programme should allow 300 000 renovations between 2010 and 2017.

Neon signs off during the night

Since July 1st, 2012, **new neon signs and neon sign advertisements** (neons, panels, enlightened letters...) **must be gone out** between 1 hour and 6 hours of the morning. This new regulation will apply gradually to the whole of the existing installations from here 2018.

This new measure will be set up according to the urban areas and activities:

- For the neon signs in bond with a night activity, between midnight and 7:00 of the morning, they will have gone out 1 hour after closing and 1 hour before reopening.

⁴ The National Housing Improvement Agency (ANAH) helps owner-occupiers, subject to an income ceiling, and social landlords to carry out housing improvement work.

- For the neon sign advertisements located in the urban units of more than 800.000 inhabitants, the mayor will delimit the zones where publicities will have to be gone out.

The application of this measure will save 800 GWh a year for neon signs and more than 200 GWh for neon sign advertisements.

ESCO in public sector

With regard to the residential sector, Article 7 of Grenelle 2 introduces a requirement for private co-ownerships to design an ESCO (or an energy-saving work plan) following obligatory audit.

For the public sector, Article 5 of Grenelle 1 enabled public procurement law to be amended to allow ESCOs to be concluded, in particular in the form of an overall contract covering design, implementation and operation or maintenance services, since energy efficiency improvements are contractually guaranteed. In March 2010, MAPPP (Support Force for Public-Private Partnerships) published a model contract adapting the ESCO, in the context of renovation of public buildings, to partnership contract procedures. Lastly, the Ministries responsible for energy published a guide to ESCOs relating to public works in July 2010, for public entities and operators, in order to provide support and clarification for public actors wishing to use ESCOs to contribute to the energy-saving targets, and, in addition, the reduced greenhouse gas emission targets, set by the Environment Round Table.

The Energy Efficiency Certificate mechanism also encourages the development of ESCOs. Two forms for standardised and specific operations, in the residential sector and in the services sector, allow energy-saving actions carried out under an ESCO to be subsidised.

Lastly, France wishes to develop ESCOs in the industrial sector.

HGV eco-tax

Grenelle 1 provides for introduction of a kilometric eco-tax to be levied on HGVs. This eco-tax will apply to the unassigned national road network of metropolitan France and the routes belonging to territorial authorities liable to see a shift of traffic.

The expected amount is about €1,2 billion a year. This eco-tax will be experimented from April 2013 and will be implemented from July 2013.

In terms of energy savings, the anticipated annual gain is 0.165 Mtoe in 2016 and 0.168 Mtoe in 2020.

4.4 Energy efficiency measure evaluations

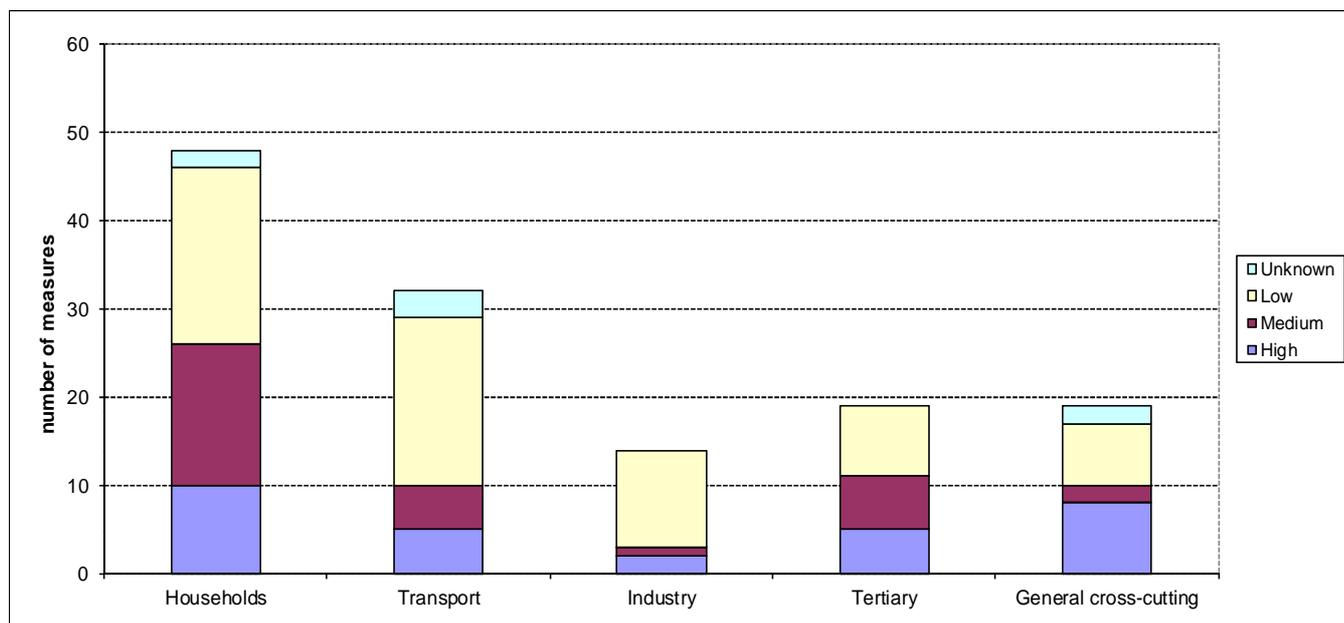
4.4.1 Semi-quantitative Impact Estimates of Energy Efficiency Measures

In the measure descriptions, which are included in the MURE database, information related to the impact evaluation of a measure is included. If a quantitative evaluation is available, the methods used and the results of the evaluation are provided, including as far as possible the impacts in terms of energy savings and CO₂ savings.

If no quantitative evaluation is available, or in addition to the quantitative evaluation, a qualitative expert judgement is reported, too, namely an assessment of the measure's impact (high/medium/low) in terms of energy and CO₂ savings⁵. The last column in the overview tables in Annex 2 shows the respective semi-quantitative impact assessment for all French measures in the MURE database. In Figure 37 the number of measures in each qualitative impact evaluation category is summarized.

⁵ The categories (low, medium, high) are linked to the aggregate electricity or final energy consumption of the respective sector (households, transport, industry or tertiary). The following limits are defined for the three impact level; low impact: <0.1%; medium impact: 0.1-<0.5%; high impact: ≥0.5%. If a quantitative evaluation is available, the qualitative impact can easily be calculated by applying this definition to the quantitative figures. For measures with no quantitative evaluation, the qualitative evaluation is a very rough expert judgement.

Figure 37 : Semi-quantitative impact evaluations by sector



132 measures are described in the MURE database for France and 125 have been qualified in terms of quantitative impact.

Thirty measures are described with a high semi quantitative impact and five types of measures are represented (generally on the building), building codes, energy performance audits, tax credit, national campaign, and local information centre.

Thirty measures are described with a medium semi quantitative impact. These measures are represented in all sectors.

Sixty-five measures are with a low semi quantitative impact. This type of measures is a majority and represents 60% of the measures in the transport.

Seven measures are proposed without evaluation of a semi quantitative impact (unknown).

4.4.2 Lessons from Quantitative Energy Efficiency Measure Evaluations

Zero-rated eco-loan

Zero-rated eco-loans are available to all property-owning individuals for projects in their main residences, including co-ownerships and let dwellings. Lasting 10 years, with the possibility of being extended to 15 years by the bank, they allow up to €30 000 in financing for work to improve the dwelling's energy efficiency.

An ex ante evaluation has been carried out in 2011. The method was based on a macroeconomic simulation through the use of SceGES tool⁶.

The SGFGAS (Management Company for the Guarantee Fund for Social Access to Home Ownership) database contains the characteristics of contracted loans. An estimate of the tax cost relating to this mechanism is provided below, based on SGFGAS data.

Table 8: Number of zero-rated eco-loans and estimated tax cost (source: SGFGAS)

	2009	2010	2011*	2012*	2013*
Number of zero-rated eco-loans issued	70 933	80 300	240 000	320 000	400 000
Resulting tax cost in M€**	125	144	431	575	719

* From 2011, the number of zero-rated eco-loans corresponds to the targets. The 2009 and 2010 values correspond to loans recorded.

** The tax cost shown for year n is the total tax cost resulting from the loans issued for the year n, obtained by aggregating the annual tax costs for these loans over their lifespan.

The SGFGAS database makes it possible to establish the number of actions of each type carried out in 2009 and 2010 and the type and year of construction of the dwellings where they were carried out. This breakdown has been retained for 2011-2013, while taking the number of contracted loans as being in line with initial targets, although the number of loans in 2009 was higher than anticipated. The number of mixed works, financed by zero-rated eco-loans, taken into account in SceGES is shown in Table 8. The mixed works carried out in 2009 consist of the actions set out in Table 9.

⁶ SceGES is a macro economic tool used to quantify energy savings and corresponding reductions in greenhouse gas emissions compared with a trend scenario

Table 9 : Assumption regarding mixed works carried out under zero-rated eco-loans
(source: SGFGAS)

	Percentage of loans
Window insulation	75%
Roof insulation	49%
Solid wall insulation	28%
Heat pumps	23%
Condensing boilers	19%
Stoves, fireplaces, wood inserts	17%
Individual solar water heaters	11%
Wood boilers	3%
Low-temperature boilers	2%

All of the actions carried out under zero-rated eco-loans are considered additional to the SceGES trend scenario.

As regards thermal insulation, the number of dwellings benefiting from zero-rated eco-loans is directly included in SceGES using a percentage application of various insulation solutions to the housing stock. Thermal insulation of opaque walls is assumed to have been achieved by application of 20 cm of glass wool (unrolled in loft spaces; $R = 6.1$) and 10 cm of extruded polystyrene on solid walls (insulation from inside: $R = 3.3$) and insulation of glazed walls by installing PVC-type windows ($U = 1.5$). The percentage applications are different for four categories of dwelling, in line with the SGFGAS statistics, as set out in Table 10.

Table 10 : Application level of actions as a percentage of the various stocks (source: SGFGAS)

	Windows (%)		Roofs (%)		Solid walls (%)	
	MI (individual house)	IC (collective building)	<i>MI</i>	<i>IC</i>	<i>MI</i>	<i>IC</i>
Before 1975	7.2	1.5	5.4	0.8	3.7	1.0
Between 1975 and 1989	7.3	0.9	5.6	0.5	2.0	0.5

As regards replacement of a heating system by an independent wood-burning appliance or a wood boiler, wood-burning appliances installed using zero-rated eco-loans are initially taken as replacing less efficient end-of-life wood-burning appliances. This assumption is reflected, in SceGES, by an increase in wood boiler performance for the years in question. The performance value then reaches the 2035 reference scenario

value. Subsequently, if the number of appliances installed exceeds the number reaching the end of their life, these new appliances are taken as replacing other types of heating.

In the case of heat pumps, zero-rated eco-loans are reflected by an increase in heat pumps replacing end-of-life heating appliances.

For condensing boilers and low-temperature boilers, it is assumed that these boilers are replacing end-of-life traditional fuel oil and gas boilers. This assumption are reflected, in SceGES, by an increase in the average performance of gas and fuel oil boilers (10% for low-temperature boilers and 20% for condensing boilers compared with the average performance of boilers installed in 2005). The performance value then reaches the 2035 reference scenario value.

Lastly, as regards individual solar water heaters, zero-rated eco-loans are reflected by an increase in the percentage equipment level of the overall stock of dwellings.

The results of the evaluation is the energy savings resulting from zero-rated eco-loans amount to 0.06 Mtoe in 2010 and 0.81 Mtoe in 2016 and 2020.

In fact, the reporting realized by SGFGAS shows that in 2011 only 40 755 zero rated eco-loans were used. Thus, the evaluation based on a complex tool, is no relevant because based on wrong hypothesis. Compared to the target in 2011, the reality is six times lesser. The reason is that banks didn't try to widespread this loan, and after the buzz of the beginning, private individual have requested less and less eco-loans.

In fact, it's really important to know precisely the different aspects of the measure and especially the sociological characteristics of the beneficiaries and the main stakeholders (here the banks) in order to have the strongest hypothesis in an ex ante evaluation.

White certificates

Ex-post evaluation of the results of the first period and the transitional period (1 July 2006 to 31 December 2010)

As at 31 December 2010, the volume of EECs issued was 163.4 TWh cumac. Evaluation of the reduction in greenhouse gas emissions resulting from the first period of the mechanism and the transitional period are based on analysis of the 65 most common standardised operations, which account for 95% of EECs issued as at 31 December 2010. For each of these operations, the total quantity of EECs issued, in kWh cumac,

has been converted into annual energy savings in line with the lifespan of the action under consideration.

The lifespan of the actions has been taken into account in such a way as to include, for 2015 and 2020, only those actions still having an effect.

By way of example, the BAR-TH-06 standardised operation concerns installation of an individual condensing boiler in an existing residential building. The conventional lifespan is 16 years. This standardised operation has led to issue of 28 million EECs, i.e. 28 TWh cumac (17% of all EECs issued). The corresponding annual energy savings are therefore 2.3 TWh/year, over 16 years. The total energy savings made is calculated by dividing the sum of the evaluations for each standardised operation by the percentage of EECs issued in relation to the 65 standardised operations studied (95%).

Ex-ante evaluation of the results of the second period

In order to evaluate the energy savings resulting from the second period of the mechanism, the following assumptions have been made:

- the total target is 345 TWh cumac, from which are deducted the EECs issued during the first period and the transitional period over and above the target set of 54 TWh-cumac, i.e. a total target of around 236 TWh cumac;
- the weighted average lifespan of the standardised operations is around 17 years;
- the average conversion factor between aggregated and updated energy savings (kWh cumac) and annual energy savings (kWh/year) will remain similar to that recorded in the first period.

The total target for the entire second period therefore produces annual energy savings of 18.5 TWh, or 1.59 Mtoe, in 2016 and 2020.

Renewal of the mechanism

The mechanism has been renewed until 2020, based on the following assumptions:

- retention of the evaluation assumptions used for the second period;
- total target for each three-year period taken as identical to that of the first period, i.e. 345 TWh cumac.

Energy Efficiency Policies and Measures in France in 2012

Each three-year period (2014-2016 and 2017-2019) therefore resulted, at its end date, in final energy savings of 2.33 Mtoe. It was taken that one-third of this amount resulted for 2020.

The gains achieved are shown in the Table 11.

Table 11: Annual energy savings generated by the EEC mechanism (source: MEDDTL)

	2010	2016	2020
Energy savings generated by all EECs issued as at 31 December 2010 (ex-post evaluation)			
Annual energy saving	1.10 Mtoe	1.05 Mtoe	1 Mtoe
Percentage of target	22%	9%	-
Energy savings generated by all EECs issued as at 31 December 2010 (ex-post evaluation) and by the second period of the mechanism (ex-ante evaluation)			
Annual energy saving	-	2.64 Mtoe	2.59 Mtoe
Percentage of target	-	22%	-
Ex-ante evaluation of renewal of the mechanism until 2016 and 2020			
Annual energy saving	-	4.97 Mtoe	8.03 Mtoe
Percentage of target	-	41%	-

These assessments give a huge impact in energy saving. However, these ex post and ex ante evaluation forget an essential parameter: the additionality of the scheme or the windfall effect. Indeed, maybe the scheme is used to change out of order devices (boilers, windows...etc) or the works are due to tax credit or zero rated eco loans. Thus in order to have a more relevant evaluation, a hypothesis of the additionality of the scheme should be used within these evaluations or if it's possible a survey to the beneficiaries should be carry out to know more precisely the windfall effect.

5 National Developments under the EU Energy Efficiency Directive and the 20% Energy Efficiency Target of the EU

The second energy efficiency action plan (NEAAP) is the document of reference regarding the France's energy efficiency strategy. It describes sector by sector the different measures. Seven sectors are represented: demand-side management; residential-services sector; transport sector; industrial sector; exemplary state and territorial authorities; agricultural sector; awareness-raising, training.

105 measures are described in details in the NEAAP. The most relevant measures are described in details in the previous chapters.

DEMAND-SIDE MANAGEMENT

1. Energy Efficiency Certificates (Measure E.1)
2. Ecodesign Directive (Measure E.2)
3. Energy labelling of products (Measure E.3)
4. Accelerated depreciation (Measure E.4)
5. Reduction in overall rental value (Measure E.5)
6. Research Demonstrator Fund for New Energy Technologies (Measure E.6)
7. Development of Energy Performance Contracts (Measure E.7)
8. Round Table commitment agreements (Measure E.6)
9. Future Investments (Measure E.9)
10. Smart grids and smart meters (Measure E.10)
11. Heat Fund (Measure E.11)

INDUSTRIAL SECTOR

1. EU ETS Directive (Measure I.1)
2. ADEME aid for decision-making to support energy diagnoses (Measure I.2)
3. ADEME 'URE - Investment' aid (Measure I.3)
4. OSEO subsidised Green Loans (Measure I.4)
5. Change to the regulatory framework: IED and rational energy use in installations classified for environmental protection (Measure I.5)
6. Strengthening the social, environmental and societal responsibility of businesses (Measure I.6)
7. Support for industrial branches of the future - 'Green branches' initiative' (Measure I.7)

AGRICULTURAL SECTOR

1. Greenhouse-Energy Plan (Measure A.1)
2. Plant Plan for the Environment (Measure A.2)
3. Performance Plan for Agricultural Holdings (Measure A.3)
4. Livestock Building Modernisation Plan (Measure A.4)
5. Technical advice and diagnoses (Measure A.5)

TRANSPORT SECTOR

1. SNIT (Measure T.1)
2. Freight-oriented network (Measure T.2)
3. Rolling motorways (Measure T.3)
4. Combined transport (Measure T.4)
5. Local rail operators (Measure T.5)
6. High-speed rail freight (Measure T.6)
7. Eradication of bottlenecks (Measure T.7)
8. Improvement of rail provision for major ports (Measure T.8)
9. Modernisation of train path management (Measure T.9)
10. Sea motorways (Measure T.10)
11. River port reform project (Measure T.11)
12. Targets contract between VNF and the State (Measure T.12)
13. Seine Nord Europe canal (Measure T.13)
14. HGV eco-tax (Measure T.14)
15. Development of high-speed rail track network (Measure T.15)
16. Development of reserved public transport routes (Measure T.16)
17. Employer responsibility for half of the cost of public transport season tickets (Measure T.17)
18. Tax on company vehicles - CO2 basis (Measure T.18)
19. Automobile bonus-malus (Measure T.19)
20. European regulation on CO2 emissions of new vehicles (Measure T.20)
21. Directive 2009/33 on clean road transport vehicles (Measure T.21)
22. Single European Sky (Measure T.22)
23. Clean Sky initiative (Measure T.23)
24. Mobility Week (Measure T.24)
25. Car-sharing (Measure T.25)
26. Car club (Measure T.26)
27. Development of non-motorised and active modes (Measure T.27)
28. CO2 display and OEET (Measure T.28)
29. Voluntary commitment 'CO2: transport carriers make a commitment' (Measure T.29)
30. Voluntary commitment by the FNTV (Measure T.30)
31. Voluntary commitment in the aviation sector (Measure T.31)
32. Travel schemes (Measure T.32)
33. AFITF (Measure T.33)

EXEMPLARY STATE AND TERRITORIAL AUTHORITIES

1. Exemplary State circular (Measure P.1)
2. ADEME as a resource centre for the exemplary role of the State and its public establishments with regard to integrating sustainable development (Measure P.2)
3. Senior sustainable development officers (Measure P.3)
4. Public purchasing guides (Measure P.4)
5. Territorial Climate-Energy Plans (PCET) (Measure P.5)
6. Mandatory assessment of greenhouse gas emissions (Measure P.6)
7. Regional Climate, Air and Energy Schemes - SRCAE (Measure P.7)
8. Reform of the Urban Development Code (Measure P.8)
9. State-Region Project Contracts (CPER) - Combating Climate Change strand (Measure P.9)
10. ADEME support tools for PCET (Measure P.10)
11. Sustainable City project call (Measure P.11)
12. Additional points regarding compliance with the ESD (Measure P.12)

RESIDENTIAL-SERVICE SECTOR

1. Thermal Regulations for new buildings (Measure B.1)
2. Labels associated with RT2005 (Measure B.2)
3. Feasibility study for energy supplies (Measure B.3)
4. Thermal Regulation for existing buildings (Measure B.4)
5. Energy performance diagnosis (Measure B.5)
6. Obligation regarding work in existing service buildings (Measure B.6)
7. Evaluation of energy performance of co-ownerships (Measure B.7)
8. Boiler maintenance and periodic control (Measure B.8)
9. Minimum energy performance of boilers (Measure B.9)
10. Inspection of air-conditioning and reversible heat pump systems (Measure B.10)
11. Sustainable Development Tax Credit (Measure B.11)
12. Zero-rated eco-loan (Measure B.12)
13. Exemption from property tax on existing buildings for BBC dwellings (Measure B.13)
14. Targeting of Scellier aid for rental investment towards BBC dwellings (Measure B.14)
15. Targeting of aid for housing purchase towards BBC dwellings (Measure B.15)
16. Relief from property tax on existing buildings (Measure B.16)
17. Sustainable Development Account (Measure B.17)
18. Change to co-ownership decision-making rules (Measure B.18)
19. Individualised breakdown of heating costs (Measure B.19)
20. Distribution of energy savings between owner/landlord and tenant (Measure B.20)
21. Possibility of exceeding land occupation coefficient (Measure B.21)
22. Social housing eco-loan (Measure B.22)
23. ERDF (Measure B.23)
24. Indicators of quality in construction (Measure B.24)
25. e-nergieBat training platform (Measure B.25)
26. ANAH financial support for combating energy insecurity (Measure B.26)
27. Energy Insecurity Observatory (Measure B.27)
28. 'Live Better' programme for thermal renovation of dwellings (Measure B.28)

AWARENESS-RAISING AND INFORMATION

1. 'Energy is our future, save it' message (Measure S.1)
2. Eco-responsible Publicity Charter (Measure S.2)
3. ADEME waste awareness campaign (Measure S.3)
4. European Week for Waste Reduction (Measure S.4)
5. ADEME energy-saving awareness campaign (Measure S.5)
6. CO2 impact of products (Measure S.6)
7. Energy Info Sites (Measure S.7)
8. Banking services/Socially Responsible Investment (Measure S.8)
9. Carbon assessment training (Measure S.9)

Annex 1

Energy Efficiency Measure Summary by Country

Energy Efficiency Policies and Measures in France in 2012

MURE II Household 48 Measures Found

Code	Title	Status	Type	Starting Year	Semi-quantitative Impact	NEEAP Measure	EU-related Measure	Quantitative Evaluation	Description
FRA47	Carbon tax	Proposed(medium/long-term)	Cross-cutting with sector-specific characteristics		Unknown	No	No	No	YES
FRA8	Building codes "RT 1974"	Completed	Legislative/Normative	1974	High	No	No	No	YES
FRA12	Limit to the internal temperature of houses or dwellings (19°C)	Ongoing	Legislative/Normative	1974	Medium	No	No	No	YES
FRA6	Subsidies for dwellings retrofitting OPAH	Ongoing	Financial	1978	Low	No	No	No	YES
FRA44	Subsidies for dwellings retrofitting PALULOS	Completed	Financial	1979	Medium	No	No	No	YES
FRA4	Demonstration projets in buildings	Ongoing	Financial	1980	Low	No	No	No	YES
FRA13	Audits subsidies in buildings	Ongoing	Financial	1980	Medium	No	No	No	YES
FRA9	Building codes "RT 1982"	Completed	Legislative/Normative	1982	Medium	No	No	No	YES
FRA18	Building codes "RT 1989"	Completed	Legislative/Normative	1989	Medium	No	No	No	YES
FRA1	High environmental quality of buildings	Ongoing	Information/Education	1990	Low	Yes	No	No	YES
FRA56	Individualised breakdown of heating costs	Ongoing	Legislative/Normative	1991	Medium	Yes	No	No	YES
FRA3	EU-related: Energy Performance of Buildings EPBD Recast (Directive 2010/31/EU) - Minimum energy performances of boilers	Ongoing	Legislative/Normative	1994	Low	Yes	YES	No	YES
FRA2	Labels on electrical households appliances	Ongoing	Legislative/Informative	1995	Medium	No	Yes	No	YES
FRA7	Sustainable Development Tax Credit	Ongoing	Fiscal/Tariffs	1995	High	Yes	No	YES	YES
FRA23	Tax credit for energy efficiency materials and renewable energies	Completed	Fiscal/Tariffs	1996	High	Yes	No	No	YES
FRA38	EU-related: Energy Performance of Buildings EPBD Recast (Directive 2010/31/EU) - Boiler maintenance and periodic control	Ongoing	Legislative/Informative, Legislative/Normative	1998	Low	Yes	YES	No	YES
FRA5	VAT Reduction on energy efficiency investments	Ongoing	Fiscal/Tariffs	1999	High	Yes	No	No	YES
FRA10	Subsidies for wood equipment	Completed	Financial	1999	Low	No	No	No	YES

Energy Efficiency Policies and Measures in France in 2012

FRA14	Minimum efficiency standards for refrigerators and freezers	Completed	Legislative/Normative	1999	Medium	No	Yes	No	YES
FRA11	Subsidies for solar equipment	Completed	Financial	2000	Low	No	No	No	YES
FRA15	Building codes "RT2000"	Completed	Legislative/Normative	2001	Medium	No	No	No	YES
FRA16	Local energy information centres	Ongoing	Information/Education	2001	Medium	Yes	No	YES	YES
FRA39	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Inspections of air-conditioning and reversible heat pump systems	Ongoing	Legislative/Normative	2002	Low	Yes	YES	No	YES
FRA22	ADEME energy-saving awareness campaign	Ongoing	Information/Education	2004	High	Yes	No	No	YES
FRA46	Information and advertising campaign "why wait" (pourquoi attendre)	Completed	Information/Education	2004	High	No	No	No	YES
FRA33	Building codes "RT 2005"	Ongoing	Legislative/Normative	2006	High	Yes	No	No	YES
FRA34	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Energy performance diagnosis	Ongoing	Legislative/Informative	2006	High	Yes	YES	No	YES
FRA45	Energy Efficiency Certificates	Ongoing	Financial	2006	High	Yes	No	YES	YES
FRA59	Indicators of quality in construction	Ongoing	Unknown	2006	Low	Yes	No	No	YES
FRA32	Sustainable Development Account	Ongoing	Financial	2007	Low	Yes	No	No	YES
FRA35	High performance label dwellings	Ongoing	Information/Education	2007	Low	Yes	No	No	YES
FRA37	CO2-credits for "household" projects	Ongoing	Financial	2007	Low	No	No	No	YES
FRA58	Possibility of exceeding land occupation coefficient	Ongoing	Unknown	2007	Low	Yes	No	No	YES
FRA28	Sustainable building training scheme	Ongoing	Unknown	2008	Low	Yes	No	YES	YES
FRA40	"Modernising buildings and cities" programme	Ongoing	Unknown	2008	Unknown	Yes	No	No	YES
FRA49	Feasibility study for energy supplies	Ongoing	Legislative/Informative	2008	Low	Yes	No	No	YES
FRA50	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Thermal Regulations for existing buildings	Ongoing	Legislative/Informative, Legislative/Normative	2008	Medium	Yes	YES	No	YES
FRA54	Relief from property tax on existing buildings	Ongoing	Fiscal/Tariffs	2008	Medium	Yes	No	No	YES

Energy Efficiency Policies and Measures in France in 2012

FRA31	Zero-rated eco-loan	Ongoing	Financial	2009	Medium	Yes	No	YES	YES
FRA42	Targeting of aid for housing purchase towards BBC dwellings	Ongoing	Financial	2009	Low	Yes	No	No	YES
FRA43	Social housing eco-loan	Ongoing	Financial	2009	Medium	Yes	No	No	YES
FRA52	Exemption from property tax on existing buildings for BBC dwellings	Ongoing	Fiscal/Tariffs	2009	Low	Yes	No	No	YES
FRA57	Distribution of energy savings between owner/landlord and tenant	Ongoing	Unknown	2009	Medium	Yes	No	No	YES
FRA60	Energy Insecurity	Ongoing	Unknown	2009	Medium	Yes	No	No	YES
FRA55	Change to co-ownership decision-making rules	Ongoing	Unknown	2010	Low	Yes	No	No	YES
FRA53	Targeting of Scellier aid for rental investment towards BBC dwellings	Ongoing	Fiscal/Tariffs	2011	Low	Yes	No	No	YES
FRA51	Evaluation of energy performance of co-ownerships	Ongoing	Legislative/Informative	2012	Low	Yes	No	No	YES
FRA48	EU-related: Energy Performance of Buildings EPBD Recast (Directive 2010/31/EU) - Building codes " RT 2012"	Ongoing	Legislative/Normative	2013	High	Yes	YES	YES	YES

Energy Efficiency Policies and Measures in France in 2012

MURE II Tertiary 19 Measures Found

Code	Title	Status	Type	Starting Year	Semi-quantitative Impact	NEEAP Measure	EU-related Measure	Quantitative Evaluation	Description
FRA13	Limit to internal temperature	Ongoing	Legislative/Normative	1974	Medium	No	No	No	YES
FRA4	High environmental quality of buildings	Ongoing	Information/Education/Training	1990	Low	Yes	No	No	YES
FRA14	Building codes RT1989	Completed	Legislative/Normative	1990	Medium	No	No	No	YES
FRA9	EU-related: Energy Performance of Buildings EPBD Recast (Directive 2010/31/EU) - Minimum energy performances of boilers	Ongoing	Legislative/Normative	1992	Low	Yes	YES	No	YES
FRA10	Periodic mandatory inspection of boilers	Ongoing	Legislative/Normative	1998	Low	Yes	No	No	YES
FRA1	Audits subsidies in buildings	Ongoing	Financial	2000	Medium	No	No	No	YES
FRA3	Building codes "RT 2000"	Completed	Legislative/Normative	2001	High	Yes	No	No	YES
FRA5	Minimum efficiency standards for fluorescent lamp ballasts	Ongoing	Legislative/Normative	2001	Medium	No	Yes	No	YES
FRA11	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Inspections of air-conditioning and reversible heat pump systems	Ongoing	Legislative/Normative	2002	Low	Yes	YES	No	YES
FRA2	Energy efficiency of residential and tertiary buildings - Program OPATB	Ongoing	Co-operative Measures, Financial, Information/Education/Training	2003	Medium	No	No	No	YES
FRA7	Building codes "RT 2005"	Ongoing	Legislative/Normative	2006	High	Yes	No	No	YES
FRA8	Energy performance audits	Ongoing	Legislative/Informative	2006	High	Yes	No	No	YES
FRA16	Energy Efficiency certificates	Ongoing	Financial	2006	High	Yes	No	No	YES
FRA12	High energy performance label	Ongoing	Information/Education/Training	2007	Low	Yes	No	No	YES
FRA15	"Modernising building and cities" programme	Ongoing	Financial, Legislative/Informative	2008	High	Yes	No	No	YES
FRA18	Feasibility study for energy supplies	Ongoing	Legislative/Informative	2008	Low	Yes	No	No	YES
FRA20	EU-related: Energy Performance of Buildings (Directive 2002/91/EC) - Thermal Regulations for existing buildings	Ongoing	Legislative/Normative	2008	Medium	Yes	YES	No	YES
FRA17	Energy advisors for local authorities	Ongoing	Unknown	2009	Low	No	No	No	YES
FRA19	Obligation regarding work in existing service buildings	Ongoing	Unknown	2012	Low	Yes	No	No	YES

Energy Efficiency Policies and Measures in France in 2012

MURE II Transport 32 Measures Found

Code	Title	Status	Type	Starting Year	Semi-quantitative Impact	NEEAP Measure	EU-related Measure	Quantitative Evaluation	Description
FRA26	"Mobility and transportation" programme	Unknown			Unknown	Yes	No	No	YES
FRA28	Carbon tax	Unknown			Unknown	No	No	No	YES
FRA30	HGV Eco-tax	Ongoing	Unknown		Medium	Yes	No	No	YES
FRA35	Car club	Proposed (advanced)	SocialPlanning/Organisational		Low	Yes	No	No	YES
FRA9	Speed limit control	Ongoing	Legislative/Normative	1974	High	No	No	No	YES
FRA2	Vehicle maintenance, technical control	Ongoing	Legislative/Normative	1985	Low	No	No	No	YES
FRA1	Development of infrastructure for combined transport : road/rail, road/river, short sea shipping	Ongoing	Infrastructure	1990	High	Yes	No	No	YES
FRA8	Subsidies for cars replacement	Completed	Financial	1994	Medium	Yes	No	No	YES
FRA34	Mobility Week	Ongoing	Information/Education/Training	1996	Low	Yes	No	No	YES
FRA14	Grants for electric vehicles	Ongoing	Financial	1999	Low	No	No	No	YES
FRA20	Mobility management for school	Ongoing	Information/Education/Training, SocialPlanning/Organisational	1999	Low	Yes	No	No	YES
FRA3	Grants for energy savings in transport companies	Completed	Co-operative Measures	2000	Low	No	No	No	YES
FRA4	Mandatory urban transport plan	Ongoing	Infrastructure	2000	Medium	No	No	No	YES
FRA5	Mobility plans for companies	Ongoing	SocialPlanning/Organisational	2000	Low	Yes	No	No	YES
FRA13	Grants for LPG and CNG vehicles	Ongoing	Financial	2000	Low	No	No	No	YES
FRA11	Grants for rail/road combined transport equipment	Ongoing	Infrastructure	2003	Low	No	No	No	YES
FRA15	Development of biofuels	Ongoing	Legislative/Normative	2005	High	No	Yes	No	YES
FRA17	Free bike rental system	Ongoing	Information/Education/Training	2005	Low	No	No	No	YES
FRA16	Car labelling in CO2 emissions	Ongoing	Legislative/Informative	2006	Low	No	Yes	No	YES
FRA21	Registration surcharge for cars	Ongoing	Fiscal	2006	Unknown	No	No	No	YES
FRA32	Tax on company vehicles - CO2 basis	Ongoing	Fiscal	2006	Low	Yes	No	No	YES
FRA19	Automobile bonus malus	Ongoing	Fiscal	2007	Medium	Yes	No	No	YES
FRA23	Speed limiter for heavy vehicles	Ongoing	Legislative/Normative	2007	High	No	Yes	No	YES
FRA22	Voluntary agreements	Ongoing	Co-operative Measures	2008	Medium	Yes	No	No	YES
FRA36	Development of non-motorised and active modes	Ongoing	Unknown	2008	Low	Yes	No	No	YES
FRA37	CO2 display and OEET	Ongoing	Information/Education/Training	2008	Low	Yes	No	No	YES
FRA39	Voluntary commitment in the avia-	Ongoing	Unknown	2008	Low	Yes	No	No	YES

Energy Efficiency Policies and Measures in France in 2012

	tion sector								
FRA24	The national plan : "clean vehicle"	Ongoing	Financial	2009	High	Yes	No	No	YES
FRA31	Employer responsibility for half of the cost of public transport season tickets	Ongoing	Fiscal	2009	Low	Yes	No	No	YES
FRA33	EU-related: Promotion of clean and energy-efficient road transport vehicles (Directive 2009/33/EC) - European regulation on CO2 emissions of new vehicles	Ongoing	Co-operative Measures	2009	Low	Yes	Yes	No	YES
FRA38	Voluntary commitment by the FNTV	Ongoing	Co-operative Measures	2009	Low	Yes	No	No	YES
FRA29	Sea motorways	Ongoing	Infrastructure	2010	Low	Yes	No	No	YES

Energy Efficiency Policies and Measures in France in 2012

MURE II Industry 14 Measures Found

Code	Title	Status	Type	Starting Year	Semi-quantitative Impact	NEEAP Measure	EU-related Measure	Quantitative evaluation	Description
FRA12	Grants for technological demonstration projects and exemplary operation in industry	Ongoing	Financial	1975	Low	No	No	No	YES
FRA9	Sofergie: funds for energy efficiency investments	Ongoing	Financial	1980	Low	No	No	No	YES
FRA14	support the promotion of radiant energies	Ongoing	Financial	1980	Low	No	No	No	YES
FRA10	Information, technical assistance in industry	Ongoing	Information/Education/Training	1983	Low	No	No	No	YES
FRA5	EU-related: - Minimum energy performances of boilers	Ongoing	Legislative/Normative	1994	Low	Yes	Yes	No	YES
FRA2	Negotiated agreement with the Ministry of Environment	Completed	Co-operative Measures	1996	Low	No	No	No	YES
FRA7	Energy audits subsidies in industry	Ongoing	Financial	1999	Low	Yes	No	YES	YES
FRA3	FIDEME: fund for investment in environment and rational use of energy	Ongoing	Financial	2000	High	No	No	No	YES
FRA4	FOGIME: Guarantee fund for energy conservation	Ongoing	Financial	2000	Low	No	No	No	YES
FRA1	Voluntary agreement (AERES)	Ongoing	Co-operative Measures	2002	High	No	No	No	YES
FRA8	Motor Challenge Programme	Ongoing	Co-operative Measures, Information/Education/Training	2002	Low	No	Yes	No	YES
FRA11	Negotiated agreements between ADEME and professional federations	Ongoing	Co-operative Measures	2003	Low	No	No	No	YES
FRA16	Energy Efficiency Certificates	Ongoing	Unknown	2007	Low	Yes	No	No	YES
FRA15	OSEO subsidised Green Loans	Ongoing	Financial	2010	Medium	Yes	No	No	YES

Energy Efficiency Policies and Measures in France in 2012

MURE II General cross-cutting 19 Measures Found

Code	Title	Status	Type	Starting Year	Semi-quantitative Impact	NEEAP Measure	EU-related Measure	Quantitative Evaluation	Description
FRA5	Carbon tax	Proposed (medium/long-term)	Non-classified Measure Types		Unknown	No	No	No	YES
FRA11	Limit to internal temperature	Ongoing	Legislative/Normative Measures	1974	Medium	No	No	No	YES
FRA8	Building codes "RT 1989"	Completed	Unknown	1989	Medium	No	No	No	YES
FRA6	High environmental quality of buildings	Ongoing	Non-classified Measure Types	1990	Low	Yes	No	No	YES
FRA12	Periodic mandatory inspection of boilers	Ongoing	Unknown	1998	Low	Yes	No	No	YES
FRA9	Building codes "RT 2000"	Completed	Unknown	2001	High	No	No	No	YES
FRA13	Periodic mandatory inspection of heating/ventilation/AC	Ongoing	Unknown	2002	Low	Yes	No	No	YES
FRA10	Building codes "RT 2005"	Ongoing	Unknown	2006	High	Yes	No	No	YES
FRA7	Energy performance audits	Ongoing	Unknown	2006	High	Yes	No	No	YES
FRA1	Energy Efficiency Certificates	Ongoing	Market-based Instruments	2006	High	Yes	No	YES	YES
FRA15	'Energy is our future, save it' message	Ongoing	General Energy Efficiency / Climate Change / Renewable Programmes, Non-classified Measure Types	2006	Low	Yes	No	No	YES
FRA3	"Modernising buildings and cities" programme	Ongoing	General Energy Efficiency / Climate Change / Renewable Programmes	2008	Unknown	No	No	No	YES
FRA2	Information and advertising campaign: why wait? (pourquoi attendre)	Ongoing	Non-classified Measure Types	2008	High	No	No	No	YES
FRA18	Heat Fund	Ongoing	General Energy Efficiency / Climate Change / Renewable Programmes	2008	High	Yes	No	No	YES
FRA14	ERDF	Ongoing	General Energy Efficiency / Climate Change / Renewable Programmes	2009	Low	Yes	No	No	YES
FRA20	Reform of the Urban Development Code	Ongoing	Non-classified Measure Types	2009	Low	Yes	No	No	YES
FRA16	Development of Energy Performance Contracts	Ongoing	Market-based Instruments	2010	Low	Yes	No	No	YES
FRA17	Smart grids and smart meters	Ongoing	Non-classified Measure Types	2010	High	Yes	No	No	YES
FRA19	Territorial Climate-Energy Plans	Ongoing	General Energy Efficiency / Climate Change / Renewable Programmes	2010	High	Yes	No	No	YES

Annex 2

Country Profile



Energy Efficiency Profile: France

Energy Efficiency Trends

September 2012

Overview

The energy efficiency of final consumers improved by 21% (or 1%/year) in France between 1990 and 2010. This is close to the EU average. All sectors participated to this improvement.

Industry

Energy efficiency improved by about 21% since 1990. Above-average improvements in energy efficiency could be observed in the steel, paper, non ferrous and chemical industries. On the other hand, some branches have poor performance such as cement, food, and especially textile industries.

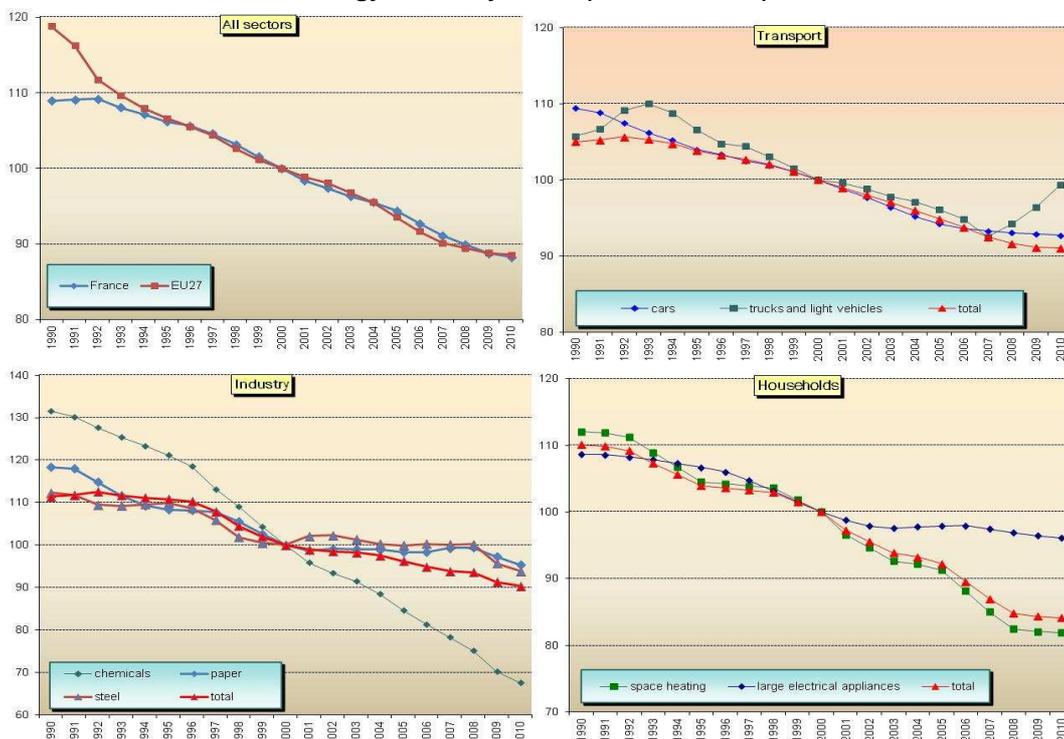
Households

Energy efficiency improved by 26% (1.3%/year) between 1990 and 2010 in the household sector, due to progress realized for space heating (25% improvements) and water heating (18%). Less energy is required every year per dwelling for space heating, as a result of an increasing share of more efficient new dwellings in the total stock of dwellings, and the substitution to electricity. Most of the progress has been realized until 1997 and after 2001.

Transport

The transport sector has experienced regular energy efficiency improvements (14% since 1990). The progress was the most significant for cars (17%) and air transport (19%): the specific consumption of cars in litres/100km is regularly decreasing since 1990 (-0.85%/year), with improvements for new cars, even if part of this gain was offset by a shift to larger cars; for trucks and light vehicles, the progress was lower : around 6%. Since 2006, water transport didn't have any energy efficiency gain and since 2007 due to the crisis, trucks and light vehicles have lost 7% of energy efficiency.

Energy efficiency index (base 100=2000)*



All indicators measured as a three-year moving average.
 Source ODYSSEE
 For more information : <http://www.odyssee-indicators.org/>

Energy Efficiency Policy measures

Institutions and programmes

ADEME is the national, agency in charge of implementing RUE, RES and environmental policies. It operates within a 4 years agreement with the government (2009-2012). The official target is to bring the annual reduction in the final energy intensity to 2%/year from 2015 and to 2.5%/year by 2030. There is since 2006 an energy saving obligation scheme for utilities with a target of 345 TWh cumac (lifetime cumulated and discounted) for the period 2010-2013: end of 2011, 15 TWh of annual energy savings (232 TWh cumac), had been certified, mainly in the household and service sectors. Since 2011, the scope was extended to oil companies.

Industry

The most challenging operation in industry was the implementation of the CO₂ National allocation plan amounting to 132.8 Mt CO₂ between 2008 and 2012. In 2011, ADEME has implemented 1215 energy audits. Since 2008, 4615 energy audits have been carried out. Since 2010, 2600 M€ of green loans subsidised by OSEO (a public agency) was proposed to industrial companies to allow them to be more environmentally friendly (in their process and products) in order to be more competitive

Households, Services

The main objectives resulting from the "Grenelle of Environment" are a 38% reduction in the primary energy consumption of existing dwellings in 2020 through the refurbishment of 400 000 dwellings per year from 2013 and of 800 000 social houses. For new building, the objective is a widespread diffusion of low consumption buildings (BBC) (by 2010 for state building, 2012 for services and 2013 for household), and positive energy buildings to 2020. According to the new thermal regulation, RT 2012, all new buildings with a building built from January 2013 must have primary energy consumption lower than 50 kWh/m². For the existing stock, the tax credit scheme, which was very successful, has been extended until 2015. Between 2005 and 2010, it benefited 8 million operations (insulation, fuel shift...etc). This tax credit can be aggregated with the zero interest eco loan. In 2010, around 150 000 loans have been granted versus an objective of 200 000. The objectives are to reach 320 000 loans in 2012 and 400 000 per year from 2013. In 2011, 1099 buildings have been audited for a total of 6184 buildings since 2008. The implementation of local energy information centres has been reinforced: in 2011, there were 250 centres with 405 advisers, which resulted in savings estimated at 134kt CO₂/year in 2011. Since 2006-2007, the energy performance certificate of dwellings or buildings is mandatory for the sale, hiring and construction.

Transport

The "Grenelle of Environment" has set an objective of reduction of CO₂ emissions in transport by 20% in 2020 and of a decrease of the average emissions of the car stock from 176gCO₂/km to 130 gCO₂/km. Two million of electric and hybrid cars are planned in 2020. The main measures for cars are the compulsory labelling scheme and an ecological bonus since January 2008. Between 2008 and 2011, the CO₂ average emissions of new cars decreased by 15% from 150 to 128gCO₂/km. For the transport of goods, the main measure is the voluntary agreement "CO₂ objective" which is very successful. In 2012, 600 companies have signed the charter (representing 62 000 trucks). The potential of savings is estimated at 423 kteq CO₂/year.

Energy prices and taxes

There is no environment or CO₂ tax in France.

Budgets

The budget of ADEME allocated for energy efficiency and renewable in 2011 was €387 million. In 2011, the most important budget for the government is the tax credit, €1.9 billion.

Selected Energy Efficiency Measures

Sector	Title of measure	Since	Evaluation
All	White certificate scheme	2006	Since 2006, 15TWh saved or 8 Mteq CO ₂
All	Local energy information centres	1990	250 centres; 760 000 contacts between 2008 and 2011; 134 kt CO ₂ /year
Households	2012 Thermal Regulation (RT 2012)	2013	Specific primary energy consumption below 50 kWh/m ²
Households	Tax credit for energy efficiency works and RES	1978	1.9 billion Euro in 2011, can be aggregated with the zero interest rate eco-loan
Households	Energy performance audits	2006	
Households, tertiary	Audits subsidies in buildings	1980	1.94 t CO ₂ saved per audited building 6184 building between 2008 and 2011
Transport	Car labelling	2006	
Transport	Ecological Bonus	2008	Since 2006, the CO ₂ average emissions of the new cars decreased from 149 to 127.7gCO ₂ /km.
Transport	Voluntary agreement "CO ₂ objective "	2008	600 companies have signed the charter
Industry	Quota Allocation plan	2002	
Industry	Energy audits and subsidies	1999	16.5 t CO ₂ saved per company

Source : MURE
www.mure2.com



