IEA Bioenergy

France – 2018 update

Bioenergy policies and status of implementation

Country Reports

IEA Bioenergy: 09 2018

This report was prepared from the 2018 OECD/IEA World Energy Balances, combined with data and information provided by the IEA Bioenergy Executive Committee. Reference is also made to Eurostat. All individual country reports were reviewed by the national delegates to the IEA Bioenergy Executive Committee, who have approved the content. General background on the approach and definitions can be found in the central introductory report[1] for all country reports.

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NATIONAL POLICY FRAMEWORK IN FRANCE

France has a national binding target for renewable energy stated in the EU Renewable Energy Directive (2009/28/EC) to account for 23% of gross final energy consumption in 2020. The targeted shares of the three sectors heating/cooling, electricity and transport are shown in the table below.

Table 1: *France´s 2020 renewable energy targets.*

Sector	Share in gross final consumption per sector
Overall target	23 %
Heating and cooling	33 %
Electricity	27 %
Transport	10.5 %

Source: Source: National Renewable Energy Action of France (2010)[2]

France has set a number of objectives in its Energy policy law enacted in July 2015:

- reduce greenhouse gas emissions by 40% by 2030;
- reduce fossil energy consumption by 30% by 2030;
- boost the share of renewable energy to 27% in final use and to 40% of renewable electricity in 2030;
- bring the use of biofuels to 7% of vehicle fuels by 2020.

The Bioeconomy R&D Programme (GRAINE) which was established in 2016 has the principal objective to fund research and development into new technologies and processes: to convert biomass to fine chemicals, to substitute fossil fuels, to produce bioenergy, to produce renewable heat and power.

[1] Available at https://www.ieabioenergy.com/iea-publications/country-reports/2018-country-reports/

[2] https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans

Since 2008, the Heat Fund (Fonds Chaleur) also supports the development of the use of biomass through an annual national call for projects for industry and through direct financing for collective facilities.

Since 2016, a new annual call for projects (for 3 subsequent years) for electricity produced from biomass is in place. These apply to vegetable and animal agricultural waste, algae and some industrial biomass waste (pulp and paper, wood industries).

With the Energy Transition for Green Growth Act (promulgated in 2015) France has revealed a draft of its Energy Bill establishing climate and renewable energy targets to be reached by 2030. Instruments and actions that favour bioenergy are e.g.:

- Greater support for the heat fund provides stronger backing for the production of heat from renewable sources (biomass, geothermal, solar thermal, etc.).
- The "Dynamic wood" (Dynamic bois) call for expressions of interest, launched in March 2015, allows for the provision of support for the mobilization of wood resources, in association with the Heat Fund (Fonds chaleur).
- Three calls for tenders have been announced for the end of 2015: the generation of electricity from biomass and the development of small-scale hydroelectricity plants.
- The multi-year energy programme (programmation pluriannuelle de l'énergie – PPE) sets out the conditions under which the main energy objectives of the Energy Transition and Green Growth Act will be achieved. The first PPEs (for continental metropolitan France and non-interconnected areas) shall concern electricity, gas and heat and all aspects of this energy until 2023: improvement of energy efficiency and energy savings, support for the exploitation of renewable energy sources and security of supply for the grids. They shall then be drawn up for two successive periods of five years.
- The savings fund (Caisse des dépôts) that supports key projects in the local public sector has been increased by EUR 5 billion. These loans are used to finance regional initiatives.
- The National Investment Bank BPI France grants loans for funding the investments of companies that generate renewable energy. The total value of the loans will be doubled between now and 2017, rising to EUR 800 million per year.
- The EUR 1.5 billion Energy transition financing fund (Fonds de financement de la transition énergétique) sponsored by the savings fund (Caisse des dépôts), strengthens the existing schemes (such as the Heat fund) and supports new projects, especially those of "Positive-energy regions for green growth" and "Zero waste, zero wastage" regions.

A detailed description of all fiscal and non-fiscal supports for bioenergy development is available at: http://www.iea.org/policiesandmeasures/renewableenergy/?country=France

TOTAL PRIMARY ENERGY SUPPLY (TPES) AND THE CONTRIBUTION OF BIOENERGY

The total primary energy supply of France in 2016 amounted to 10,227 petajoule (PJ) with an export surplus of electricity of 149 PJ (1.5% of TPES). The main share (43%) holds nuclear energy with 4,398 PJ, producing three quarters of all electricity in France. Oil products account for more than one quarter (2,917 PJ) of total primary energy supply. Natural gas accounts for 16% (1,603 PJ) and coal products for 3.5% (359 PJ). Non-renewable waste accounts for 0.7% (69 PJ). Renewable energy sources have a share of 10.1% or 1,029 PJ - 6.8% bioenergy and 3.3% other renewable energy sources.

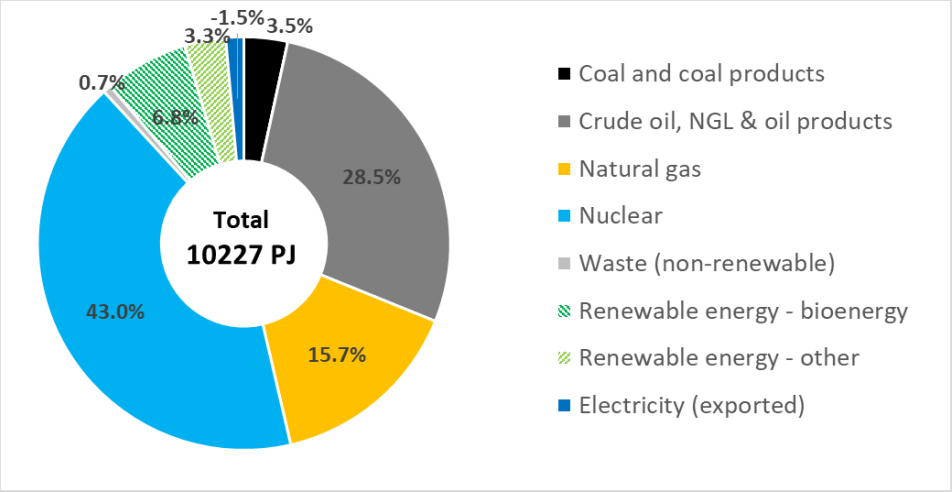

Figure 1: Total primary energy supply[3] in France in 2016 (Source: World Energy Balances © OECD/IEA 2018)

Compared to 5 years earlier (2011) the share of the different energy carriers remained relatively stable, with slight reductions for coal, oil products and nuclear energy. Renewable energy increased from 7.3% to 10.1%.

The total primary energy supply of renewable energy sources is for two thirds covered by energy from biomass, with 690 PJ. Hydropower amounts for 216 PJ, wind energy for 75 PJ and solar energy for 33 PJ. Geothermal energy represents around 10 PJ, and there is a minor fraction of tide, wave and ocean energy (2 PJ).

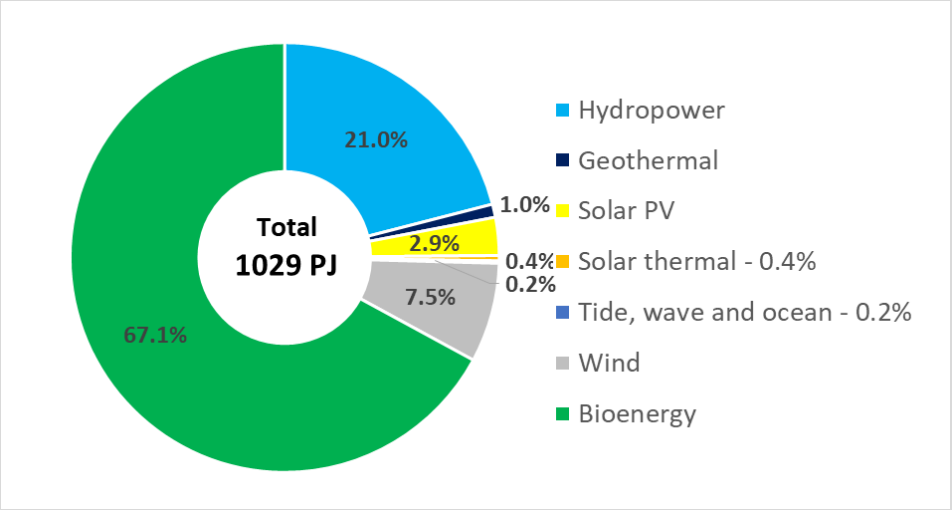

Figure 2: Total primary energy supply of Renewable Energy Sources in France in 2016 (Source: World Energy Balances © OECD/IEA 2018)

Most of the bioenergy consumed in France comes from solid biomass; their share accounts for 67% or 465 PJ in 2016. Around 290 PJ of that is used in the residential sector. The second largest item is biodiesel (110 PJ), followed by renewable municipal waste (65 PJ), biogas (32 PJ) and biogasoline (20 PJ).

[3] TPES underestimates the actual role of pure electricity sources like PV, wind or hydro energy, and overestimates the role of resources producing electricity with a high share of unused waste heat (like nuclear).

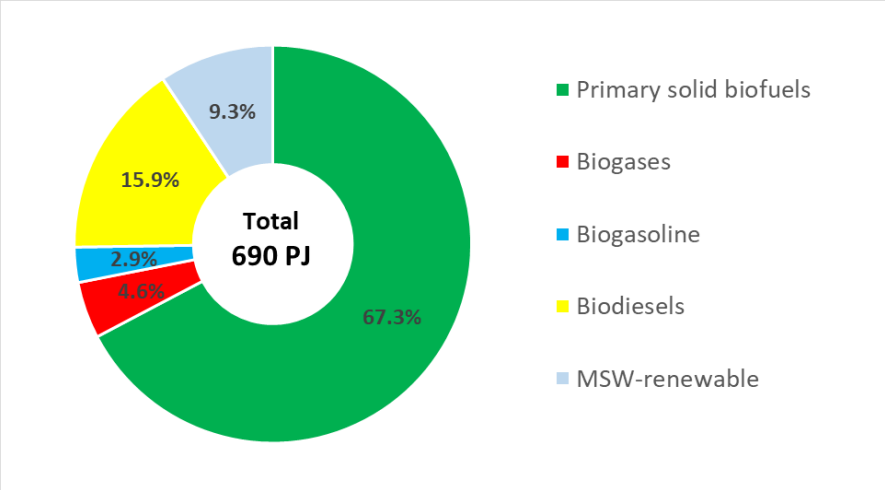

Figure 3: Total primary energy supply from bioenergy in France in 2016 (Source: World Energy Balances © OECD/IEA 2018)

The share of bioenergy in total primary energy supply went from 4% in 1990-2005 to 6.8% in 2016. In 1990 bioenergy came predominantly from solid biomass; in fact the energy from solid biomass merely fluctuated around 400 PJ per year in the past decades. The increase in the past decade came from the other energy carriers, in particular liquid biofuels. Liquid biofuels were already introduced in the 1990s, but their share really increased between 2005 and 2010 from 24 to 100 PJ per year. Since 2010 there is still a steady but more modest growth of liquid biofuels up to 130 PJ. Biogas is also steadily growing from 8 PJ in 2005 to 32 PJ in 2016. Energy from renewable MSW had a steady increase from 1990 to 2010, and has stabilized around 60-65 PJ per year since.

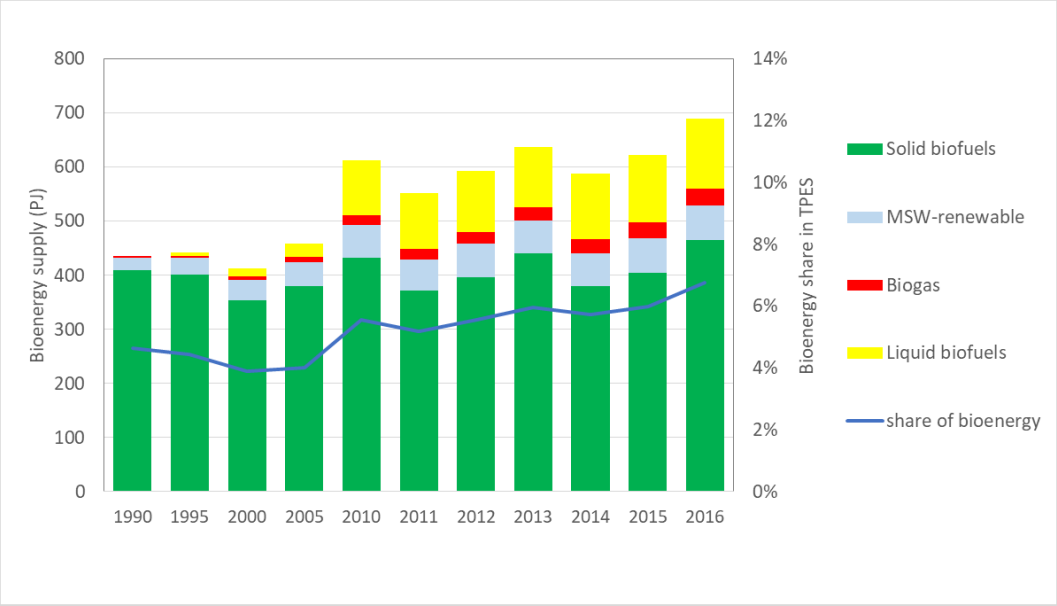

Figure 4: Development of total primary energy supply from bioenergy in France 1990 – 2016 (Source: World Energy Balances © OECD/IEA 2018)

Table 2 expresses the 2016 TPES figures per capita, considering the French population of 66.9 million people. Compared to the other 22 member countries of IEA Bioenergy (expressed per capita), France ranks at the top 10 for liquid biofuels, and halfway for solid biofuels, renewable waste, and biogas.

Table 2: Total primary energy supply per capita in France in 2016

	GJ/capita
Total energy	153.0
Bioenergy	10.3
Solid biofuels	6.9
Renewable MSW	1.0
Biogas	0.5
Liquid biofuels	1.9

Source: World Energy Balances © OECD/IEA 2018

Role of bioenergy in different sectors

France has a modest share of renewable electricity, which is mostly hydropower and wind energy, with a small role for electricity from biomass. Mind that nuclear power plants produced 73% of electricity in France in 2016.

The share of biofuels for transport amounts more than 7%, which is higher than European average.

Overall, the direct share of biomass for heating in the different sectors is around 16%. Heat output generated and sold by CHP plants and heat plants represents around 6% of fuel/heat provided, of which on average 39% is produced from biomass. In the residential sector biomass represents about a quarter of fuel/heat consumption.

Table 3: Role of bioenergy and renewable energy in electricity production, transport energy consumption and fuel/heat consumption in 2016

Sector	Share of bioenergy	Share of renewable energy	Overall production/ consumption
Electricity production	1.3%	17.6% (11% hydro)	550 TWh (1,985 PJ)
Transport energy (final consumption)	7.1%	7.5%	1,835 PJ
Overall fuel and heat consumption[4]	Direct biomass: 16.1% Biobased heat: 2.1%	18.7%	2,387 PJ

(Source: 2018 World Energy Balances © OECD/IEA)

According to Eurostat[5], the following renewable energy shares in *gross final energy consumption* were reached in France in 2016:

[4] This includes final consumption of fuels and heat in industry, the residential sector, commercial and public services and agriculture/forestry. Transport fuels are excluded. Energy used for transformation and for own use of energy producing industries is also excluded.

[5] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_ind_335a&lang=en

- Overall share: 16.0%
- In heating and cooling: 21.1%
- In electricity: 19.2%
- In transport: 8.9%

Most sectors seems to be on track towards their 2020 target (see Table 1), but additional efforts are still to be made. Mind that some of these figures can differ from the IEA derived data because of different accounting rules, particularly in the transport sector.

RESEARCH FOCUS RELATED TO BIOENERGY

The 2016 established Bioeconomy R&D Programme (GRAINE) has the principal objective to fund research and development into new technologies and processes: to convert biomass to fine chemicals, to substitute fossil fuels, to produce bioenergy, to produce renewable heat and power.

www.ademe.fr

- https://www.ademe.fr/sites/default/files/assets/documents/graine-projets-laureats-2016.pdf
- https://www.ademe.fr/recherche-innovation/programmes-projets-recherche

LINKS TO SOURCES OF INFORMATION

General information biofuels (in French): https://www.ecologique-solidaire.gouv.fr/biocarburants

Fonds Chaleur (support for renewable heat, in French): https://www.ademe.fr/expertises/energies-renouvelables-enr-production-reseaux-stockage/passer-a-laction/produire-chaleur/fonds-chaleur-bref

ADEME (French Environment & Energy Management Agency): www.ademe.fr; https://www.ademe.fr/expertises/energies-renouvelables-enr-production-reseaux-stockage/passer-a-laction/produire-chaleur/dossier/bois-biomasse/biomasse-energie