

Country Study - France

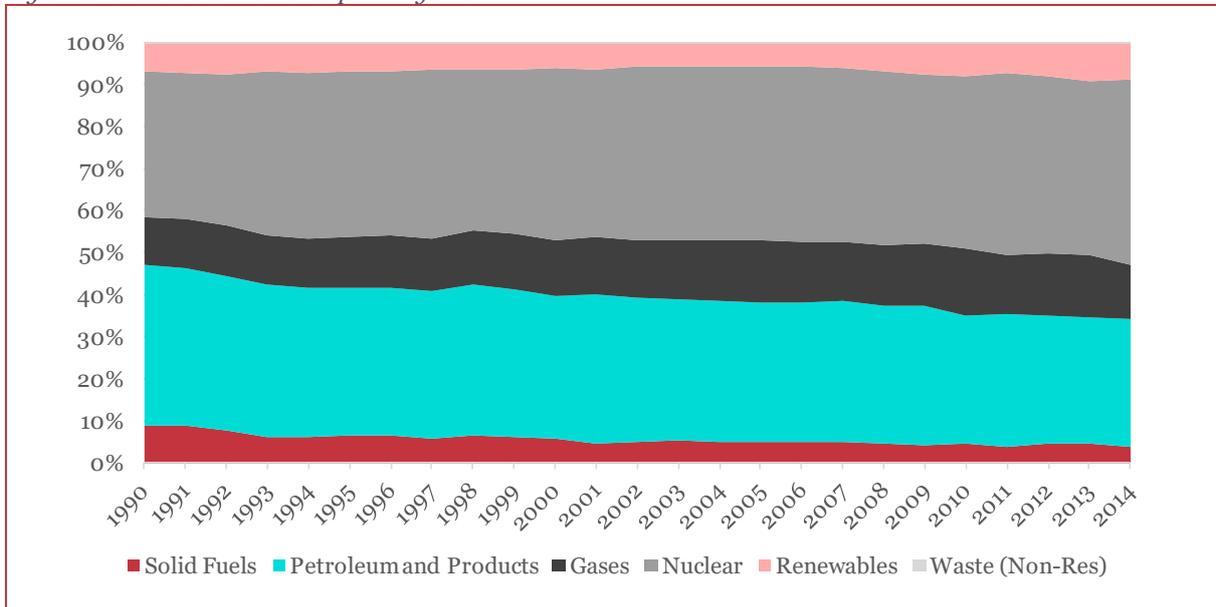
1 France in numbers

1.1 Economic and industrial structure

France has a population of 66.8 million inhabitants (2015) and a surface of 643,000 km². The GDP of France for 2015 was 2,181.1 billion EUR or 32,649 EUR/inhabitant.

1.2 Main indicators on energy generation and usage

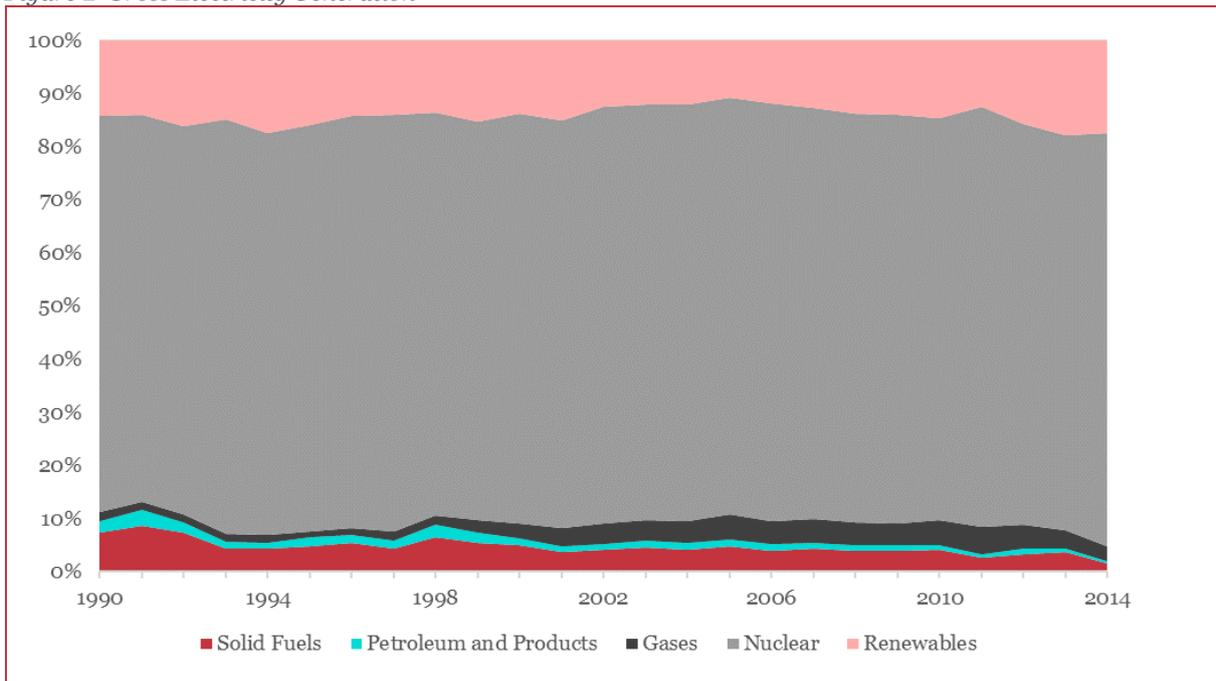
Figure 1 Gross Inland Consumption by Fuel



Source: Eurostat

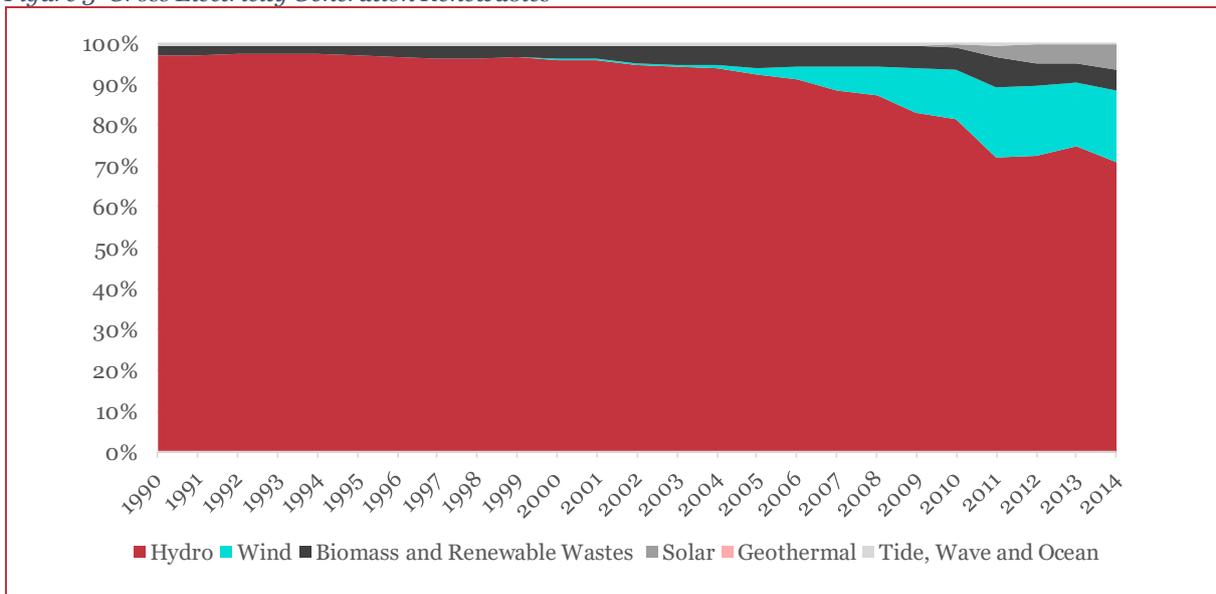
The share of nuclear energy for electricity production has been relatively stable for the last 25 years, around 77%. The share of coal, petroleum products and natural gas more than halved to 4.7% in 2014 (Figure 2). Renewable has been growing slowly to 14.3% in 2014.

Figure 2 Gross Electricity Generation



Source: Eurostat

Figure 3 Gross Electricity Generation Renewables



Source: Eurostat

The graph illustrates the share of electricity produced from different renewables as they evolved from 1990 to 2014. We observe that hydro, by far the biggest renewable electricity source, has increased nominally from 11.9% to 12.2% of gross electricity generation. However, it represents a slightly smaller share of the overall electricity generated from renewables mainly because of the share of wind.

While in 2010 wind was a mere 1.75% of the overall energy production it has almost doubled to 3.06%. Solar has grown almost 10 times from an almost non-existent 0.11% in 2010 to 1.05%

in 2014. Marine energy has not picked up yet and it has grown marginally from 0.08% to 0.09%. Biomass has grown some 15% from 0.78% in 2010 to 0.88% in 2014.

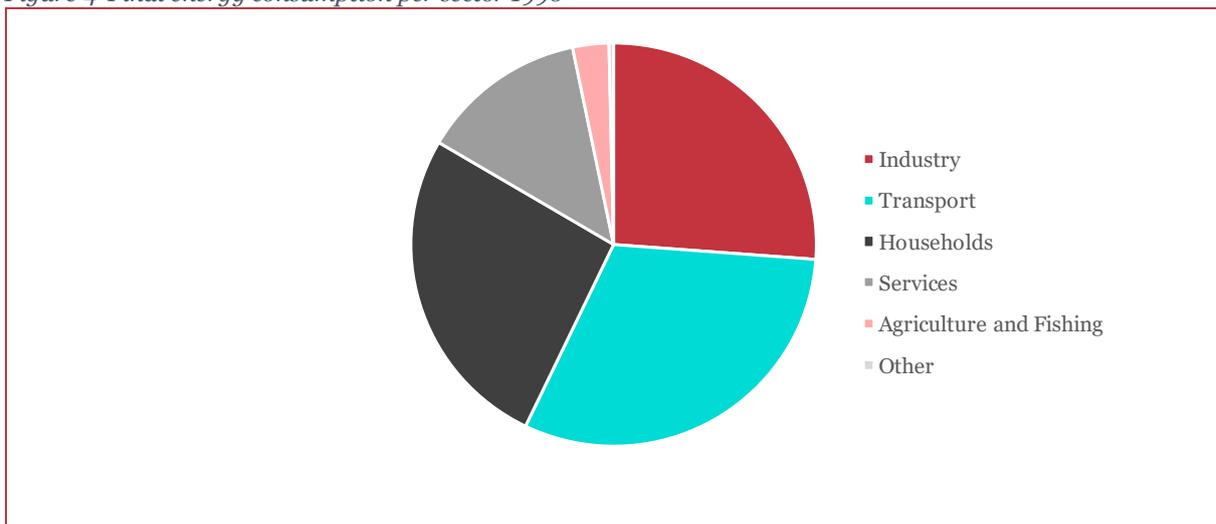
1.2.1 Energy use per sector

Transport is by far the biggest consumer of energy in France with a stable 34.9% of the total in 2014. Some 41.4% of these come from road transport in 2014 and it has been stable since 2010. The reason for this is the fact that individual cars have been seen as a symbol of status and wealth for many years. The challenge is to deploy a number of available solutions which, however, require a change in mentality..

Households are the second largest consumer of energy with 26.4% of the total in 2014 and it has been slowly decreasing from 27.8% in 2010. The renovation of buildings has been taken up by the Environment and Energy Agency (ADEME) in its Vision 2030-2050 as the single most important measure which could lead to a significant reduction of energy consumption.

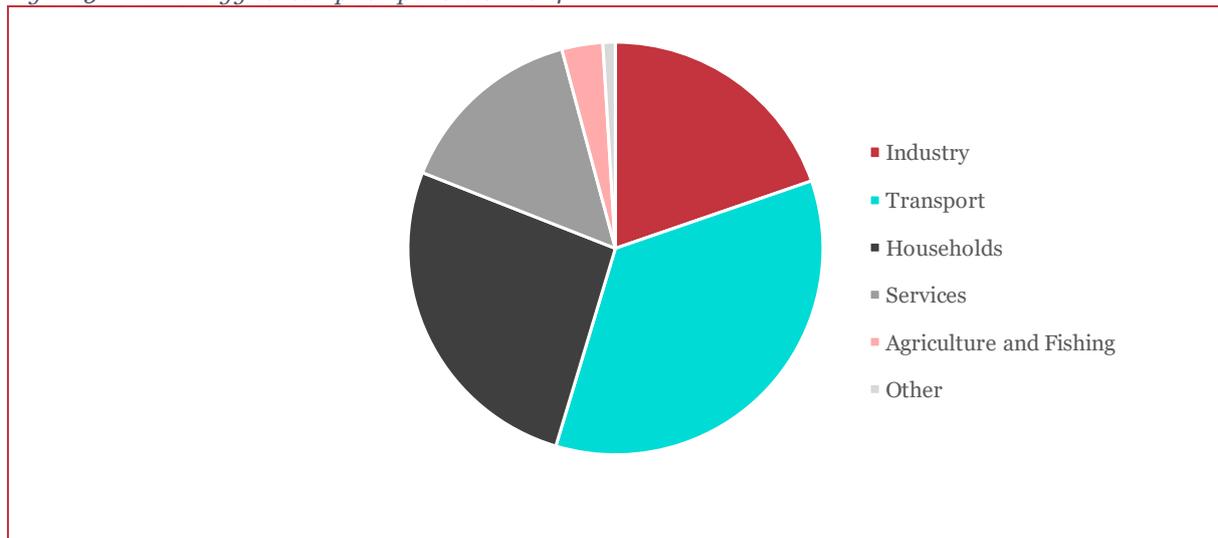
Industry consumes almost 19.7% of the energy in France in 2014 and the figure has been stable since 2010. Within the industrial sector, iron and steel industry is the highest consumer with 6.2% in 2014 and consumption is slowly growing as a share of the total. Chemical and petrochemical industry is the second biggest consumer with 4.7% in 2014 which is lower than 2013 but around 20% higher than the 2010-2012 level. The next two consumers on the list are the food and tobacco industry (4.4%) and the non-metallic industry (3.8%).

Figure 4 Final energy consumption per sector 1990



Source: Eurostat

Figure 5 Final energy consumption per sector 2014



Source: Eurostat

1.2.2 Energy outlook

The energy outlook in France has been debated at length in the framework of the National Debate on Energy Transition which took place in 2012-2013 as a run-up to the drafting of the Law on Energy Transition. It ended with four energy transition scenarios. The **reference scenario** (described briefly further down) is compatible with the objectives of the Law on Energy Transition. The scenario illustrates the ambition of the efforts that need to be made. It is not an action plan but a simplified horizontal picture without having the ambition of drawing the best possible route.

The direction of the energy transition is set by the Law on Energy Transition (2015): 50% GHG emission reduction between 1990 and 2030 and Factor 4 reduction between 1990 and 2050 (Factor 4). This is a huge challenge requiring 140 Mt of GHG reduction meaning an acceleration of the 2005-2013 trend. The big challenge is to achieve these objectives without undermining the economic development and without exporting emissions abroad. The four big pillars include: energy economy in all sectors; use of low-carbon energy in transport, heating and industry; strengthening of natural carbon storage and bio-sourced products; and decarbonisation of the energy mix.

Reference scenario description:

- 2016-2020: the assumption is that the GDP will grow 1.6% per year as well as the industrial value added;
- Assumptions in Transport: improved fuel economy to 2l/100km in 2030; 2.5 million hybrid rechargeable cars in 2030; 1.9 million electric cars by 2030; 20% rail freight by 2030; increase public transport use; new behavioural changes such as 10% of telework in 2030, co-sharing goes up to two persons per car in 2030, soft transport grows to 12% in 2030.¹ An ADEME prospective study forecasted that mobility would not go down by 2030 and gains would come through technological improvements;²

¹ National Low Carbon Strategy

² MEDDE, 2013, Le facteur 4 en France : la division par 4 des émissions de gaz à effet de serre à l'horizon 2050

- In Heating: compliance with Thermal Regulation (RT) 2012 by 2020 and RT 2020 – after that; a pace of new construction of 500,000 apartments per year in the period 2017-2021 and 330,000 per year – between 2022 and 2035; reaching 59% of average consumption in the residential park in 2030 and 41% of ‘performing’ status;
- Assumptions in Industry: improvement of efficiency (thanks to energy audits) leading to 20% reduction in energy consumption in 2030; improvement of recycling and reusing of a part of final heat (10 TWh by 2030).³ The Perthuis Report (named after the author - Economy Professor at à l’Université Paris-Dauphine) insists on the visibility and predictability of the carbon price.⁴

To achieve these reference targets the National Low Carbon Strategy (NLCS) (whose adoption is required by the Law on Energy Transition) makes some main policy recommendations. The first one is internalising the price of carbon by financing institutions and fiscal measures and removing harmful subsidies and incentivising green behaviour. The second major recommendation is removing obstacles to the decarbonisation of the economy by securing acceptability of policies, better information (labels, etc.) and allow for the transformation of the economy (networks, infrastructure, professional education, smart regulation, financing instruments). Additional measures include improving of carbon metrics, improving of non-financial reporting of financial institutions (i.e. carbon impact of financing); create a space for dialogue between private and public actors and civil society, facilitate the access to financing of low-carbon projects.⁵

2 Culture and history around energy policy

2.1 Policy history, informal rules and structures, events that shaped the country’s energy transition

2.1.1 Forces behind the changes in the energy system

The oil crisis and the creation of the Energy Efficiency Agency

Similar to a number of EU countries, following the 1973 oil crisis France realised the importance of decreasing the reliance on imported oil and improving the energy efficiency. In 1974 the Energy Efficiency Agency was created to act on the demand side. Since then, households and individuals are well aware of the problem. As a result, France’s energy intensity (Final Energy Consumption) decreased from 100 in 1970 to 52 – in 2013.⁶

For example, the history of thermal regulations shows the evolution of thinking towards stricter energy efficiency in building. The first RT appeared in 1973, a second one in 1982 (after the second petrol shock), followed by RT1988 for offices. RT2000 added the summer comfort component and RT2005 – the bioclimatic and renewable aspects. RT2012 and RT2020 are described in detail later.⁷

In parallel, actions were being taken on the supply side of energy as well. The process of shift to nuclear was taking place and from 65% of electricity produced from coal in 1973 it fell to

³ National Law Carbon Strategy

⁴ <http://www.lopinion.fr/2-novembre-2014/christian-perthuis-ras-bol-fiscal-interdit-reflechir-a-vision-globale-notre-systeme>

⁵ National Law Carbon Strategy

⁶ idem

⁷ <https://www.e-rt2012.fr/explications/generalites/precedentes-reglementations-thermiques/>

4.72% in 2014. In the beginning of the 1980s the momentum for the decarbonisation of the economy decreased because of the fall of oil prices but the efforts have increased again since the end of the 1990s. This resulted in one of the most low-carbon economies in the world with solid public policies accompanied by monitoring indicators; a trend of development of renewables; and significant awareness of people.

It has to be noted though that the fluctuations of energy consumption in some sectors like building and industry are very significant from year to year. Significant jumps means a narrow link with unpredictable factors such as temperatures or implementation of new technologies. The trends in transport and agriculture are much more gradual which shows a gradual evolution of lifestyles and prices. For example, policies on fleet renewal and public transport strategies have their impacts in the long term.⁸

A combination of top-down and bottom-up approach

The evolution of French climate and energy policy in the 2000s was a combination of a top-down and bottom-up approach. EU environmental, climate and energy policy were a major driver of changes in France. According to an IEA report from 2009, the French energy policy is relatively centralised and with a strong government involvement despite the fact that it is more and more guided by EU Directives. The power of the energy regulator, CRE (Commission de Regulation de l'Energie), was strengthened but the government has the last say with regards to tariffs.⁹

At the same time, there is a strong pressure from below and a multitude of citizen movements and associations have also been demanding commitments and action from the government. Additionally, huge quasi-government energy players like EDF recognised the enormous potential of the renewables in the early 1990s and started investing in it. It is also clear that the availability of relatively cheap nuclear energy for households and industry did not make action extremely urgent and factors of change are elsewhere. It is difficult if not impossible to assign weight and importance to the different factors.

Factor 4 (2003)

In 2005, the French President committed to reduce the national greenhouse gas (GHG) emissions by a factor 4 until 2050 compared to the 1990 level or otherwise divide by four the energy consumption. This commitment was taken up in the Climate Plan in 2004 and the Law on Programming of the Orientations of the Energy Policy (POPE) in 2005 (described later).¹⁰ Certain stakeholders consider Factor 4 as a nice political slogan but reasonably optimistic analysis show that the reduction would be by a factor of 2-2.5 between 1990 and 2050 unless carbon is given a price.¹¹ The Report Alain Quinet (named after the chairman of a mission within the Centre of Strategic Analysis) proposed a value of carbon based on a cost-benefit analysis: by 2010 32€; 2020 56€; by 2030 100€; by 2050 around 200€ (per ton CO₂ equivalent).¹² Factor 4 commitments informed the consultation process within the Grenelle of the Environment. It increased the public awareness of the radical efforts that need to be

⁸ National Law Carbon Strategy

⁹ Interview with EDF Energies Nouvelles

¹⁰ <http://www.geoplac.com/lexique/pope/>

¹¹ MEDDE, 2013, Le facteur 4 en France : la division par 4 des émissions de gaz à effet de serre à l'horizon 2050

¹² idem

undertaken in different sectors such as transport, buildings and industry if such a significant reduction is to be achieved.

Grenelle of the Environment (2007-2010)

The Grenelle of the Environment was an important process of consultation between different players in the environment: the government, local authorities, enterprises, trade unions and NGOs. It started in 2007 and comprised of 5 distinct phases (explained later). It ended up with the Law Grenelle I (2009) comprising of 268 environmental commitments and Law Grenelle II (2010) making these commitments more precise. The process and ensuing laws set the course of development for years to come.

Law on Energy Transition for Green Growth (2014-2015)

The Law on Energy Transition for Green Growth (2015) is a major milestone in France's environmental and energy legislation. It was announced during President Hollande's election campaign in 2012 but became a fact three years later. The debate started in 2013 with more than 1000 consultation meetings and ended with the adoption of the law in July, 2015. It has to be noted that the adoption coincided with a period of cheap oil which decreases the incentives for different actors. Despite being recognized as a hugely positive achievement, a year later (2016) there are still criticisms (including from interviewed stakeholders) in several main directions: 77% of the decrees linked to the law have not been published, the important decree on multi-annual planning was adopted with a certain delay (28.10.2016) and the perception is that the translation of measures into concrete actions is lagging behind.¹³

2.1.2 Public opinion on climate and energy

Climate and energy are widely debated in society. The long and wide consultations within the Grenelle of the Environment, the Law on Energy Transition for Green Growth as well as the organisation of COP21 in Paris additionally raised the profile of the issue in France. Major newspapers and TVs regularly publish articles and broadcast programmes on environmental and energy transition issues. The past decade there have been two major debates organised around the drafting and adoption of two laws – Grenelle of the Environment (leading to the adoption of Grenelle I and Grenelle II) and Law on Energy Transition. Both processes took several years and involved thousands of consultations and stakeholders.

Naturally, one of the major topic of interest for the French society is the future of nuclear energy. There is a relative consensus that France cannot get out of the nuclear any time soon. Nevertheless the Environment and Energy Management Agency (ADEME) came out with a daring Vision 2030-2050 outlining the possibility of a 100% renewable future. This vision is shared by many association. For example, the interviewed wind energy associations supported this vision at the same time realising the futility of attacking the nuclear sector and lobby. The wide-spread consensus is that renewables need to first replace fossil-based electricity generation. The targets for nuclear energy production within the multi-annual programming are still very general and more detailed ones are impatiently awaited by all players.

The long-awaited multi-annual energy programming was released on 28.10.2016 but the evolution of the nuclear park is not spelled out. The government requires from EDF the preparation of a strategic plan within six months on how to reduce the share of nuclear energy from the current 77% to 50% in 2025. There are some indicative elements in the programme namely the reduction of the share of nuclear energy by 10 TWh to 65 TWh per year. However,

¹³ Fabrique Ecologique, 06/2016, Note on the Law on Energy Transition

this will depend on many factors such as the evolution of demand, electricity exports, development of renewable energy and decisions on closing down reactors and prolongation of exploitation beyond 40 years.¹⁴

Additionally, there are pressure groups such as Sortir du Nucleaire Network (Get out of the Nuclear Energy). SNN is an association of actors (930 associations and more than 60,000 individuals) with the conviction that France needs to quit the nuclear energy. Some of the SNN's successes include preventing the text on deep nuclear waste storage from entering the Law on Energy Transition for Green Growth. SNN has managed to increase the awareness of the population about little known and more controversial facts about nuclear energy in France such as nuclear waste, transport of radioactive materials and waste, etc.¹⁵

The topic of development of renewables and 'democratisation' of energy is also high on the agenda as it becomes possible for local authorities and individual citizens to invest in energy projects. Similar citizens' projects are mushrooming in French regions although interviewed stakeholders consider their development as far from being close to countries like Denmark and Germany.¹⁶

French society is divided on the issue of shale gas. Public opinion polls from 2013 show a better understanding of the issue and its environmental impact at the same time acknowledging the increased energy self-sufficiency that go with it.¹⁷

French society is still largely dependent on cars, especially in the countryside, but new, innovative alternative transport policies are being implemented and actions are being taken. A tangible decarbonisation is expected in the next two decades due to the development of sustainable transport modes like biking and measures like co-sharing schemes. Both are becoming widely popular.

Energy and environmental taxation is another issue of interest in France. There is a Committee on Environmental Taxation which deals with the issue. The current government does not have the will to green the taxation as the perception of people is that this is going to add to their taxes while the truth is that it replaces other forms of taxation.¹⁸

2.1.3 Energy interests in society and policy making

Energy interests are deeply rooted in society and policy making. As specified earlier, France took an early, strategic decision to develop nuclear energy as the major energy source in the country. Hence, the importance of all actors included in the nuclear energy value chain. It is the third industrial value chain after aeronautics and automobile construction regrouping 2,500 enterprises and 220,000 employees. The accidents in Chernobyl and Fukushima spurred an important debate on nuclear security but did not lead to a fundamental rethinking of the energy system and a decision to phase out nuclear energy similar to Sweden and Germany. In line with the objectives of the Law on Energy Transition for Green Growth, the share of nuclear has to decrease from around 75-77% to 50% in 2025.¹⁹ One of the major player in the energy sector - EDF - is the owner of the nuclear power stations. EDF recognised the

¹⁴ <http://www.actu-environnement.com/ae/news/publication-programmation-pluriannuelle-energie-ppe-27779.php4>

¹⁵ <http://sortirdunucleaire.org/Le-Reseau-en-quelques-chiffres>

¹⁶ Interview with Lucas Robin-Chevallier, France Energie Eolienne (FEE)

¹⁷ http://www.ifop.com/?option=com_publication&type=poll&id=2199

¹⁸ Interview of L'Opinion with Christian de Perthuis, 02.11.2014

¹⁹ <http://www.latribune.fr/entreprises-finance/la-tribune-de-l-energie/10-chiffres-a-connaître-sur-la-france-et-le-nucleaire-479263.html>

importance of renewable energy and has created EDF-Energies Nouvelles which is in charge of wind, solar and hydro development.

With the speeding up of the development of renewable energy different interest groups defending their interests are gaining speed and strength. The associations France Energie Eolienne, Enterprises for the Environment and Fabrique Ecologique have been interviewed within this study. Similar associations exist for other types of renewables as well. France has a strong environmental NGO sector and foundations such as Fondation Nicolas Hulot, Fabrique Ecologique, Oree and others have been vocal for many years including the major discussions during the last decade – the Grenelle of the Environment and the one on the Law on Energy Transition for Green Growth. Overall, the interviewees’ perception is that their opinions have been heard by the government and that they can successfully impact the policy making process. Another perception of the interviewees is that media (printed and TV) are more and more interested in their opinions as well.

With the Law on Energy Transition for Green Growth and the Law on New Territorial Organisation (NOTRe) regional and local authorities are becoming a more important energy player. The Law NOTRe regulates the reform of French administrative units and merges regions into bigger ones. It assigns the responsibility for climate, air and energy to the regions. The Law on Energy Transition for Green Growth forces communes with more than 20,000 inhabitants to develop Plans on Climate, Air and Energy.

Grenelle II unleashed the development of renewables in the regions through the Schemes for development of renewable energy. The Law on Energy Transition further accelerated this process. At the same time citizens also have more opportunities to participate in energy projects as local shareholders. However, according to Fabrique Ecologique, an active think-tank, during the energy planning process it is always the top-down approach which is predominant. The roles of the regions and their responsibilities are not defined. One of the challenges will be for regions and municipalities to adopt their new responsibilities.

Table 1 Stakeholder type mapping

	High power	Medium power	Low power
<i>High interest</i>	Nuclear Industry Areva ERDF EDF GRDF ADEME CRE Total Engie Car manufacturers	France Energie Eolienne Industrial associations NGOs ATEE, Fondation Nicolas Hulot, Orée, Réseau Action Climat Labour organisations Syndicat Energies Renouvelables,	NGOs Fabrique Ecologique Competitiveness clusters

The energy transition issues are of strategic importance to all identified players and it is impossible to identify players for which the issues are of low interest.

2.1.4 *Alternative arrangements in the domain of energy*

A slow uptake of citizens' participation

Historically quite centralised, the electricity production modes are changing with the development of renewable energy and the taking up of the energy question by the citizens. Recently, the number of cooperative projects has been quickly increasing. These initiatives are still marginal in France but nevertheless they have an impact: social acceptance of renewable energy; further sensibilisation on energy management; and development of local economic democracy. Citizens and local authorities participate in the design, development and/or exploitation of renewable energy units in a local sustainable development context. These initiatives reflect a form of appropriation of energy issues by the citizens. There are several forms of participative projects: projects initiated by citizens, by classical investors or by local authorities. The promoters are driven by motifs such as: GHG reduction; willingness to position civil society next to the government and the state in determining energy transition issues.²⁰

However, the culture of launching collaborative projects in France is not as developed as in some other countries such as Denmark and Germany. For example, the major problem with wind energy projects is the governance and sometimes the big number of participants can be counterproductive at the stage of voting. Otherwise, every project has bigger chances to get implemented if the citizens participate. In wind energy the model private-local authority-citizens will be even more viable in the future.²¹

There are couple of issues which are very positive in this respect. Currently, the hands of local authorities are untied and they are free to invest and participate in companies.

Crowd-funding of renewable energy projects

A regulation from 05/2015 on participative financing made crowd funding much easier and currently as much as 2.5 million EUR could be crowded compared to 100,000 EUR before that. Each individual can invest a maximum of 2,500 EUR to avoid concentration of shares. The system is functioning and secure. There are a number of active intermediaries such as Lumo²² and Landosphere²³. Crowd funding is a way of bringing the renewable energy problem closer to the people so that citizens start 'owning' it by being favourable to it and by knowing what is behind.²⁴

Box 1 The wind park at Les Landes du Méné

The wind park Landes du Mené is a participative project of local investment innovating in energy production. It is driven by the objective of local energy independence and the creation of a local energy value chain allowing the consumption of energy in the place it is produced. Putting the citizens at the heart of the project is an essential point of the project. The founders of the project include: CIGALES(Club d'Investisseurs pour une Gestion Alternative et Locale de l'Epargne Solidaire) , SICAP (Société Coopérative de la Région de Pithiviers), Imagin'ère, Citéol Méné, ADELIS.

The project include seven wind turbines with a total nominal power of 5 600 kW. The production is estimated at 14.5m Kwh/year or the equivalent of 3,000 households. 30% of the capital is held by 137 individuals grouped in

²⁰ idem

²¹ Interview with Lucas Robin-Chevallier, France Energie Eolienne, 26.10.2016

²² <https://www.lumo-france.com/projets>

²³ <https://www.lendosphere.com/>

²⁴ idem

eight clubs of investors (CIGALES) while 70% is owned by SICAP. EDF has committed to purchasing the produced electricity for 15 years. Investments have been estimated at 7.7-8 million EUR.

Source : Citeol Energetique, Landes des Mene²⁵

3 Formal rules and instruments

3.1 Laws and regulations

Plans, laws and regulations concerning energy policy

Factor 4, the Law POPE (Loi de Programmation fixant les Orientations de la Politique Énergétique)

As mentioned early, the French President committed to divide the national GHG emissions until 2050 compared to the 1990 level by a factor 4 or otherwise divide by four the energy consumption. This commitment was taken even though the GHG emissions per inhabitants was already relatively low. The commitment was taken up in the Climate Plan in 2004 and the law POPE in 2005. The law POPE sets four main objectives: contribute to the energy independence; guarantee supply of electricity; everyone has access to electricity; divide by factor 4 of the GHG emissions; decrease by 2% per year of the final energy intensity. Measures include the confirmation of the role of local authorities and a higher transparency in the information to consumers. It also creates a Supreme Energy Committee dealing with gas and (renewable) energy.²⁶ The Grenelle of the Environment has oriented its objective towards factor four as well.

Grenelle of the Environment

The Grenelle of the Environment is a forum for consultation between major players in the environment: the government, local authorities, enterprises, trade unions and NGOs. Phase 1 included consultation between five major stakeholders: the state, local authorities, enterprises, trade unions and NGOs. Phase 2 of the process included public consultation of more than 30,000 participants. Phase 3 included negotiations and decisions of 268 commitments taken by the French president. Phase 4 comprises of an operational implementation through 34 committees proposing concrete actions. Phase 5 includes the adoption of the law on programming for the implementation of Grenelle of the Environment.²⁷

There are a number of thematic agreements. These are several agreements in the energy area:

- Agreement on showing energy performance of buildings in real estate announcements (2008);
- Agreement on promoting low consumption lamps (2008);
- Agreement on the development of a sustainable hydro energy (2009);
- Agreement on reducing energy consumption in buildings (2010).

The Grenelle of the Environment was a huge exercise of participative democracy. It has to be noted that the Grenelle of the Environment has a strong social pillar which is called a Pact of Environmental Solidarity. One of the themes of the pact is fighting energy poverty. Families in

²⁵ www.ccmene.fr

²⁶ <http://www.geoplac.com/lexique/pope/>

²⁷ <http://www.developpement-durable.gouv.fr/-Les-engagements-du-Grenelle-de-l-.html>

rural areas and provincial cities are the most concerned by energy poverty as they spend more than 15% of their incomes on heating and fuel. The four factors explaining energy poverty in France are the low incomes, the price of heating, the low quality of insulation and their location making them dependent on cars. There are policies tackling all of these factors:

- Support to low income families through the Housing Solidarity Fund;
- Support to electricity price through social tariffs;
- Support to housing renovation through the ‘Habiter Mieux Programme’ (Live Better Programme).²⁸

The Law on Energy Transition for Green Growth (2015)

The Law on Energy Transition for Green Growth was adopted after two years of debates across the society. The regulations which would make it operational have still not been adopted in their entirety.

The Law sets the following objectives:

- Reduce Final Energy Consumption (FEC) by 50 % in 2050 compared to 2012 aiming at an intermediary objective of 20 % in 2030;
- Reduce the primary energy consumption of fossil fuels by 30 % in 2030 compared to 2012;
- Reach a renewable share of 23 % from Final Gross Energy Consumption (FGEC) in 2020 and by 32 % of FGEC in 2030;
- Reduce the share of nuclear energy in the energy production to 50% in 2025;
- By 2050, the real estate park should be in line with the low energy consumption norms through leading a policy of renovation of buildings mainly concerning the low and modest income households;
- Multiply by five the renewable heating and cooling by 2030;
- The Law on energy transition for Green Growth (2015) set up the High Council on Construction and Energy Efficiency. Its mission is to advise the public authorities in policy making and evaluation with regards to construction.²⁹

Multi-annual energy programming

The multi-annual energy programming is a key text in the Law on Energy Transition. It replaces the old multi-annual programming of investments into energy production. The new programming looks at the energy mix as a whole. It requires that the sectoral targets are based on studies and that their implementation is regularly reviewed. Some experts think that the fact that the multi-annual energy programming was delayed is because it is very difficult to publish a strategy in the nuclear sector while keeping the targets. In theory, the reduction of the part of nuclear in the energy mix can be achieved by increasing the consumption but this is not in line with the energy efficiency and consumption reduction objectives and therefore there cannot be a deliberate government policy. Another strategy would be to adopt an

²⁸ idem

²⁹ Law on Energy Transition, 2015

approach for constant consumption but provide a timetable of closing down of nuclear reactors. Anyway, an ambitious programming in the nuclear is absolutely necessary, according to all of the interviewed organisations and reviewed literature on the topic.³⁰ The objective is to have a much clearer idea of the future of the nuclear energy, foresee the investments for energy efficiency measures and the increase of renewables. It is necessary to have a list of reactors which should be closed at the end of their life of 40 years.³¹ The precise targets are available in Figure 6 below.

Climate Plans (within the Law on Energy Transition)

The local governments (cities, departments, regions with >20,000 inh.) need to develop and update every six years Territorial Plans on Climate-Energy-Air (PCAET). These should be drafted in an integrated manner aiming at GHG reduction and climate change adaptation. The plans represent a major planning exercise involving a multitude of local actors. ADEME is managing an observatory of regional plans.

It has to be noted that local authorities and territories had other planning mechanisms before namely Agenda 21 and SRCAE (Regional Schemes for Climate, Air and Energy). The regional schemes have to be drafted on a regional level.

EDF CAP 2030 Strategy³²

EDF is by far the most powerful player on the French energy market. Within the framework of the energy transition in France EDF has defined a strategy named CAP2030. The main points in the strategy answer important questions which are relevant to this study:

Table 2 EDF CAP 2030 Strategy

Point from strategy	Conclusion
<ul style="list-style-type: none"> • Get closer to the clients by creating new, decentralised and personalised services. • Support local authorities and companies in their energy transition. 	There is a trend for energy decentralisation and tailor-made services to individuals, local authorities and companies.
<ul style="list-style-type: none"> • Double the production of renewable energy until 2030 (wind, solar, marine, hydro); EDF is a player in the renewable sector with 21.9 GW of hydro power. The ambition of the group is to increase production from 28 GW to 50 GW of installed capacity of renewables. 	There has been a recognition that ‘the next 15 years will be marked by the development of the renewable energy’.
<ul style="list-style-type: none"> • Improve energy efficiency through the smart meter Linky. 	
<ul style="list-style-type: none"> • Develop the “new nuclear” programme: development of new reactors which are more powerful and consume less resources. EDF has just signed a contract for the construction of two nuclear reactors in the UK. 	France, through its strategic choice for nuclear energy, will not abandon this road and will focus on the coexistence of nuclear and renewable energy.

³⁰ Decryptage, Fabrique Ecologique

³¹ Fabrique Ecologique

³² EDF CAP 2030 Strategy

3.1.1 Means of monitoring

ADEME

The Agency for Environment and Energy (ADEME) is an institution under the Ministry of Environment, Energy and Sea (MEEM) and implements and monitors energy policy. Its energy-related responsibilities includes techniques to promote energy efficiency in industry, transport and buildings, while also promoting renewable energy technologies.³³

Electricity

ERDF has to provide equal access to the electricity grid to all electricity providers without favouring EDF. This neutrality is monitored by the Committee on Energy Regulation (CRE). ERDF is 90% financed by the Tariff for Utilisation of the Electricity Grid (TURPE) which is defined by CRE.

Buildings

Every five years the Government submits a report to the Parliament which spells out the national strategy until 2050 in order to mobilise investments in energy management in buildings. The strategy includes analysis of the national buildings park from an energy efficiency point of view, presentation of suitable renovation strategies, a summary of policies, action plan and estimation of saved energy.³⁴

3.1.2 Regulations under debate

Low-carbon Strategy

The strategy aims to reduce by factor 4 the GHG emissions by 2050 allowing to keep the GHG emission ceilings for the periods 2015-2018, 2019-2023 et 2024-2028 as well as the commitments of France towards the EU to reduce by 40% the GHG emissions by 2030. The expected impact includes: smaller dependence on imported fossil fuels; increase employment by an average of 350,000 between 2015 and 2030. There is an implication for the other sectoral policies namely taking into consideration the GHG emissions when financing projects. In terms of individual consumption the strategy promotes durable and repairable products; commits to a circular economy approach; renting, car-sharing, etc.; reduce food waste; reduce emissions from buildings (simple measures, energy performance services, issuing of energy renovation, passports). In the field of industry the strategy reiterates the need to limit lock-in effect by introducing a more predictable foreseeable carbon price.³⁵

3.1.3 Additional laws and regulations of interest

- **National Strategy on Biomass and on Regional Biomass Schemes** – defines the biomass production and valorisation for the purpose of electricity production with a view to increase the supply of installations for electricity production

³³ <http://www.ademe.fr/>

³⁴ Law on Energy transition

³⁵ http://www.consultations-publiques.developpement-durable.gouv.fr/IMG/pdf/2015-08-13_DEVR1519707D_SNBC_r_R_sum_R_.pdf

Table 3 Overview of targets and regulations per energy function

Targets and regulations				
Target 2030	Reduce consumption by at least 38% by 2020. (Grenelle 1)		7 million charging points till 2030 Implementation of biking infrastructure 15% RE (FEC)	See figures in the separate table below
Target 2050	Emission reduction of 87% relative to 2013. (Low-carbon Strategy)	Emission reduction of 24% relative to 2013. (Low-carbon Strategy)		
Special/additional regulations or targets	Renew 500,000 homes per year starting 2017 (Law on Energy Transition) All buildings consuming >330kWh/m2 need to be renovated before 2025 Reduce annual energy consumption to 50 KWh/m2	By 2020 reduce by 50% the quantities of non-recyclable products	Multi-annual programming fixes a minimum share of biofuels in final energy mix for transport	

Renewable energy targets

The targets for renewable energy development were released on 28.10.2016 with the multi-annual programming decree. Targets are not described in percentages but in capacities.

Figure 6 Renewable energy targets as set in the multi-annual programming decree (in GW)

	2014	2018	2023	
Onshore wind	9.3	15	21.8 - 26	
Solar	5.3	10.2	18.2 - 20.2	
Hydro	25.3	25.3	25.8 - 26.05	
Offshore wind	0	500	Between 500 MW and 6 GW	
Marine energy	NC	NC	Between 200 MW and 2 GW	
Biomass	357	540	790	1040
Biogas	85	137	237	300
Geothermal	0	8	53	
Waste, biogas	1200	1350	13	14
Total	41GW	52GW	71GW	78GW

Source: Multi-annual programming, 28.10.2016

- The decree foresees an almost doubling of renewable capacities by 2023 with as many as 150% growth in onshore wind, quadrupling of solar and methanisation and tripling of biomass. No or minimum growth is foreseen in hydro. Growth in marine energy and offshore wind is tentative and depends on the success of the pilot projects.
- These targets are not contradictory to the targets set in the EDF CAP 2030 Strategy. EDF now has 21.9 GW of hydro. Obviously, the growth of renewable energy produced will not come from hydro.

3.2 Energy policy and instruments

3.2.1 Institutions in charge of energy policy formation and execution

MEEM

The Ministry of Environment, Energy and Sea was created in 2007 to address energy issues among others. It represents an opportunity to create coherent policies between sectors.

Commissariat général au Développement durable (CGDD) (General Commissariat for Sustainable Development)

This is a new horizontal structure within the Ministry of Environment, Energy and Sea (MEEM). It aims to promote sustainable development within public policies and in the action of all actors. It facilitates the drafting of the Strategy for Sustainable Development and ensures its monitoring and implementation. CGDD's competencies link the research and the innovation, the observation and statistics, economic, social and environmental analysis.³⁶

DGEC

The Directorate General Energy and Raw Materials was changed to Directorate General Energy and Climate in 2008. DGEC has many missions including development of comprehensive climate-air-energy policies and low-carbon transport systems as well as policies related to the energy markets, security of supply and nuclear power.³⁷

DREAL

The 12 DREALs – Regional Directorates on Environment, Planning and Buildings – are 12 regional structures around France of the Ministry of Environment, Energy and Sea the Ministry of Territorial Planning, Rural Affairs and Local Governments. The DREALs elaborate regional policies in the above fields, implements the state policies, evaluates environmental impacts of actions, etc.³⁸

CRE

The French Energy Regulatory Commission (CRE) is an independent energy board created in 2000 with the responsibility of opening of the energy markets. The CRE is responsible for securing open access to all transmission networks (electricity and gas) for all eligible suppliers and the independence of these networks from any historical and ownership influences. It proposes electricity and gas tariffs to the government which has the authority to adopt them. This means that there are still risks of politically motivated decisions.³⁹

³⁶ http://www.actu-environnement.com/ae/dictionnaire_environnement/definition/commissariat_general_au_developpement_durable_cgdd.php4

³⁷ Energy Policies of IEA Countries, France, 2009

³⁸ http://www.developpement-durable.gouv.fr/Pourquoi-la-DREAL_12610.html

³⁹ idem

National Council on Energy Transition (CNTE)

The CNTE is consulted on relevant projects namely the environment, energy, national strategies on sustainable development, biodiversity, environmental responsibility of enterprises and low-carbon strategies. Each year CNTE is informed of the development of national performance indicators on sustainable development in order to measure the progress of the transition. CNTE is also in charge of drafting roadmaps for energy/environmental transition.⁴⁰

3.2.2 Space for experimentation. Innovation policy.

EDF investment fund Electranova Capital

In 2012 EDF launched an investment fund Electranova Capital supporting start-ups in the new energy sector and environmental technologies. In three years, it has acquired shares in seven start-ups in the domains of new batteries radars for offshore wind projects, etc.⁴¹

EDF Pulse & You Co-innovation Platform

EDF launched a co-innovation platform. It is a collaborative platform inviting users to test innovations in a form of participative manner.⁴²

Competitiveness clusters

Box 2 DERBI competitiveness cluster

DERBI brings together enterprises, laboratories, financiers, professional organisations and local authorities involved in the development of renewable energy. Its mission is to develop on a regional, national and international level innovation, research, training, technology transfer in the domain of renewables for the construction sector and the industry.⁴³

There are other energy clusters with slightly different focus such as Alsace Energivie, Capenergie, Mer Bretagne Atlantique, Mer Mediterranee, S2E2, Tenerrdis, Trimatec and others.⁴⁴

National Strategy on Energy Research (SNRE)

The elaboration of SNRE in 2016 happened through wide participation of concerned actors. It had to be in line with the National Research Strategy. The strategy has to be reviewed every five years. SNRE has to take into consideration the Low-Carbon Strategy and the multi-annual energy programming. The elaboration is managed by a SNRE permanent secretariat comprised of the ministries in charge of energy, research and ADEME. It created a baseline on research in energy production and use. Several directions of research have been identified in the process of consultation namely:

⁴⁰ <http://www.developpement-durable.gouv.fr/Le-conseil-national-de-la-42513.html>

⁴¹ <https://www.edf.fr/edf/accueil-magazine/edf-se-met-en-4-pour-les-start-up>

⁴² EDF Pulse & You - <https://www.edfpulseandyou.fr/participate>

⁴³ <http://www.pole-derbi.com/articles.asp?srb=1&id=1&lng=FR>

⁴⁴ http://competitivite.gouv.fr/identifier-un-pole/annuaire-des-poles-20.html?tx_wtdir

- Integration of renewable energy: vectors, conversions and stocking, flexibility and intelligent systems;
- Multi-level governance of the energy transition;
- Materials and systems for energy: strategic resources; innovative materials for energy storage;
- Bioenergies and biochemical complexes; soil management; valorisation of carbon;
- Energy efficiency: buildings-transport-productive systems.⁴⁵

Table 4 Overview of policy instruments per function

Instrument				
Economic	Guarantee funds Heating Fund	Heating Fund	Bonus-malus system Fiscal measures for bike fleets Biofuel tax reductions	Energy check
Information, education, networks	Labelling Territorial platforms		Auto-share label	Energy Information Space Labelling
Policy and regulations	Energy efficiency certificates Thermal regulation RT2012	Cap-and-trade through National Plan for Allocation of Quotas (PNAQ)	Fleet renewal Public procurement	Env. clauses in public procurement
Research and development	More funding for energy R&D			
Voluntary instruments	White certificate scheme		Teleworking Innovative logistics	

3.2.3 Space heating

- *Carbon tax* – a tax imposed on fossil fuels. It concerns diesel, natural gas (4.45 EUR/MWh in 2016)⁴⁶
- *Guarantee Fund for Energy Efficient Renovation of Buildings* – facilitates financing into building renovation; guarantees loans;⁴⁷
- *Heating Fund* – it is managed by ADEME and is targeted at buildings and enterprises. It participates in the development of production of renewable heating. In France, heating

⁴⁵ https://www.celluleenergie.cnrs.fr/IMG/pdf/13-f_ravel_-strategie_nationale_energie_menesr.pdf

⁴⁶ http://www.lesechos.fr/01/04/2014/LesEchos/21659-074-ECH_la---taxe-carbone---entre-en-vigueur-aujourd-hui.htm

⁴⁷ Law on Energy transition, Art.20

represents 50% of energy production and is mainly produced from fossil fuels. The fund is targeting industries and local authorities.⁴⁸

- *Territorial Platforms* – information to consumers – technical, financial, fiscal;⁴⁹
- *Energy efficiency certificates* – a measure introduced in 2005 whereby the state imposes to certain actors to reach energy efficiency goals. The sectors include mainly the buildings, SMEs, agriculture and transport. Additionally, energy suppliers are obliged to promote energy efficiency and energy economies.⁵⁰
- *Strategy on buildings* – every five years the government submits to parliament a strategy with a horizon 2050 in order to mobilise investments into energy renovation of buildings. (Art.4)
- *Creation of a digital passport of the apartment* – mentions all information relevant to the constant improvement of its energy performance.

New model (example from wind energy)

- In line with EU State Aid legislation, the wind energy development is transiting from feed-in tariff model to feed-in premium model. The latter depends on the price of the electricity on the market. Additionally, there is a management premium which also varies. The premium will be indexed.
- From 2017, the system will rely on public tenders for a certain capacity. The system will work if only mature projects with secured funding and permits will have the right to bid;
- Other factors which will be taken into account are the environmental impact, the availability of crowd funding, etc. However, for the solar energy the regulation gave too high a weight to the environmental factors and this meant that only one big group could qualify for it as all others were importing the technology from abroad and this increased their carbon impact;
- The public tenders will take place three times per year.⁵¹

3.2.4 Industrial heat

Industrial heat represents 20% of all energy consumption in France. It is mainly produced from fossil fuels. The saving potential has been estimated by ADEME at 20% till 2030. The biggest sectors concerned are the chemical industry, food industry, iron and steel industry, etc.

- *Cost-benefit analysis of heat reuse* - starting in 2015, ICPE Installations (high environmental risk installations as defined in the regulation on risk prevention and environmental protection) with a capacity of > 20MW need to carry out a cost-benefit analysis of heat reuse in case of major renovation or new installations.
- *Strategies*: reduce upstream (through technology optimisation); use internally; use externally (through electricity production or urban heating);

⁴⁸ <http://www.ademe.fr/expertises/energies-renouvelables-reseaux-stockage/passer-a-l'action/produire-chaaleur/fonds-chaaleur-bref>

⁴⁹ Law on Energy transition, Art.22

⁵⁰ ADEME 2015, Connaitre pour Agir (Know to Act)

⁵¹ Interview with Lucas Robin-Chevallier, France Energie Eolienne, 26.10.2016

- *Approaches*: tackle first the most energy consuming processes (ovens, dryers, etc.); aim at the most accessible waste products (smoke); focus on heat with temperature of 100 degrees which is the most common and with the highest potential to be exploited.⁵²

3.2.5 Transport

- *Strategy for Clean Mobility* – the strategy was adopted in 2016 as foreseen in the Law on Energy Transition. It includes the following objectives: limit the mobility demand; develop low-emission vehicles; develop the market for alternative fuels; optimise transport networks and reduce the demand for the most polluting modes of transportation; and develop collaborative modes of transportation.⁵³
- *Fuel economy* - Encouragement of low-consumption vehicle (2l/100km) through the bonus-malus system and parking advantages; alternative fuels infrastructure
- *Fleet renewal* - Public organisations with more than 20 vehicles are obliged to: renew 50% of the fleet with electric or low-emission vehicles; Obligations vary according to weight of vehicles and type of public institution.
- *Auto-share label* – given to vehicles dedicated to this purpose with the purpose of increasing the level of car filling.
- Companies (>150 p) have to encourage car-sharing. Car-sharing will have priorities on roads.
- *Smart logistics* - experiments in securing merchandise to cities through train, river
- *Encouragement of teleworking*
- *Public procurement* - Preference of train supplies within public procurement (LET)
- *Fiscal measures for bike fleets* – tax reduction for enterprises buying urban transport vehicles up to 25% of the purchase price;
- *Differentiation in highway fees* - in favour of low-emission vehicles

3.2.6 Electrical power

Energy checks - That's a tool which was introduced in four territories (départements). It is a subsidy for the payment of energy used for heating no matter what energy was used at source. It would replace the several social tariffs available. After the pilot phase it will be extended to the whole territory after 2018. The amount of the energy check is calculated on the basis of the household revenue and is on average 150 EUR/year while it can go up to 227 EUR/year and a minimum amount of 48 EUR/year. The check can be used for thermal renovation as well.⁵⁴

Energy Information Sites (Espace Info Energie) - Espace Info Energie is a national independent energy mediator. It is an independent public institution. Individuals and companies can get information on different issue related to energy such as: how to act when moving, how to act when constructing, what to do to change a supplier, etc.

Labelling – the electricity consumption of all household appliances are clearly labelled.

⁵² <http://www.ademe.fr/sites/default/files/assets/documents/ademe-chaleur-fatale-industrielle-8445-2015-03.pdf>

⁵³ http://www.developpement-durable.gouv.fr/IMG/pdf/3c_-_Volet_SDMP.pdf

⁵⁴ <http://www.energie-info.fr/Fiches-pratiques/Ma-facture-mon-compteur/Le-cheque-energie-experimentation-dans-4-departements>

4 Interaction and governance

Energy governance in France is a complicated interaction between a number of powerful and highly interested players acknowledging the high stakes of the energy transition. On one hand, the government pursues its international obligations through wide-scale initiatives such as Grenelle of the Environment and the Law on Energy Transition for Green Growth. Besides achieving compliance with international commitments these bring political benefits. On the other hand, big industrial players are positioning themselves with regards to the energy transition both by buying into the ongoing processes but also through diversifying their businesses (i.e. through renewable energy). It has to be noted that many of the big industrial players are emanations of the state and the government is still a major shareholder. As such, they need to be relatively aligned with the government policy in energy. However, because of their significance and size they have a major say anyway. Additionally, a number of associations participate in all important policy debates. These include associations with very concrete and non-negotiable agendas such as *Sortir du Nucleaire* (Quit the nuclear energy) which exert pressure for more radical solutions to the energy puzzle. Others, such as renewable energy trade unions push for development in different renewable energy sources without necessarily attacking the nuclear industry sector. A number of influential NGOs and think tanks participate vocally in the debates and take positions varying from moderate to radical.

ERDF (Electricité Réseau Distribution France) has the monopoly on energy distribution in France for 95% of the clients. ERDF changed its name to Enedis in May, 2016. ERDF/Enedis is 100% owned by EDF (Electricité de France). ERDF manages the electricity distribution network (<50kV), the connections and the electricity meters. ERDF has to provide equal access to the energy grid to all electricity providers without favouring EDF. The energy distribution is an obligation of the local authorities which give concessions to ERDF. Every year ERDF submits a report on actions and investments. ERDF is managed by a management board defining the industrial, social and environmental policies of ERDF. The monitoring committee includes two representatives of the state, 8 – of the shareholders and 5 – of the employees. **RTE (Réseau de Transport d'Electricité)** (100% owned by EDF) manages the high-tension electricity lines (>50 kV, 1.3 million km).⁵⁵

Since 2012, ERDF/Enedis has been developing an intelligent electricity meter Linky aiming the shift to a smart grid. Linky communicates consumption to the operator but is also capable of self-calibration. The precision of consumption transmission facilitates the introduction of renewables and is also of help to consumers to manage their electricity consumption.⁵⁶

EDF Energies Nouvelles (EDF-EN) was an early starter in developing renewables more than 20 years ago. Wind and solar energy production is a priority. However, the group operates in other renewable energy sources such as distributes energy and marine.⁵⁷

Areva supplies products and services for the nuclear fleet. The company operates throughout the entire nuclear cycle, from uranium mining to used fuel recycling, including nuclear reactor design and operating services. Areva has a workforce of almost 40,000 people and a turnover of 4.2 billion in 2015. Through its purchase of Alstom Areva is also a player in the field of renewable energy namely offshore wind (126 wind turbines in 2014), bioenergy (100 bioenergy

⁵⁵ <http://www.fournisseurs-electricite.com/erdf#activites-erdf>

⁵⁶ <http://www.fournisseurs-electricite.com/erdf/linky#difference-linky-compteur-classique>

⁵⁷ <http://www.edf-energies-nouvelles.com/>

plants supplied or under construction), concentrated solar power and energy storage (provides solutions from 20 kWe to 1 MWe).⁵⁸

Total is the fifth petrol group in the world. However, Total diversified towards the renewable energy and in 2011, it bought one of the solar panel leaders in the world for more than a billion EUR. Total is also engaged in small scale initiatives and partnerships such as supports to co-sharing in partnership with Bla-bla-car.

TILT (Total Collaborative Platform). This is a possibility to offer one's innovative ideas on different topics. Currently, there is a public vote on biofuels on the TILT website.⁵⁹

Engie (ex-GDF Suez) is number two in France after EDF and a global leader in three industries: electricity, natural gas and electricity-related services. The energy transition is announced to be a main focus of the group namely energy efficiency and renewables. Its strategy has several elements relevant to this study: decarbonise energy production by reducing GHG by 70% by 2050, increase renewable energy; decentralise energy supply by producing, stocking and consuming energy locally; 57% improvement in energy efficiency.⁶⁰

Starting in October, 2016 Engie will propose to its new clients energy sourced from renewables only. It is a commercial move in the hope to secure an additional one million clients by end of 2017.⁶¹

4.1.1 *Examples of groups of stakeholders that uphold a clear, strong position with regards to energy and the energy transition*

Bottom-up initiatives

The Energy Transition Actors - some 200 organisations gathered in the energy transition actors initiative – enterprises, professional organisations, NGOs, trade unions, towns, association of towns, etc. They put pressure on the MPs to adopt a strong Law on Energy Transition. ETA outlined 14 NGO measures related to the energy transition, namely: limit energy bills through better buildings and sustainable transport; eradicate energy poverty; remove polluting heating installations and fossil fuels; programme the phasing out of nuclear; support to renewable energy; better split of competencies between central government and regional and local governments; support citizens' projects.⁶² We may conclude that their efforts have been successful as the Law on Energy Transition addresses all of these issues except the nuclear energy. Nevertheless, the efforts are now focusing on the successful implementation in practice of the directions given by the law.

Government vision

ADEME Vision 2030-2050 - In 2015, ADEME published a vision of the energy mix in France relying entirely on renewables. The analysis is based on the enormous potential of the renewable sector. It doesn't involve radical changes of behaviour or technologies but rather relies on high-impact measures such as renovation of buildings. The main goal of the analysis

⁵⁸ <http://www.aveva.com/>

⁵⁹ <https://tilt.total.fr/subdomain/tilt/end/home>

⁶⁰ <http://www.engie.com/groupe/strategie/>

⁶¹ <http://www.connaissancedesenergies.org/afp/engie-proposera-uniquement-de-lelectricite-renouvelable-ses-nouveaux-clients-161026>

⁶² <http://transitionenergetique.org/actualites/transition-energetique-6-lignes-rouges/>

is to demonstrate that such a future is possible if all energy actors are aligned behind it. The analysis demonstrates that a reduction of 20% of energy consumption is possible by 2030. By 2050, the consumption could be divided by two and GHG emissions – by four.

Brief analysis of 2017 French Presidential campaign for the primaries

Currently, there are campaigns for the primaries on the right of the spectrum. The campaign on the left has not started yet. The candidates for the presidency from Les Republicains have spoken very little about the environment so far with the exception of Nathalie Kosciusko Morizet. Francois Fillon would like to persevere with the nuclear energy and close down the fossil fuel power plants. Right of the centre there is a fracture with regards to the environment.⁶³ Recently, Nikola Sarkozy reversed his position from his previous presidency and said climate change was not only caused by man. This is very paradoxical given the fact that he was the instigator of the Grenelle of the Environment.⁶⁴

Jean-Luc Melanchon from the Far Left La France Insoumise (Untamed France) highlights the central energy planning and planning in general and relies on energy sobriety, limited growth and even de-growth. The environmental issue is central in the far left discourse as the anti-capitalist discourse is outdated. JLM emphasizes the need for supply policies and not demand policies. The green rule should be incorporated in all policies. JLM would like to concentrate efforts on the geothermal energy and ocean energy.⁶⁵

4.1.2 Government's relation with interest groups

Annual Environmental Conferences

In April, 2016 the Government organised the 4th annual conference – an event which takes place every year since the beginning of Francois Hollande's presidency. This conference serves to draw the roadmap for the year to come.

- Roadmap on the development of nuclear energy within the multi-annual energy programming
- RES objectives to appear in April, 2016: the target till 2023 is to increase by 50% the installed capacity of RES passing from 43,000 MW to 71-78,000 MW. This means a 100% increase of wind power (to 26,000 MW)

However, the conference was criticised severely by CGT and by main environmental actors such as environmental NGOs. They consider that there are discrepancies between the President's promises and reality. The main points of disagreement include the delay of the energy transition, the lack of planning in the nuclear energy and the environmental fiscality.⁶⁶ The multi-annual energy programming was released in October, 2016 reiterating the goals of achieving 40% of renewable energy in the energy mix by 2030 and reduce the nuclear to 50% of nuclear in 2025. The text mentions the closing of nuclear reactors namely two reactor in Fessenheim in the short- to mid-term.⁶⁷

⁶³ idem

⁶⁴ Le Monde, 14.09.2016

⁶⁵ <https://reporterre.net/Jean-Luc-Melenchon-Je-m-interdis-le-mot-croissance>

⁶⁶ Le Monde, A. Garric, S. Landrin and L. Eeckhout 25.04.2016

⁶⁷ http://www.developpement-durable.gouv.fr/IMG/pdf/4_-_Volet_Offre.pdf

Participatory democracy

The Ministry of Environment, Energy and Sea has a dedicated website on participatory democracy or environmental dialogue. In France, environmental dialogue started with the Law Bouchardeau from 1983 on public hearings and public opinion. In 2005, the participation in environmental decision making becomes a constitutional principle with the adoption of the Environmental Charter. In 2014, a Special committee on the democratisation of environmental dialogue was created by CNTE. The new committee was staffed by assigned CNTE members.⁶⁸

Grenelle of the Environment

The Grenelle of the Environment (describe above) was also a forum of participative democracy namely for consultation between several players in the environment: the government, local authorities, enterprises, trade unions and NGOs.

4.1.3 Individual stakeholders (groups) that stand out

In France, there is a big number of influential NGOs in the environmental, climate and energy field.

Fondation Nicolas Hulot pour la Nature et l'Homme (Nicolas Hulot Foundation for Nature and Man)

This is a well-respected and vocal foundation established in 1990. Its goals are to change individual behaviour in order share fairly the natural resources. The foundations values include: creativity, dialogue, sobriety, solidarity and transparency.⁶⁹

Orée Association

Founded in 1992, Oree brings together members from diverse areas to discuss and test specific integrated environment management solutions throughout France. The association is committed to proposing solutions to the consequences of indiscriminate growth at the expense of nature, so as to bring economy and environment into balance. Oree is a constructive forum for operational action and dialogue between all of these agents. Oree represents members and their concerns on an institutional level.⁷⁰

Enterprises for the Environment

This is an association of big enterprises sharing the vision of the environment as an opportunity; created in 1992; energy is one of the foci. The ambitions are to: act as a think-tank and a platform; improve knowledge and practice of the members; stimulate innovation. They publish practical publications such as: practical guide on climate change adaptation.

Fabrique Ecologique

This is an association, is primarily a Think-tank, founded in 2013 and active in a number of topics including energy transition. It was founded by people coming from the political circles and its objective is to promote sustainable development through concrete and constructive proposals. The feeling of the founders was that there are big political slogans in the environment without enough substance behind. Therefore FE decided to be rigorous and

⁶⁸ <http://www.developpement-durable.gouv.fr/De-la-democratie-participative-au.html>

⁶⁹ <http://www.fondation-nicolas-hulot.org/>

⁷⁰ www.oree.org

constructive and to bring a pluralistic approach and trans partisan approach to the environmental issues. They have started to be recognized in the press and their opinions are solicited more and more.

They have just introduced the format of breakfasts with politicians who are candidates for the 2017 presidency. The invitees include directors of companies, NGOs, trade unions, scientists, start-ups, etc. The goal is that the candidates speak of environment.

They also introduced the ‘Facts and Figures’ format. FE reacts critically and constructively when there is a political opinion expressed. They send their opinions to the press and publish them on their website.⁷¹

National Council on Energy Transition (CNTE)

CNTE is a consultative forum complementary to the National Council on Sustainable Development. The government informs CNTE on the indicators linked to energy transition. CNTE is consulted on new strategic documents being prepared. It is chaired by the minister of environment and is comprised on eight local authorities, eight environmental organisations, etc. CNTE is also in charge of preparing the annual environmental conferences of the government. CNTE functions through several committees namely: national indicators on ecological transition and green economy; modernisation of environmental law; participatory democracy; setting up the French Biodiversity Agency.⁷²

France Energie Eolienne

France Energie Eolienne (FEE) represents the wind energy professionals in France and its members (about 300) have constructed 90% of the wind turbines in the country and are running more than 85%. Members include: construction companies, project developers, implementing companies, consulting companies, industrial companies, lawyers. Lobbying is FEE’s main mandate. They have grown significantly after 2014 at the start of the debates on the Law on Energy Transition. Many members joined FEE to be better represented. Additionally, many big companies wanted to invest in wind energy and diversify their business.

As the market is small and the players are small therefore they need to be well represented. Until 2012, FEE was a member of the Syndicat des Energies Renouvelables but they split at that time as there was a need for better representation of the wind energy sector. It is interesting to note that EDF is the only big player in the wind energy industry (around 7% of the market⁷³) which is not a member of the FEE because of their role in developing nuclear energy. While FEE is lobbying for the wind energy sector it is not attacking the nuclear. FEE believes in multiple energy mix although they believe that a 100% renewables energy mix is possible. Their point of view is in line with ADEME’s Vision 2030-2050.⁷⁴

Enerplan

Enerplan (founded in 1983) is the trade union of professionals in solar energy. It is an active negotiation partner representing them in negotiations with policy makers (ADEME, ministries, regional authorities, etc.). Some interesting initiatives include: SOCOL (an

⁷¹ Interview with Sarah Grau, Fabrique Ecologique, 20.10.2016

⁷² http://www.developpement-durable.gouv.fr/Le-Conseil-national-de-la-42513.html#Les_missions_du_Conseil_national_de_la_transition_cologique

⁷³ Interview with Elodie Perret, EDF, 24.10.2016

⁷⁴ Interview with Lucas Robin-Chevallier, France Energie Eolienne, 26.10.2016

interprofessional collaborative platform for collective hot water from solar). For example, on regional level Enerplan monitors the drafting of the Regional Schemes for Connecting of Renewable Energies to the Electricity Distribution Network.

4.1.4 Energy Autonomy

With the new Law on Energy Transition for Green Growth (2015), local authorities acquired a much bigger autonomy in terms of defining their energy priorities. Firstly, this happens through the planning process

Territoires à énergies positives (TEPOS) (Territories with positive energy)

This is a relatively novel concept. These are territories with very ambitious goals on energy consumption and use of 100% of renewables. The local authorities involved in this approach share the vision that rural territories can take back the energy management power from central government with the participation of a wide circle of actors.⁷⁵ **Territoire à énergie positive pour la croissance verte (TEPCV)** is a similar concept. (Territories for green growth)

It is important to note that there is an administrative reform going on in France whereby some of the old regions are merging into newer, bigger ones. The reform follows the adoption of the **Law NOTRe** (Nouvelle Organisation Territoriale de la République) attributing new competences to the regions and clearly redefining the competences of each level of territorial governance. The number of regions goes down from 22 to 13. In this context it is interesting to observe the case of one of the new regions – Occitanie – which put a strong focus on the environment and committed to becoming the first region with positive energy balance. In terms of transport the new region vows to modernise the railway network and create more new multimodal hubs.⁷⁶

4.1.5 External stimuli given to individuals to push the transition in the “right direction”

Since 2012, ERDF/Enedis has been developing an intelligent electricity counter Linky aiming the shift to a smart grid. Linky communicates consumption to the operator but is also capable of self-calibration. The precision of consumption transmission facilitates the introduction of renewables and is also of help to consumers to manage their electricity consumption.⁷⁷ However, there are concerns that Linky could be an intruder in private lives and communicate sensitive information on the household.

Space heating

Individual households are encouraged to make thermal renovations of their buildings. There are different financial instruments mobilised for this purpose. Households can benefit from tax breaks through the so called tax credit on equipment and labour for the renovations. There is also an interest-free eco-loan at a maximum level of 10,000 EUR per household.

Industrial heat

ADEME provides information through a comprehensive guide on the subject.⁷⁸

⁷⁵ <http://www.territoires-energie-positive.fr>

⁷⁶ <http://www.laregion.fr/infographies/Budget/>

⁷⁷ <http://www.fournisseurs-electricite.com/erdf/linky#difference-linky-compteur-classique>

⁷⁸ <http://www.ademe.fr/sites/default/files/assets/documents/ademe-chaleur-fatale-industrielle-8445-2015-03.pdf>

Additionally, ADEME is managing a Heating Fund (Fonds Chaleur). It supports the production of renewable heating from biomass, geothermal and solar energy. It also supports the capturing of industrial heat and its reuse in heating networks.

Transport

Currently there is a very interesting clash going on between the City of Paris and pro-automobile interest groups. Paris has decided to permanently close for cars a 3 km stretch of road along the Seine river. Some 60% of the citizens are in favour of the action. The debate is interesting as it reflects the issue of the place of cars in the city in general. While the environmental benefits of the action are clear in terms of better air quality and reduction of GHG emissions the question is if the action causes additional traffic jams. Studies across Europe have shown the ‘phenomenon of evaporation’ whereby a part of the drivers who used the closed section of the road change their behaviour and start using alternative modes of transport.

Electrical power

With the opening up of the electricity market there is a place for individual electricity providers giving the possibility to citizens to choose the type of energy they are consuming. Some of the big providers (like Engie) are also starting to define such offers. Below is an example of a smaller, cooperative-type provider.

Enercoop

So far Enercoop has been the only supplier providing an offer of 100% renewable energy. Enercoop is a cooperative company for public interest (société coopérative d'intérêt collectif) founded 10 years ago. In 2014, the company has 23,000 clients and 60% out of them participate in its governance on the principle one person=one vote. Enercoop is an interesting story of an engineer who worked for other suppliers of electricity offering a 100% renewable offer and who realised this was not really the case.⁷⁹

5 Interviewed stakeholders

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⁷⁹ http://www.liberation.fr/terre/2015/07/05/l-electricite-plus-verte-que-celle-des-voisins_1343857