



## French energy policy: A gradual transition

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### ABSTRACT

Over the past decade, France has gradually adapted its energy policy to bring it into line with its international environmental commitments. Historically based on independence and sobriety criteria, French energy policy now prioritises the environmental and climate impact of its energy mix. However, chaotic or fuzzy public policies make this transition gradual and non-linear. This paper analyses the recent developments in French energy policy by placing it in its international context. After an analysis of the general situation of the country, we examine the main lines of the French public policy in three main areas: transport, power generation and heating. Then, we conclude with the political implications for the future.

### 1. Introduction

Unlike its neighbours in northern Europe, France has long based its energy policy, until the early 2000s, on industrial, fiscal and trade balance bases (Sénat, 1998). Thus, until 2008 the *Direction Générale de l'Énergie et du Climat* (DGEC, French energy administration) was a department of the Ministry of Economy and Finance,<sup>1</sup> before being attached to the Ministry of Environment (MEEM)<sup>2</sup> in 2008. One of the priorities of this department is the strengthening of national energy industry flagships,<sup>3</sup> a policy that has worked well, as these groups have become European – even global – leaders in their sectors. To do this, authorities have long sought to consolidate the dominant competitive positions or monopolies of these groups to enable them to maximise their income, generating corporate income taxes and dividends for the

government. On the fiscal front, arbitrations were often governed by the desire to increase tax revenue rather than by energy or environmental policy objectives. However, it is in international trade that France led the most effective policies to increase its energy independence and secure its supplies: development of a large nuclear power industry, fighting against waste oil, diversifying its supply sources and supporting a strong refining and petroleum products industry (Taylor et al., 1998). Moreover, the French doctrine also provides uniform access and prices throughout the national territory (Sénat, 1998).

This policy enabled France to reach very good energy indicators compared to European Union (EU28) or OECD (Table 1): gross energy consumption per capita (3.77 toe per capita in 2014) is lower than the OECD average but somewhat higher than the EU28 one. This indicator is showing a downward trend (–10% since 2004), at a slightly lower

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<sup>1</sup> The DGEC, called the *Direction Générale de l'Énergie et des Matières Premières* before 2008, was again placed under the supervision of the two ministries from 2010 to 2012.

<sup>2</sup> Called the *Ministère de l'Environnement* before 2007, the *Ministère de l'Écologie et du Développement Durable et de l'Énergie* between 2007 and 2012 and the *Ministère de l'Environnement, de l'Énergie et de la Mer* since 2012.

<sup>3</sup> Alstom (whose energy division was acquired by General Electric in 2014), Areva (resulting from the merger of Cogema, Framatome and CEA Industrie in 2001), EDF (*Électricité de France*), Engie (formerly GDF Suez before 2015, resulting from the merger of GDF and Suez in 2008), Total (Total absorbed Petrofina in 1999 and Elf Aquitaine in 2000), Veolia (formerly Vivendi Environnement before 2003).

**Table 1**  
French energy indices compared to EU28 and OECD.

Index	France		EU28		OECD	
	2014	2004	2014	2004	2014	2004
Gross energy consumption (Mtoe)	257 <sup>a</sup>	275 <sup>a</sup>	1 606 <sup>b</sup>	1 824 <sup>b</sup>	5 238 <sup>c</sup>	5 508 <sup>d</sup>
En. consump. per capita (toe)	3.77 <sup>b</sup>	4.18 <sup>b</sup>	3.17 <sup>b</sup>	3.65 <sup>b</sup>	4.13 <sup>c</sup>	4.73 <sup>d</sup>
GHG emissions (MtCO <sub>2</sub> )	474 <sup>b</sup>	566 <sup>b</sup>	4 415 <sup>b</sup>	5 375 <sup>b</sup>	15 643 <sup>c</sup>	16 769 <sup>c</sup>
GHG emissions per capita (tCO <sub>2</sub> )	7.22 <sup>b</sup>	9.11 <sup>b</sup>	8.72 <sup>b</sup>	10.9 <sup>b</sup>	12.3 <sup>c</sup>	14.4 <sup>c</sup>
Energy imports (Mtoe)	146 <sup>a</sup>	171 <sup>a</sup>	1 412 <sup>b</sup>	1 414 <sup>b</sup>	3 019 <sup>c</sup>	3 063 <sup>d</sup>
Energy exports (Mtoe)	32.2 <sup>a</sup>	31.9 <sup>a</sup>	531 <sup>b</sup>	474 <sup>b</sup>	1 695 <sup>c</sup>	1 320 <sup>d</sup>
Independence rate	56%	49%	45%	48%	75%	68%
Energy intensity (toe per 1000 EUR <sub>2014</sub> GDP)	0.120 <sup>b</sup>	0.146 <sup>b</sup>	0.122 <sup>b</sup>	0.152 <sup>b</sup>	0.137 <sup>c</sup>	0.166 <sup>c</sup>

Notes:

<sup>a</sup> MEEM, 2016b.

<sup>b</sup> Eurostat, 2016.

<sup>c</sup> IEA, 2015 (1 USD<sub>2005</sub> = 1.072 EUR<sub>2014</sub>).

<sup>d</sup> IEA, 2006.

rate than comparable areas, mainly due to the influence of the decline in industrial activity (−7% in volume since 2004), but also because of household heating due to mild weather conditions (MEEM, 2016a). Greenhouse effect gas (GHG) emissions per capita are also following a downward trend (−19% over the decade) identical to that of the EU28. The effect of the drop in energy consumption per capita is amplified, first, by changes in the energy mix (reduction of fossil energies in favour of renewables, see Table 2), and second, by complementary measures in non-energy sectors. The French level of GHG emissions per capita (7.22 tCO<sub>2</sub> per capita and per year) remains significantly lower than in comparable areas (−17% over EU28 and −41% over OECD) due to the significant weight of nuclear power in the French energy mix (44%), but other factors such as the high rate of buildings heated with electricity and a fleet of small and medium capacity diesel vehicles are important as well. The French energy balance remains negative (114 Mtep of net imports in 2014), but this deficit was reduced by 18% over ten years thanks to a decline in the consumption of petroleum products and, to a lesser extent, of natural gas and coal. This deficit balance is lower than that in the EU28, particularly thanks to the strong use of nuclear power, but it is higher than that in the OECD, which includes very large energy producers. Accordingly, the rate of energy independence (56%) is quite high compared to that in the EU28 (45%), albeit far from that of the OECD (75%). This rate is rising in France, while it is falling for the EU28. However, this overall figure hides two distinct components: fossil energies, for which the independence rate is almost zero, and electricity and RES, for which the rate is 100%. In terms of energy intensity, France is consistent with the EU28 average (0.12 toe per EUR<sub>2014</sub> 1000 of GDP) and is experiencing the same downward trend (−18% over the decade).

**Table 2:**  
French primary energy mix.

Resource	2015		2004	
Nuclear power	108.5	43.9%	111.2	39.7%
Hydro, wind and solar power	7.7	3.1%	6.0	2.1%
Oil and oil products	76.6	31.0%	98.4	35.1%
Natural gas	34.9	14.1%	39.6	14.1%
Coal	8.4	3.4%	12.9	4.6%
Biofuels	2.4	1.0%	–	–
Other renewables (heat pump, waste, geothermal...) and misc.	8.5	3.4%	12.0	4.3%

Note: Production + imports - exports + inventories changes + bunkers (Mtoe); MEEM, 2016b.

During this decade, the international context has been marked by two types of events: on one hand, major technical and geopolitical developments in the energy sector, and on the other hand, international and European regulatory frameworks strengthened around environmental and health issues. Several events have significantly impacted the French energy policy: the strong shock backlashes on oil prices, the geopolitical turmoil in the gas pipeline routes from Central Asia, the boom in the exploitation of unconventional gas in North America and the potential of the French underground, the development of LNG conveying, the refining overcapacity in Europe and the accident at the Fukushima nuclear station. From a regulatory perspective, the decade was marked by the United Nations conferences on climate change (see WEC, 2016), including conferences in Copenhagen (COP 15 in 2009) and Paris (COP 21 in 2015), and by the consequences of the Kyoto conference (COP 3) in 1992, with the establishment and corrections of the emissions trading system (EU ETS, in 2004 and 2008). During this period, the EU set strategic objectives to comply with the Kyoto Protocol, called the Energy 2020 goals (European Council, March 2007), reinforced by the 2030 Energy Strategy<sup>4</sup> (European Commission, 2014). Consequently, European legislation has been strengthened to support the development of renewables (Gawel et al., 2014; Stavins, 2014), in particular by acting on the market (European Commission, 2011), sometimes against the lobbies (Strunz et al., 2016). Thus, it was decided to give priority to green electricity in the wholesale market (Unteutsch and Lindenberger, 2014). At the same time, the European Commission has also continued its market liberalisation policy to decentralize the market and encourage lower energy prices. This policy is likely to increase the probability of energy transition (Jenner et al., 2012).

It is in this contrasted context that France gradually changed its doctrine and engaged its energy transition policy in the mid-2000s (Energy law in 2005 and Grenelle de l'Environnement program, or Grenelle laws, in 2007–2008). However, the content of this concept is ambiguous and gives rise to different interpretations in the country, as was demonstrated during the national debate on energy transition in 2012. Some issues, such as the forced reduction of energy consumption or the share of nuclear power, are still controversial; conversely, the desire to promote renewable energy sources (RES), both through the levers of taxation and innovation, is fairly consensual. The Energy law of July 2005 assigned very ambitious goals for sustainable development, sometimes higher than those of the EU, such as a 75% reduction of GHG emissions by 2050 or a return in 2020 to 1990 emission levels in the transport sector. The *Programmation Pluriannuelle de l'Énergie* resulting from the 2015 law on Energy Transition<sup>5</sup> established new targets: a 40% reduction of GHG emissions by 2030 compared to 1990 levels, a 30% drop in the consumption of fossil fuels in 2030 compared to 2012 levels, increasing the share of RES to 32% of final energy consumption in 2030 and 40% of electricity generation, reducing final energy consumption by 50% in 2050 compared to 2012 levels and reducing the share of nuclear power to 50% of electricity generation. Some question the achievement of other policy axes, such as maintaining moderate consumption prices or completing market liberalisation. Finally, the country has initiated a number of reforms; thus, a large part of the 2011 IEA recommendations (15 out of 25) (IEA, 2011) are already incorporated in the French rules, and the country is on the path towards the Energy 2020 goals; for example, the share of RES in final consumption was 14.6% in 2015, compared to a target of 23% (MEDDE, 2015).

<sup>4</sup> By 2030, at least a 40% reduction in GHG emissions compared to 1990, a savings of 27% of energy consumption compared to projections and a 27% share of renewables in energy consumption.

<sup>5</sup> *Loi relative à la transition énergétique pour la croissance verte*, August 2015.

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