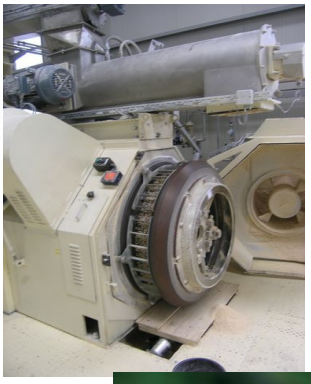

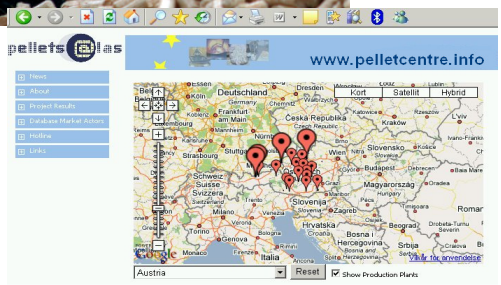

Development and promotion of a transparent European Pellets Market

Creation of a European real-time Pellets Atlas

Pellet market country report
FRANCE

Intelligent Energy Europe

Copyright © ADEME
Agence de l'Environnement
et de la Maîtrise de l'Energie
34, avenue André Malraux,
57000 Metz, France

November 2009

Prepared by ADEME
Christophe Barel

Contact christophe.barel@ademe.fr
Tel. + 33-387 502 648

This report is available at the pellets@las website at www.pelletsatlas.info

The pellets@las project is supported by the European Commission under the EIE programme (EIE/06/020/SI2.448557). The sole responsibility for the content of this report lies with the authors. It does not necessarily reflect the opinion of the European Communities. The European Commission is not responsible for any use that may be made of the information contained therein.

TABLE OF CONTENTS

1. Overview 4

2. Wood availability 5

3. Fuel wood utilisation 6

Fuel wood consumption in the residential sector 6

Fuel wood consumption in the collective and industrial sector 7

4. Pellet market development 9

5. Pellet production 11

6. Pellet prices 12

7. Pellet consumption 12

Residential heating 12

Medium and large scale 13

8. Mixed biomass pellets (MBP) 13

9. Policy and legal framework 15

Energy context 15

Policy support 17

10. Outlook 19

1. Overview

Table 1: Basic figures for France

Population	64 million
Area	675,000 km²
Number of pellet producers	60
Pellet Production (2008 estimation)	240,000 tons
Pellet Production capacity (2008 estimation)	1,400,000 tons
Pellet consumption (2008 estimation)	200,000 tons

2. Wood availability

Around 15 million hectares of mainland France are covered with forest, adding up to roughly one quarter of the total area. The average afforestation rate in France is around 27 %. 2 types of forest are predominant:

- Temperate forests: largely influenced by human activity; mostly broadleaved species in maritime regions; A mixture of broadleaved and coniferous trees on the inland plains of mainland France, and predominantly coniferous stands in mountainous regions.
- Sub-temperate or Mediterranean forests: a mixture of broadleaved species and conifers with evergreen foliage, maquis scrublands, wooded garrigue scrublands, etc.

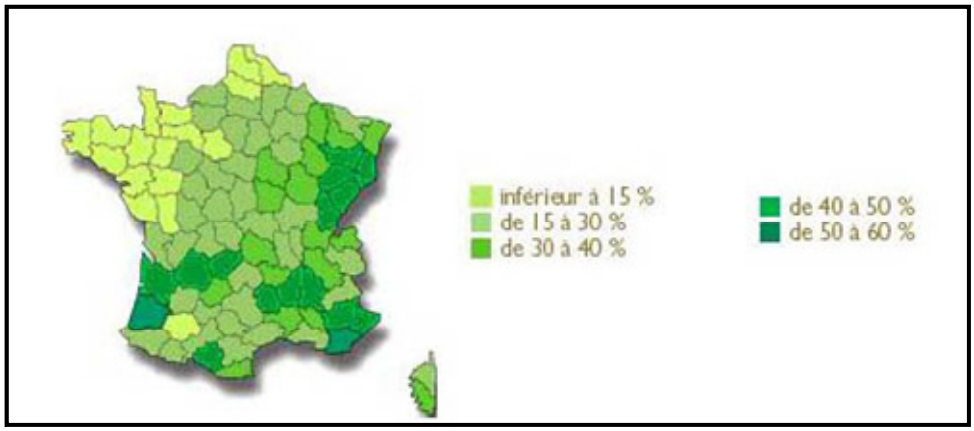

Figure 1: Distribution of forest area in France (source: MAP)

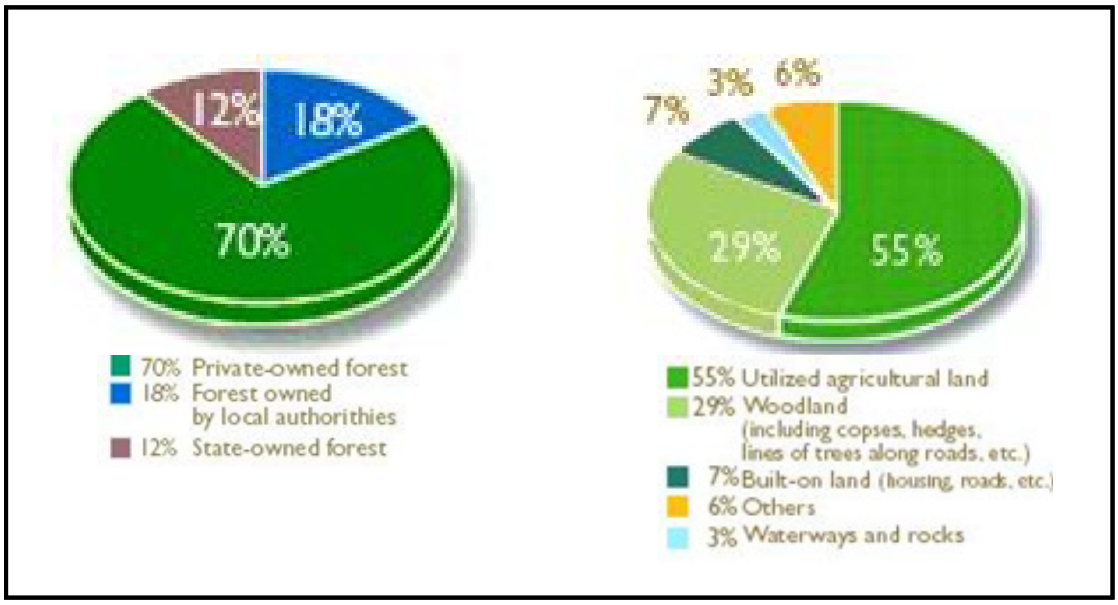

Figure 2 (source: Agreste)

Left: Structure of ownership of French forests

Right: Land utilisation in France

3. Fuel wood utilisation

At present, 4% of the primary energy used in France is derived from wood, which is an essential source of energy for residential heating. More specifically, wood now has a 20% share of energy consumed for home space heating. This is equivalent to 35 million m^3 per year, of which 20 million m^3 come from forestry and 15 million m^3 from wood industry, agricultural wastes and by-products. Significant amounts of wood industry residues (bark, packaging, etc.) are not exploited for value, and untapped forestry resources are abundant. It is estimated that an additional amount of about 50 million m^3 of biomass could potentially be used for energy purposes per year (equivalent to 12 million toe/year).

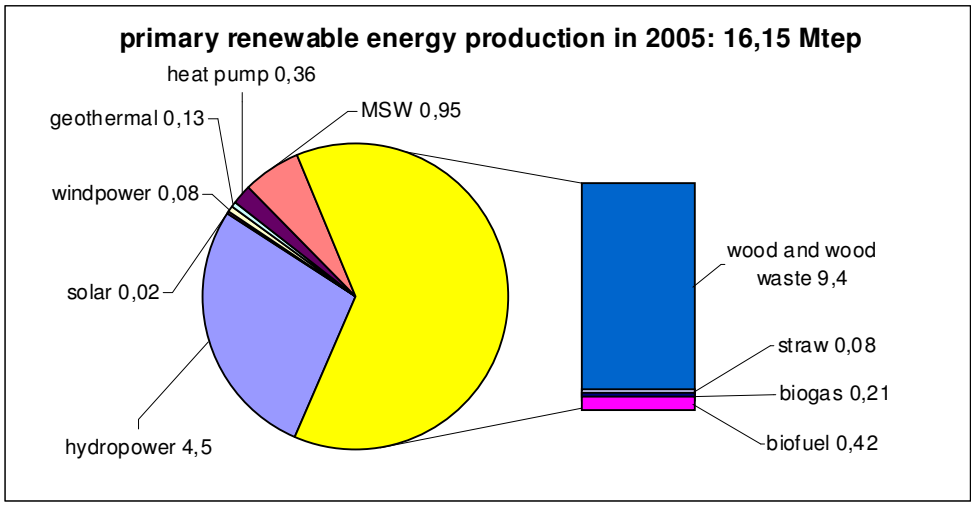

Figure 3: Renewable energy production in France (source: DGEMP)

With around 9.4 Mtep, wood is the most important source of renewable energy in France. In Europe, France is among the leading countries in terms of total energy production from wood. France also has one of the highest per capita fuel wood consumption values in Europe (151 tep per capita).

The major part of the fuel wood is used for residential heating (8.6 Mtoe). Industrial heat or CHP plants (pulp and paper, panel and board mills) with 0.6 Mtoe and collective use (0.3 Mtoe) are comparably low.

Fuel wood consumption in the residential sector

Around 50 % of all single-family dwellings in France are equipped with wood heating (close to 6 million homes). Wood heat is often coupled with another energy source, in particular with electricity.

Besides minor annual changes, the annual fuel wood consumption has remained stable between 7 to 8 Mtoe over the past 30 years. More than 99 % of this is accounted for by wood log consumption. Sixty percent of this firewood is self-supplied or comes from non-commercial suppliers. Pellet consumption has developed later, since the middle of the 90's.

After a drop in the 1980s, sales of domestic wood-fired heating devices are now showing significant increases (Figure 4). Sales of wood-fired devices for single-family

homes are rising increasingly rapidly, (+40 % compared to 2005), with more efficient and less polluting devices on the market. Close to 76% of devices sold carry the *"Flamme Verte"* label (based on EN standards) or an equivalent certification.

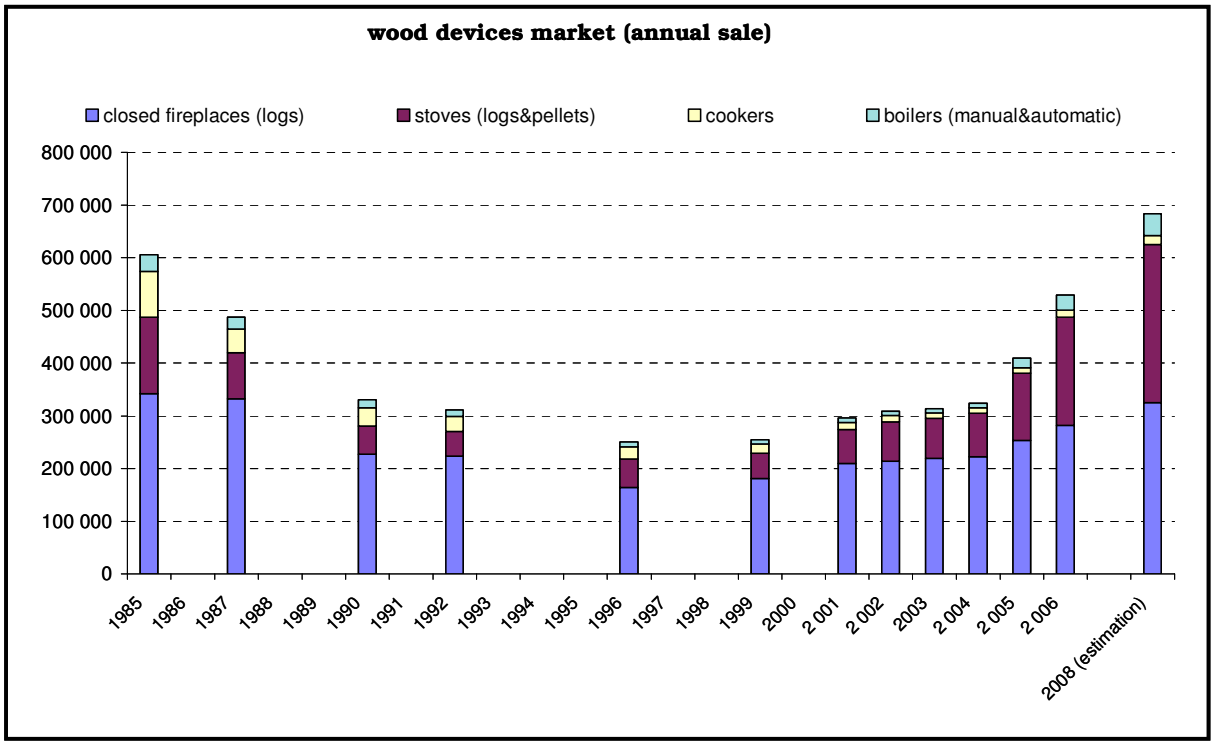

Figure 4: The French market for wood heat appliances (source: ADEME)

Fuel wood consumption in the collective and industrial sector

Before 1994, about 150 heating plants were operated in France (consumption: 52,000 toe, 100 MW).

ADEME started a first support programme for woodfuel in 1994, notably in the housing, community/institutional and commercial sectors. It was known as "The woodfuel and local development plan". 350 heating plants were installed between 1994 and 1999 (equivalent to power output of 280 MW and a consumption of 310,000 toe).

After 1999, with a new emphasis on energy management policy, it was possible to set up a new programme for the period 2000-2006, covering all the regions of France. 1,400 collective heating plants and 480 industrial plants were funded by ADEME and regional authorities (equivalent to power output of 670 MW).

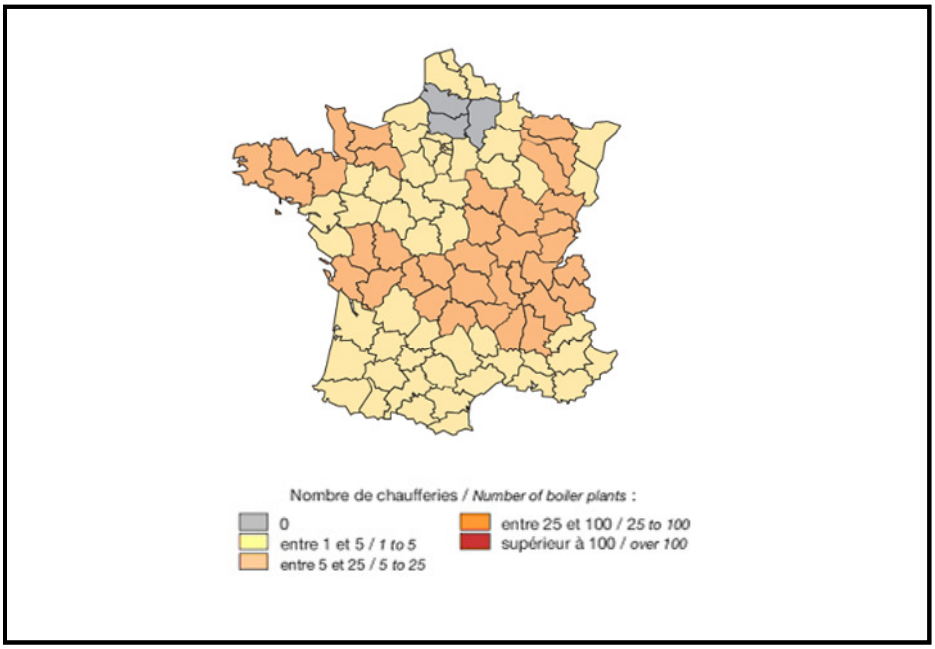

Figure 5: Boilers (thermal output higher than 1 MW) with/without ADEME funding (since 1999)

Until 2005, biomass power production was exclusively supplied by wood by-products.

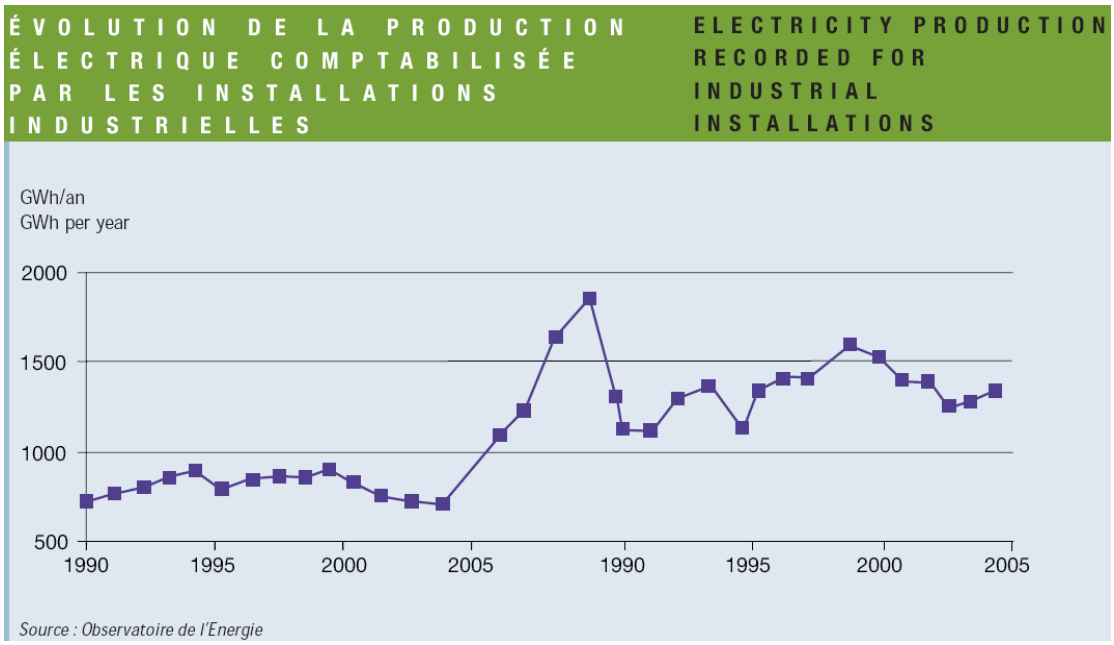

Figure 6

4. Pellet market development

By the end of the 1990s, first pellet heating devices were installed in the East of France. Many regional associations (such as ITEBE, AJENA, etc.) and ADEME, with the support of equipment retailers, started to work on regional trainings and communication tools to promote the use of pellet heating systems.

In 2001, ADEME, together with the National Union for Renewable Energies (SER), launched a national label for wood heating devices: The "*Flamme Verte*" label promotes only high efficiency performance and slow emission levels. In 2003, this quality certification system was extended to boilers. Since 2006, this label is certified by ATITA (on behalf of AFNOR Certification).

The same year, the bioenergy association ITEBE launched a "French Pellet Club" in order to promote pellet activities (pellet standardization, wood heat device certification, trainings for installers and retailers), but the French pellet market has never really been organized and remained difficult to assess.

In 2007, discussions between pellet producers and the FNB (National Union of the Wood Sector[1]) led to the creation of a union representing only pellet and briquette producers in France: The SNPGB held the first annual meeting on 1 October 2008 and gathered 26 members who are mainly sawmills (wet sawdust), wood companies producing by-products (dry sawdust), companies from the agriculture and food sector, as well as other stakeholders.

Missions of the SNPGB are:

- Provide information on pellet production (price, quantity, quality) towards all public and private actors (ministries, communities, associations, etc.);
- Support training and communication actions;
- Focus on all standardisation, regulation, fiscal and economic barriers which limit pellet market development at national or European level.

[1] www.fnbois.com

In 2008, ADEME and SNPGB supported the development of a French pellet standard by FCBA (which is appointed by AFNOR Certification) and ITEBE. "*NF Granules Biocombustibles*" is the only French quality label which certifies pellets produced from wood or agricultural by-products. It only concerns pellet producers. Fives categories of pellet certificates can be issued (Table 2).

Table 2: Pellet quality categories and usage types

Wood pellets	**Agricultural pellets**
« **Bois Premium** » for all stoves and automatic boilers. « **Bois Standard** » for some stoves and automatic boilers according to technical specifications of equipment manufacturers. « **Bois Industriel** » for industrial or collective automatic boilers according to technical specifications of equipment manufacturers.	« **Agro+** » for automatic and domestic biofuel boilers. « **Agro** » for automatic boilers (biomass, mobile grill) according to technical specifications of equipment manufacturers.

Table 3: Quality requirements on wood pellets, according to "*NF Granules Biocombustibles*"

Specifications	Wood "premium"	Wood "normal"	Wood "industrial"
Dimensions	D = 6 ± 1mm	D = 6 to 9 mm ± 1mm	D = 6 to 16 mm
Moisture content	≤ 8%	≤ 10%	≤ 15%
Net caloric value (MJ/kg)	≥ 16.7	≥ 16.2	≥ 15.2
Net caloric value (kWh/kg)	≥ 4.6	≥ 4.5	≥ 4.2
Bulk density (Kg/m3)	≥ 650	≥ 650	≥ 650
Mechanical durability	≥ 97.5%	≥ 95%	≥ 95%
Amount of fines (after	≤ 1%	≤ 2%	≤ 3%
Ash Content	≤ 0.7%	≤ 1.5%	≤ 3%
Cl Content (on dry matter)	≤ 0.03%	≤ 0.05%	≤ 0.05%
N Content (on dry matter)	≤ 0.3%	≤ 0.3%	≤ 0.5%
S Content (on dry matter)	≤ 0.05%	≤ 0.06%	≤ 0.08%
Ash temperature	-	-	-
Heavy metals (mg/kg)			
As	≤ 1		
Cu	≤ 10		
Cr	≤ 10		
Cd	≤ 0.5		
Hg	≤ 0.05		
Ni	≤ 10		
Pb	≤ 10		
Zn	≤ 100		

5. Pellet production

The number of pellet producers does not grow rapidly. Even if many plants start production they often stop operation after 1 or 2 years. Reasons are the lack of resource assessments, proven business models and experience with quality assurance. Technical specifications (DIN, ÖNORM, CEN, ITEBE quality charter, etc.) are known by most of the producers. Half of them apply one of these standards, but only few are certified.

	2006 (source: ADEME/ITEBE)	2007 (source: SNPGB)	2008 (source: SNPGB)	2009 (source: SNPGB)
Number of producers (inc SNPGB)	30	30	41	
Production (tons)	100,000	180,000	210,000	345,000
Import (tons)	*na*	*na*	20,000	10,000
Export (tons)	*na*	*na*	35,000	50,000
Consumption (tons)	100,000	140,000	200,000	305,000

In 2009, the SNPG represented around 85 % of the French pellet production.

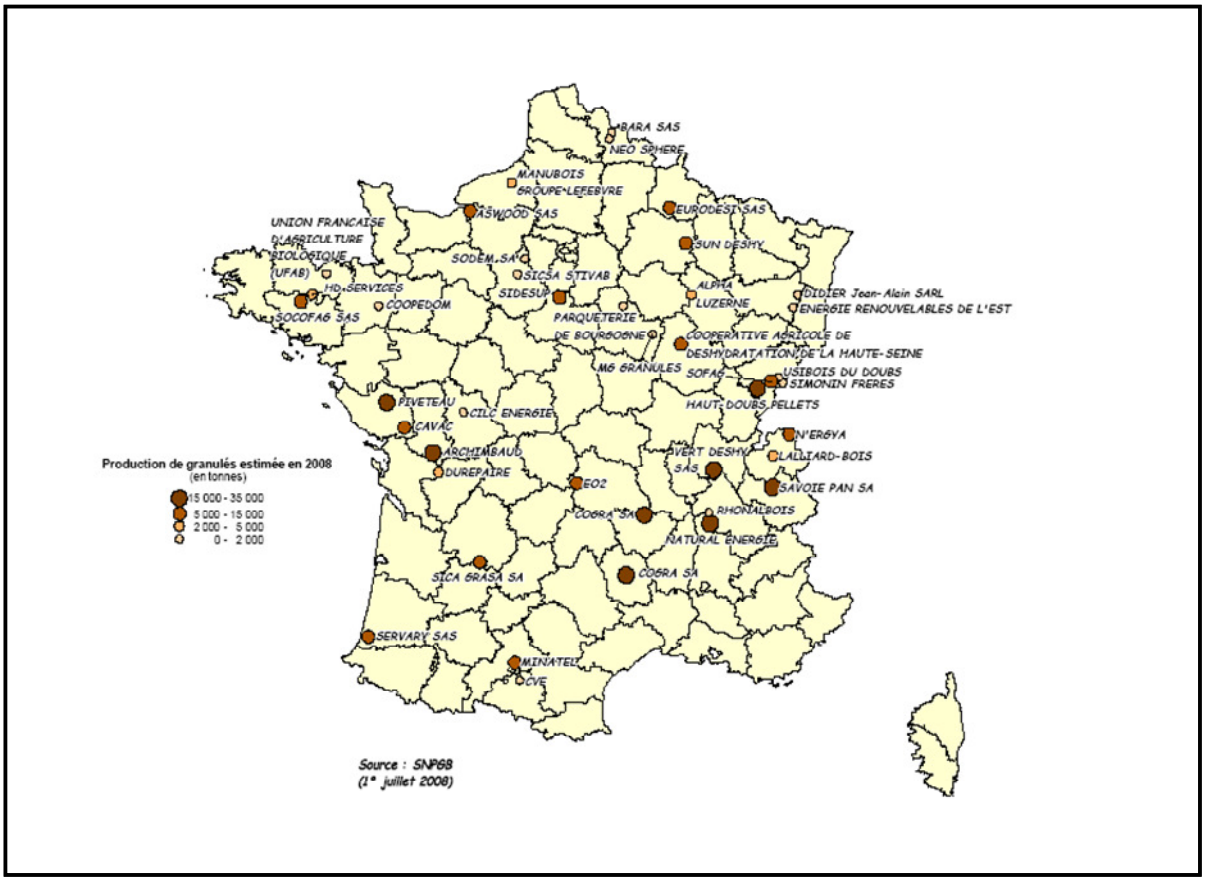

Figure 7: Location of pellet production plants (SNPGB members in July 2008)

6. Pellet prices

French producers deliver pellets in sacs, big bags and bulk, mainly to local markets. Pellets are sold via retailers or directly to the end-consumers.

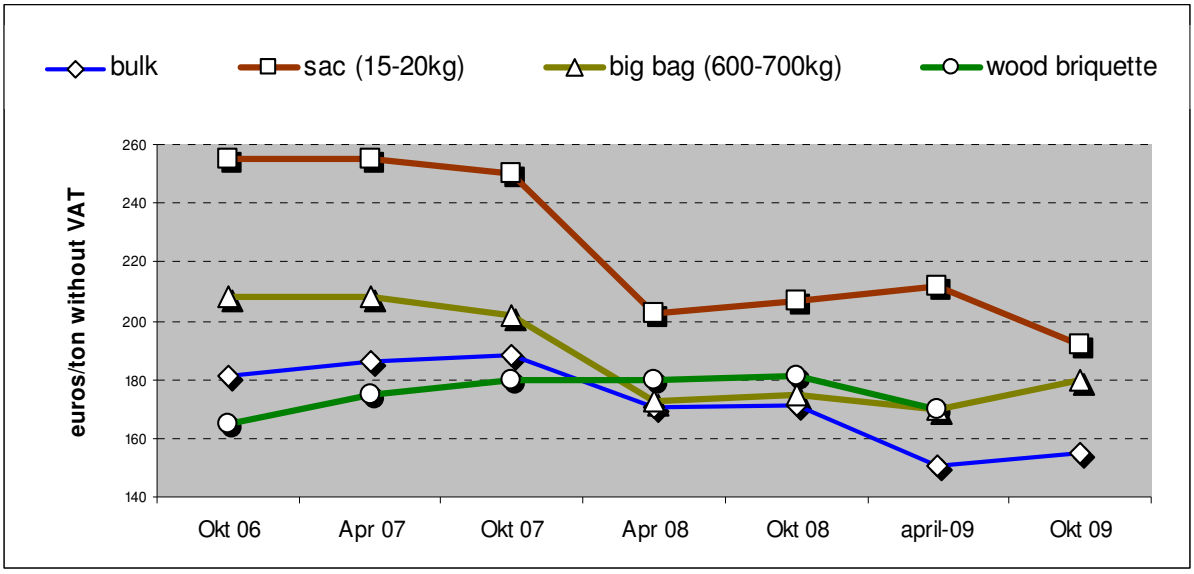

Figure 8: Development of French pellet prices (source: SNPGB)

7. Pellet consumption

Residential heating

In 2008, pellet appliance sales can be estimated at 18,000, and since 1995, around 65,000 appliances have been installed (Figure 9).

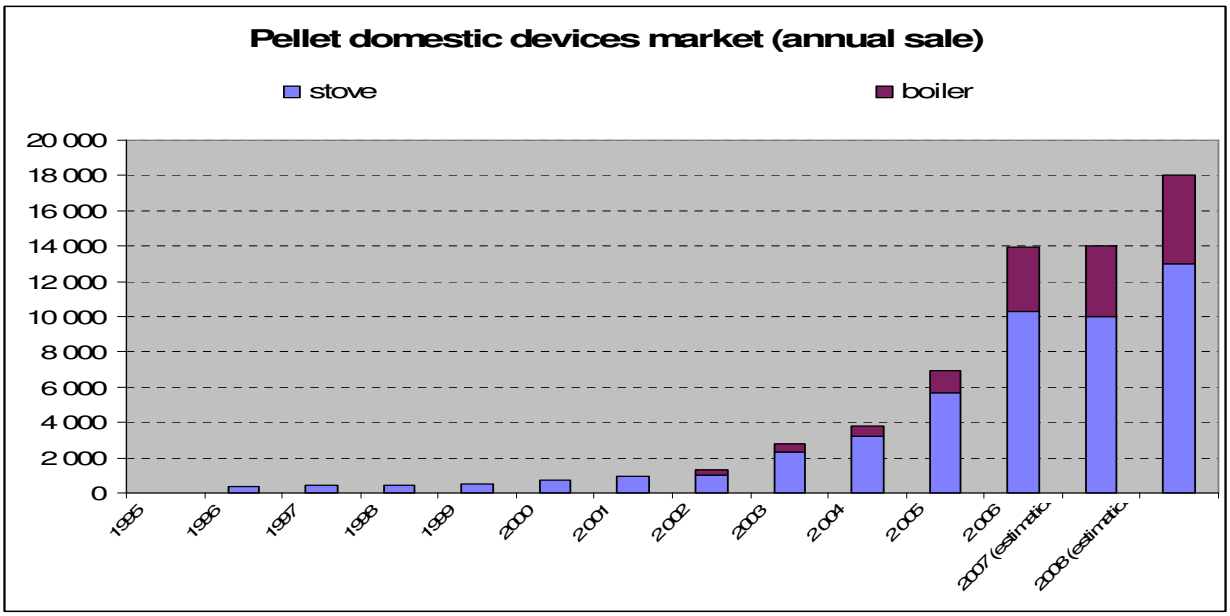

Figure 9 (source: ADEME / SER)

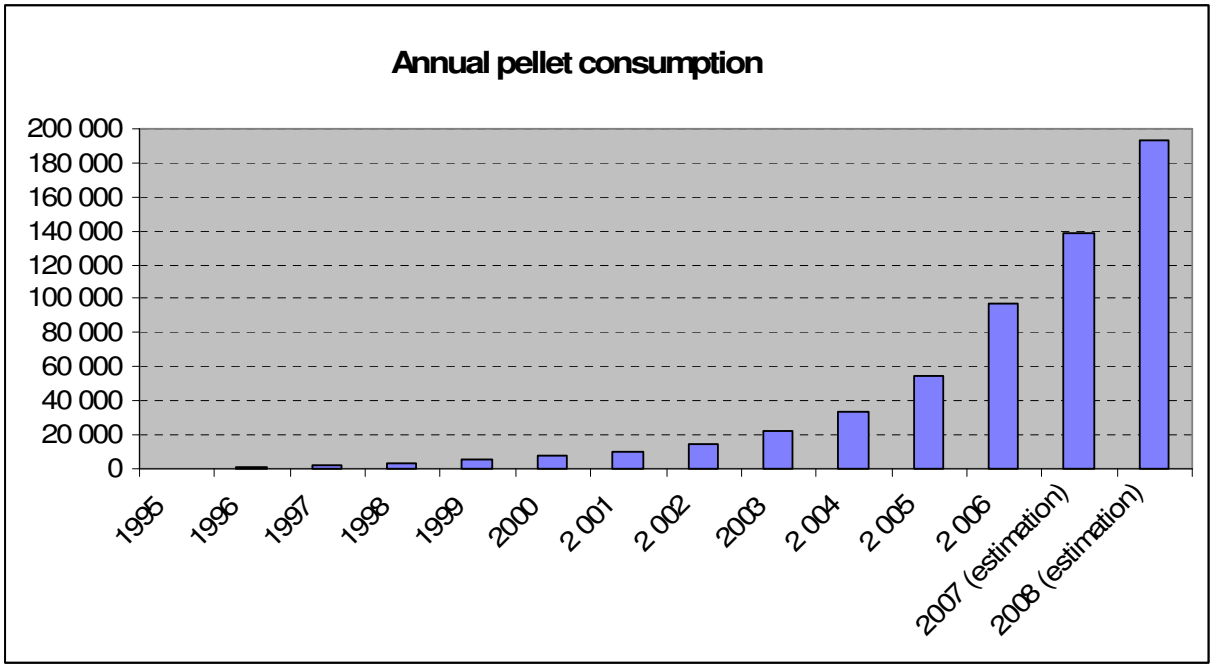

Figure 10 (source: ADEME, SER)

Medium and large scale

The number of medium-scale (below 300 kW) heat production plants consuming pellets is estimated at 50 to 100. The total pellet consumption in this sector in 2008 is estimated at around 10,000 tons.

Pellet co-firing for large-scale power production or pellet use in CHP plants is not reported.

8. Mixed biomass pellets (MBP)

Most of the MBP producers in France were formerly active in food and feed production, especially in alfalfa dehydration for cattle feed. For environmental (regulation on coal combustion, CO_2 emissions) and economic reasons (Tapping new markets), agropellet production was tested to supply local consumers (mainly households or farmers) in rural areas. However, so far only small quantities have been produced, mainly due to the lack of regulations and quality standards for MBP.

Compared to the wood pellet market in France, the MBP market started developing later (since 2005), but remained at small local level. At this time, also agricultural products (corn or wheat cereals) were considered for combustion in pellet appliances.

In order to inform all actors (consumers, retailers, etc.) about impacts of non-wood material combustion on combustion equipment, ADEME, in 2006, has published state-of-the-art information on the use of solid agrofuels:

- NO_x and dust emission levels are higher than for wood fuels;
- Ash fusion temperature is low and could produce clinkers;
- Corrosion of equipment parts (acid smoke damages).

"NF Granules Biocombustibles" now provides quality standards and certification not only for wood pellets, but also for MBP. For agricultural by-products, two quality categories are available:

- "Agro +" for automatic and domestic biofuel boilers;
- "Agro" for automatic boilers (biomass, mobile grill) according to technical specifications of equipment manufacturers;

Table 4: Quality requirements on MBP according to "*NF Granules Biocombustibles*"

Specifications	AGRO+	AGRO
Dimensions	D = 6 to 8 mm ± 1mm L = 10 to 30 mm	D = 6 to 16 mm ± 1mm L = 10 to 30 mm
Moisture content	≤ 11%	≤ 15%
Net caloric value (MJ/kg)	≥ 15.5	≥ 14.7
Net caloric value (kWh/kg)	≥ 4.3	≥ 4.1
Bulk density (Kg/m3)	≥ 650	≥ 650
Mechanical durability	≥ 95%	≥ 92%
Amount of fines (after production)	≤ 2%	≤ 3%
Ash Content	≤ 5%	≤ 7%
Cl Content (on dry matter)	≤ 0.2%	≤ 0.3%
N Content (on dry matter)	≤ 1.5%	≤ 2%
S Content (on dry matter)	≤ 0.2%	≤ 0.2%
Ash temperature	Agro+ ≥ 1000°C	Agro ≥ 800°C
Heavy metals (mg/kg)		
As	≤ 1	
Cu	≤ 40	
Cr	≤ 10	
Cd	≤ 0.5	
Hg	≤ 0.1	
Ni	≤ 15	
Pb	≤ 10	
Zn	≤ 60	

9. Policy and legal framework

Energy context

The French Government has decided to elaborate a law (POPE law voted in July 2005) setting 3 targets for 2010-2015:

- Reduce energy intensity by 2 % per year until 2015, and by 2.5 % per year until 2030;
- Develop RES: satisfy 10 % of energy consumption by RES
  - by reaching a 21 % level for power production from RES (3 million additional toe);
  - by increasing heat production from RES by 50% (from 12 to 18 million toe);
  - by increasing biofuel production from 0.4 to 3.6 million toe;
- Reduce GHG emissions by 3% per year until 2050.

These targets are very ambitious for biomass by raising primary consumption from 3.5 % to 5.5 % in 2015, either reaching 15 Mtep in 2010 (10 in 2000) shared as below:

- Biofuels: 1.6 Mtep (0.3 in 2000); Implementation of a biofuel Plan;
- Heat and electricity: 13 Mtep (10 in 2000, 80 % from domestic heating) by re-launching a wood fuel Plan 2006-2015 lead by ADEME.

Table 5: Total biomass until 2010 (source: DGEMP/ADEME, 2006)

	Source	Needed biomass assessment
Biofuel	(10% of substitution until 2010)	5 Mtoe
Heat production	(law POPE + 50 % for RES)	3 Mtoe
Power production	21% of RES	2 to 4 Mtoe
Chemical sector		4 to 8 Mtoe
Total		**15 to 20 Mtoe**

According to first assessments, the potential resource is higher than 30 Mtoe (about 40 Mtoe if agricultural biomass such as short rotation coppice and cultures on industrial fallows is included).

These targets are reachable under the following conditions:

- Develop the use of bioresources and especially wood as raw material in construction;
- Avoid wasting resources and give priority to biomass valorization: biofuel, heat production and power production (only in CHP plant);
- Reduce environmental impacts

- Avoid competition with other sectors (food, pulp and paper, panel and board, packaging, etc.);

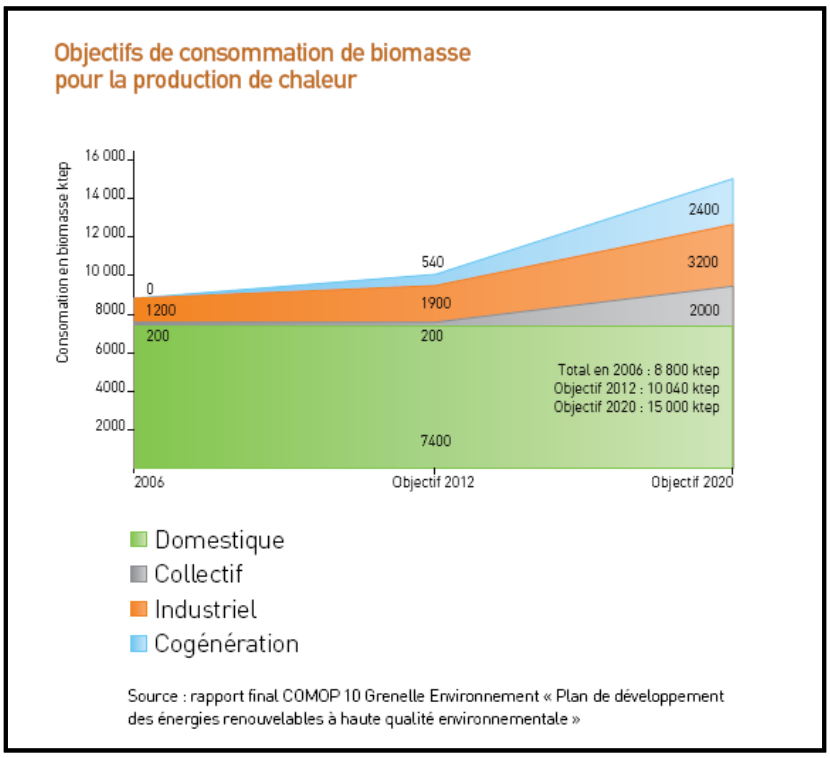

Figure 11

At least, all national actions towards rational use of energy should be reinforced (RT 2005, ADEME actions, energy suppliers, etc.); Energy Saving Certificates (CEE, white certificates) have been created by DGEMP into a CEE exchange market (same mechanism as carbon market): one CEE corresponds to 1 MWh avoided.

In the first period (2006-2008), DGEMP has fixed targets at 54 TWh to be avoided and only energy suppliers to final consumers are «obliged»: electricity, natural gas, heat, LPG, domestic oil, etc. Penalties are fixed at 2c/kWh.

Table 6: Obligation level per energy source (DGEMP, 2005)

	Obligation (TWh)	Share (%)
electricity	28.62	53
natural gas	14.62	27
domestic oil	8.07	15
LPG	1.22	2
heat and cold	1.048	2
TOTAL	54	100

As described in the law on «air and rational use of energy» (30/12/96), space must be reserved for flue only in individual houses. After several years, an arrêté of 31/10/05 has finally precised all conditions of its application. Obligation (from 1/09/06) to reserve a space in floors will only concern individual houses heated by electricity in order to simply retrofit heat system. The flue will be in adaquation with installations of heating systems supplied by solid, gaseous or liquid fuels. Wood energy, through closed fireplaces or inserts, is clearly mentioned.

Policy support

Information: *"Espaces Info Energie"*

Backed and supported since 2001 by ADEME, the *"Espaces Info Energie"* (EIE) network has now 200 offices throughout France run by 400 technical advisors. The aim of the network is to raise awareness and inform the general public about energy efficiency and renewable sources. The two main activities are to provide free advice in response to specific public enquiries and to present individual events (Fairs, shows, exhibitions, and conferences). The EIE is mainly backed by ADEME and regional authorities but other communities can also contribute financially. The structures supporting EIE activities vary from energy / environmental sector associations to territorial structures.

More than 5 million people have been advised and informed since 2003. In 2007, further investment occurred in 50 % of the cases after raising public awareness against 26 % in 2003. An EIE advisor generates on average projects worth 1.3 million Euros per year. Each project avoids about 1.3 tons of CO_2. This network of associations also strongly contributes to disseminate information on pellets.

Training and qualification for building companies

The quality of residential decentralized energy production equipment and of installations is ensured by certifications that are more and more recognized and used.

One of them promotes best practice for RES equipment and is supported by ADEME through the national association *QualiEnR*. The *"QualiBois"* brand is only concerning wood (logs, chips, pellets) equipment and gathers about 2,000 installers.

Financial incentives for the residential sector

- Direct subsidies: Few direct subsidies are available in France. Some local authorities (Regional or Department Councils) provide subsidies for automatic wood boilers.
- Fiscal reduction: Tax credits for primary-residence equipment purchases are aiming at the most efficient appliances. They provide strong support for domestic woodfuel devices (stoves, closed hearths, boilers, etc.). Tax reductions were 40 % in 2005 and 50 % since 2006. All households whether they pay income tax or not, are eligible. Biomass devices or biomass CHP equipment must have more than 65 % efficiency (national or EN standard) and must be installed by a qualified company. Tax reductions are granted based on equipment costs only. Installation costs are not eligible. For Pellet devices, all European standards are taken into account (EN 13240 for stoves, EN 303.5 or EN 12809 for boilers). Retailers have

to provide a quality certificate (standard tests) to customers and specify it on the bill.

- VAT reduction: Since 2000, value added tax is fixed at 19.6 % for all fuels and energy. Until end of 2005 the domestic heating sector was promoted with reduced VAT (5.5 %) for wood fuels, subscription for gas and electricity, and renovation works in households. In the beginning of 2006, reduced VAT (5.5 %) is also available for residential building until 2010, subscription and heat delivered by heating networks (minimum supplied by 60 % of RES), and for all wood fuels (chips, by-products, pellets) of any sector (domestic, collective or industrial).

Financial incentives for the medium-scale heat sector

- Subsidy (collective or DH boilers plants): Through ADEME's policy, only wood chip boilers are funded. From 2009 on, a new public fund managed by ADEME is available to support only thermal energy from RES ("heat fund"). For biomass, the main condition for funding is to have a consumption higher than 100 toe.
- CHP units (Green certificate for power production): Green electricity production through RECS (Ob'server is the French institute), since December 2002 until August 2005, 848,211 certificates have been emitted (a certificate is equivalent to 1 MWh). Green electricity was mainly produced from hydropower (77 %). Biomass represents 14 % (biogas from landfill 12 % and MSW 2 %). The rest is wind power (9 %).
- Feed in tariffs for power production from biomass (Table 7).

Table 7: Feed in tariffs for biomass, 2009 (source: DGEC)

Electricity produced from	Date of decree	Contract duration	Range of prices for new installations c€/kWh	Efficiency incentive bonus (according heat valorization rate)€/kWh
biomass CHP plants	16/04/02	15 years	4.9	0 to 1.2

10. Outlook

Since 1990, many difficulties to identify and support pellet producers had to be addressed. Due to lack of liability, proven business models and pellet quality assurance systems are hardly developed.

Several organisations (ITEBE, SNPGB) gather most of the producers but localisation of pellet producers and real production can be improved by better partnership and coordinated action plans (communication) between pellet actors.

Due to public support (fiscal reduction, national quality charter supported by ADEME) and information from the *"Espaces Info Energie"*, French pellet actors are now well organized to compete with fossil fuels and electricity in the residential heating sector.

In the medium and large scale sectors, many problems (e.g. establishment of long-term contracts and quality guarantees) remain to be solved.