

Country Report FRANCE

Presented by
ADEME

Second IEA Bioenergy Task 42 Meeting

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Country Report “Identification Current Processing Potential and Mapping Existing Biorefineries”

1. Introduction

Biorefinery is a dynamic concept evolving with time and economic context

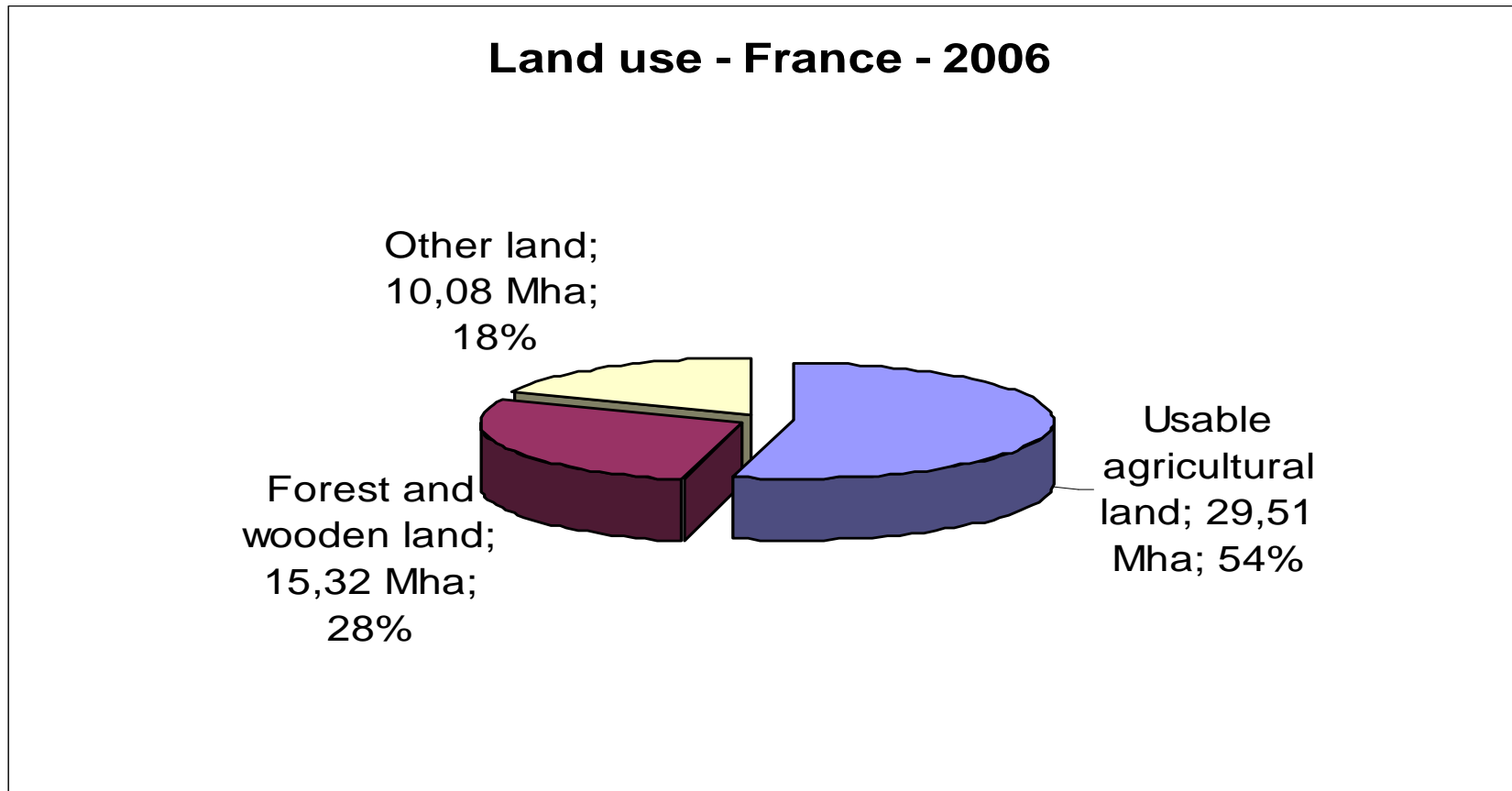
Its application potential is :

- **depending on the type of feedstock used**
- **based on actual market and industrial conditions**

Intended to :

- **reduce GHG emissions and fossil energy dependency**
- **maximise the use and added – value of biomass**
- **improve energetic balance**
- **open, new agroforestry markets**
- **boost industrial innovation**
- **increase employment**
- **etc...**

2. Current national biomass use



Sources: Agreste

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3. Biomass-related national policy goals

THE RENEWABLE ENERGY TARGETS – 2020

France – EU 25

	Europe	France
RES (20% target)	380 Mtoe (1)	35 Mtoe
of which BIOMASS	195 Mtoe (2)	20/25 Mtoe (2005 = 10)

Sources:

(1) PRIMES –(gross inland consumption in 2020: 1885 Mtoe)

(2) Renewable Energy Road Map (impact assessment – 2007)

* Final energy

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3. Biomass-related national policy goals

BIOPRODUCTS/BIOENERGIES MARKET

France

Prospects: 2020

MARKET (Mtoe)	2006	2020	Δ+
Biomass solid fuel	9,5	18,5	9
Biofuels	0,7	4,3	3,6
bioincineration biogas	1,2	2,5	1,3
bioproducts (new)	0,08	1	0,92
Total BIOENERGIES/BIOPRODUCTS	11,48	26,3	14,82

Sources: *Observatoire de l'Energie, Euroserv'er,*

Etude ADEME/ALCIMED "Bioproducts market survey 2007"

4. Mapping of Existing Biorefineries

Primary agricultural sector (Main industrial cultures in 2006)

Cultures	*1000 ha
cereals	9051
oil producing crops	2118
sugar beet	379
protein producing crops	324
fresh vegetables	224
potato	158
Fibre plants	83
aroma, perfume and medicinal plants	33
other industrial cultures	13

Source : Agreste

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4. Mapping of Existing Biorefineries

Food industry : cereals

- Total French cereal production: 81.2 Mt (2004/2005)
- Total French cereal consumption = 28% of the production = 21.9Mt
 - Food: 4.6 Mt (25%)
 - Feed: 10.8 Mt (57%)
 - Starch industry: 3.4Mt (18%)
- **517 active cereal mills** in France mainly for food uses = First cereal transformation
- 87% of the French flour production is dedicated to the French market.

Sources: meunerie française (ANMF), Passion céréales

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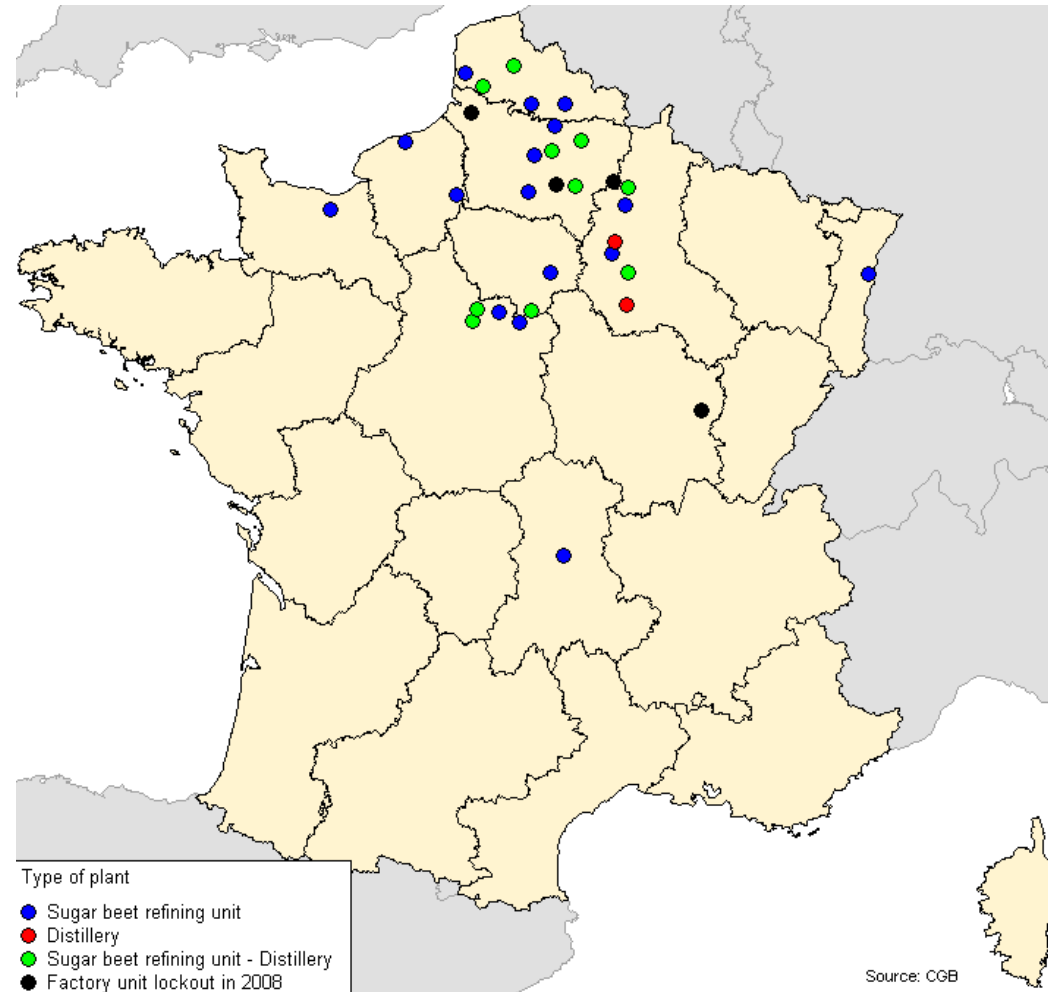
4. Mapping of Existing Biorefineries

Food and non food industry :

Beet sugar (2005/2006)

Sugar beet production :
26.1 Mt

Fresh beet sugar production:
4 140 248 t



4. Mapping of Existing Biorefineries

Food and non food industry :

starch Industry

Starch Production (2005/2006) in France:

2 908 000 t

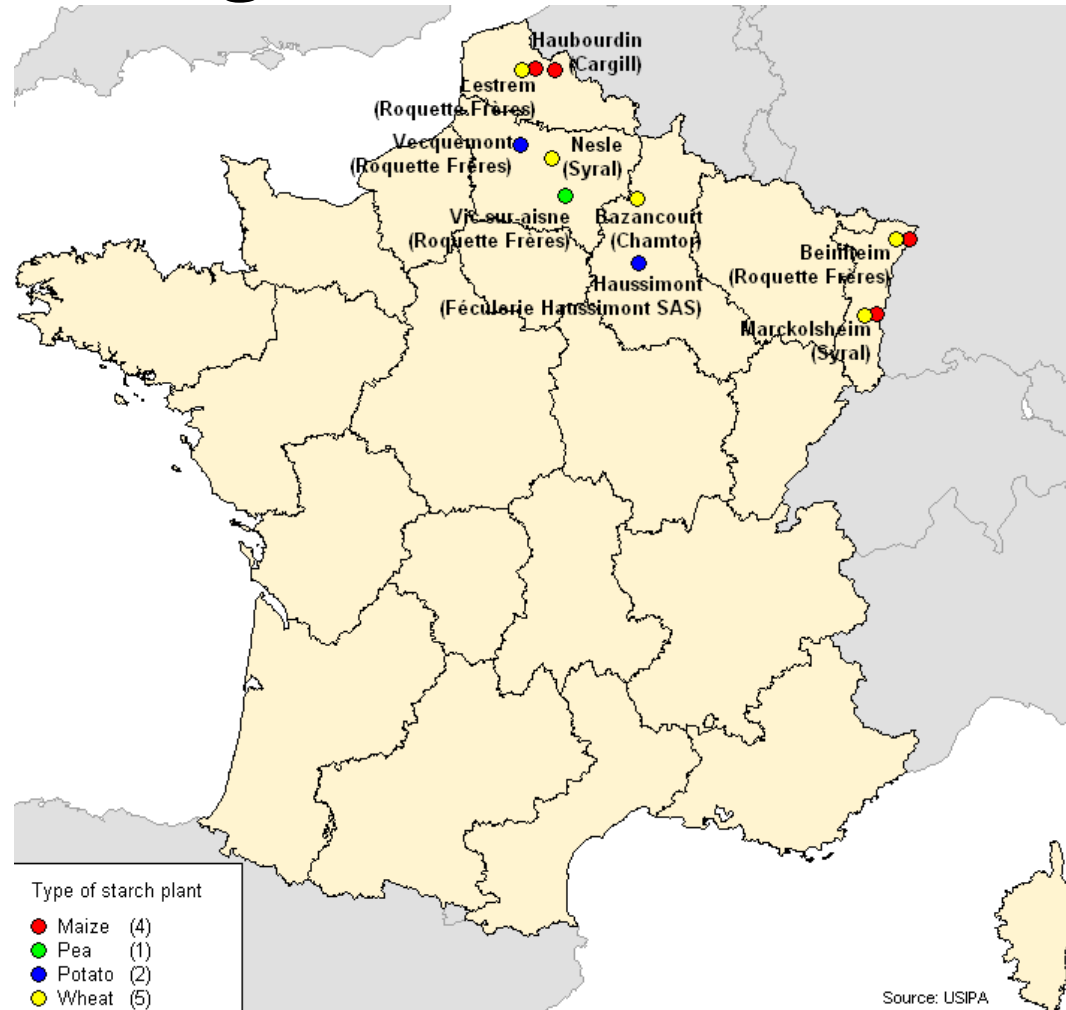
Feedstock:

-Maize : **37%**

-Wheat : **48%**

-Potato : **9%** Source: USIPA

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Source: USIPA

4. Mapping of Existing Biorefineries

Food and non food industry :

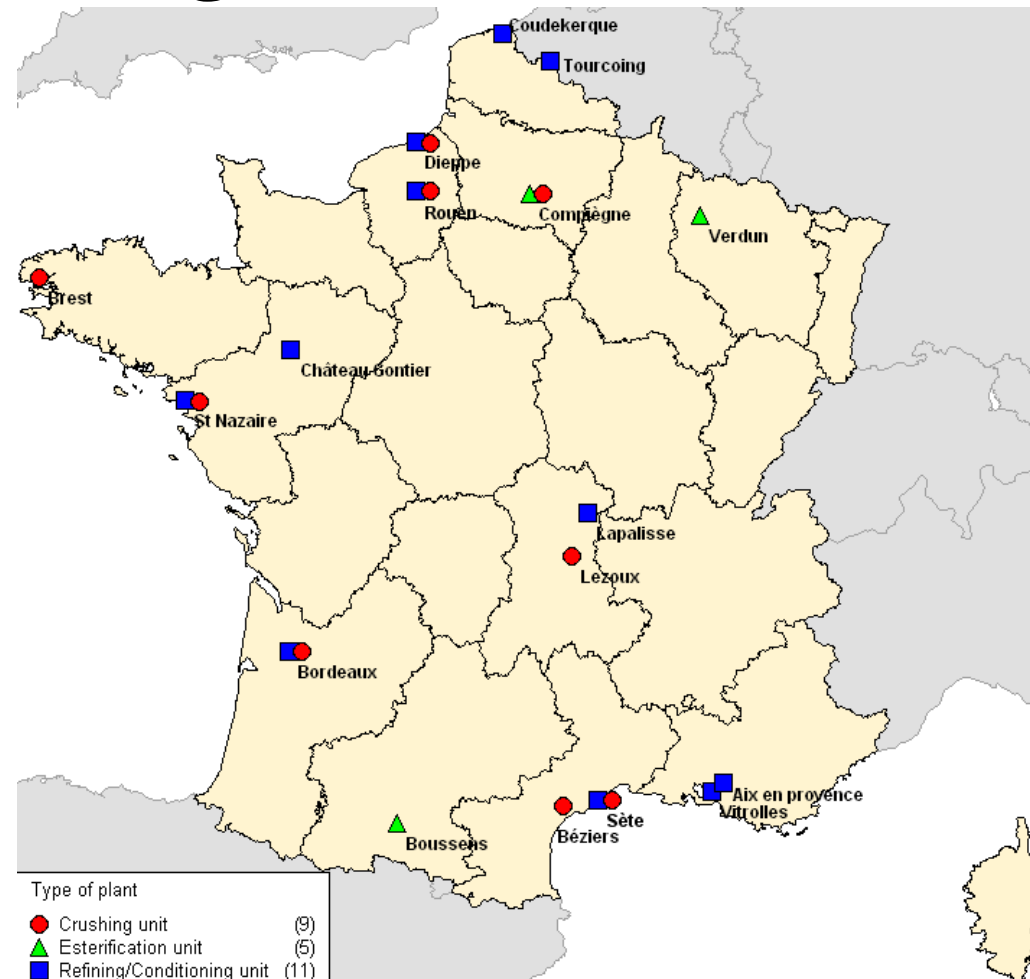
Oleochemistry

- Oil crop production in France (2006):

5 582 000 t (73% Rapeseed)

- Vegetable Oil production in France (2005):

1 375 000 t



Source Proléa / ONIGC/ huileries de France

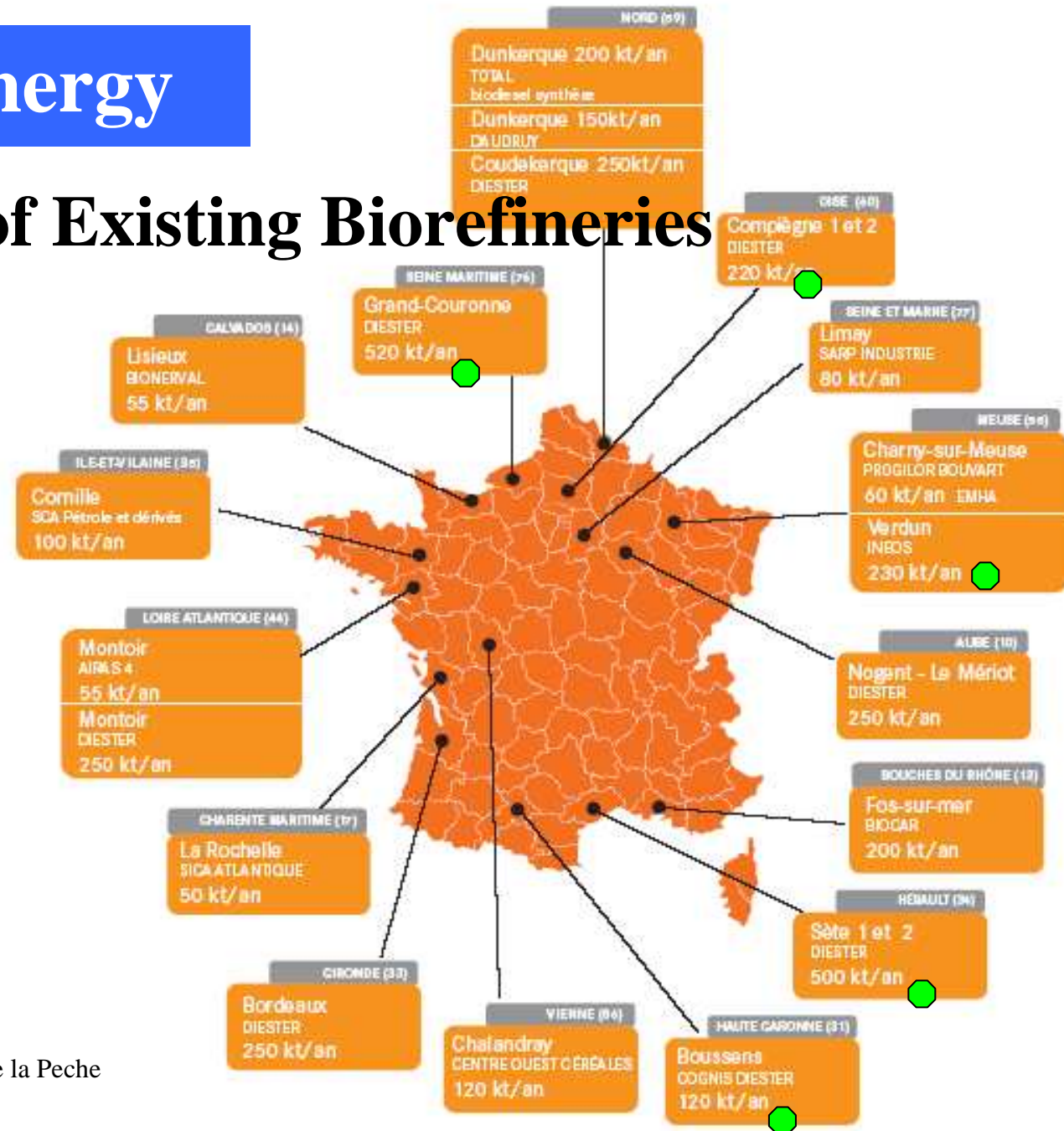
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IEA Bioenergy

4. Mapping of Existing Biorefineries

biodiesel

● production plants in 2006



Consumption in 2006:

631 800 t

Source: Ministère de l'Agriculture et de la Pêche

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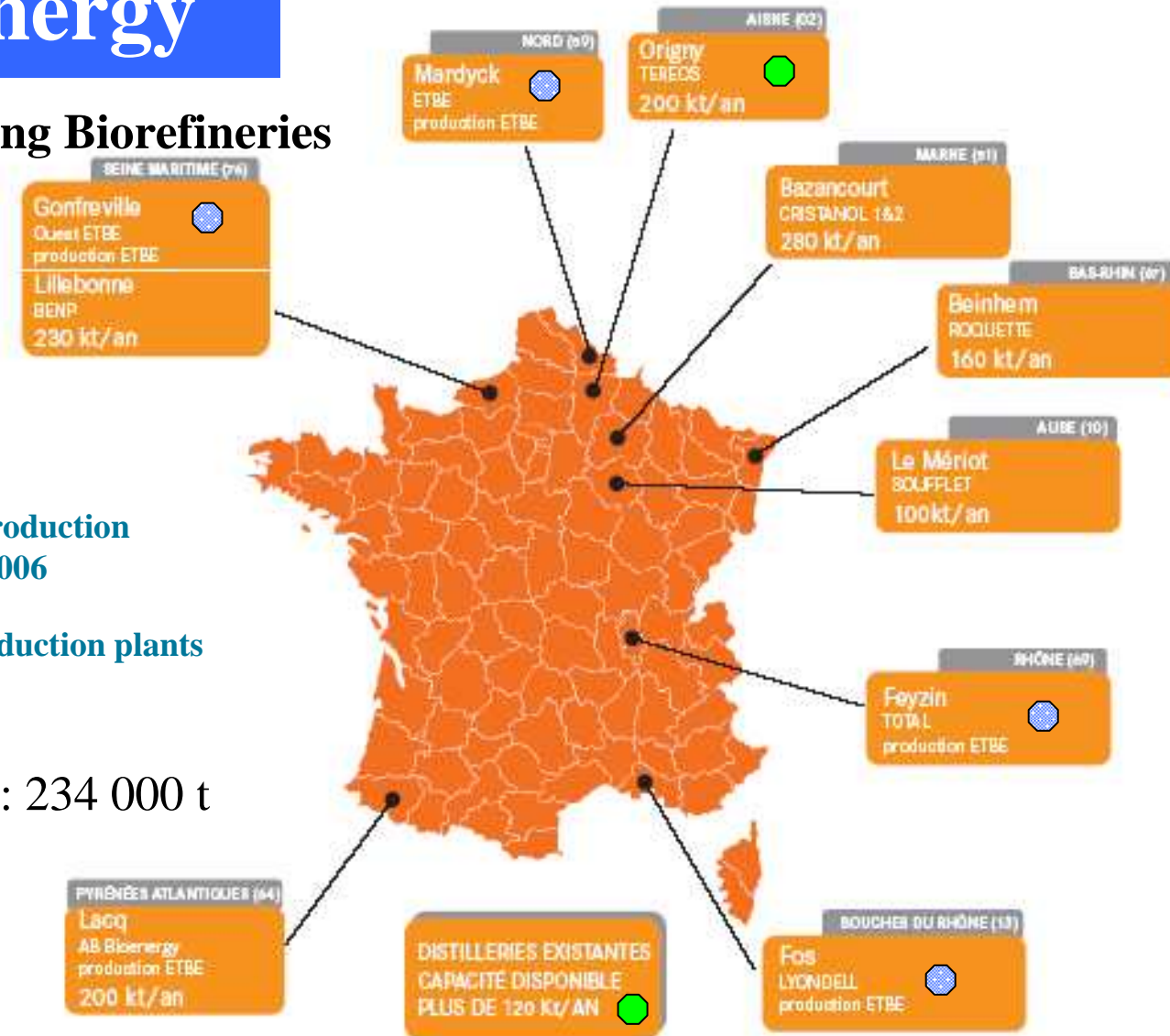
IEA Bioenergy

4. Mapping of Existing Biorefineries

bioethanol

- Ethanol production plants in 2006
- ETBE production plants

Consumption in 2006: 234 000 t



Source: Ministère de l'Agriculture et de la Pêche

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4. Mapping of Existing Biorefineries

Biofuels: planned production volumes

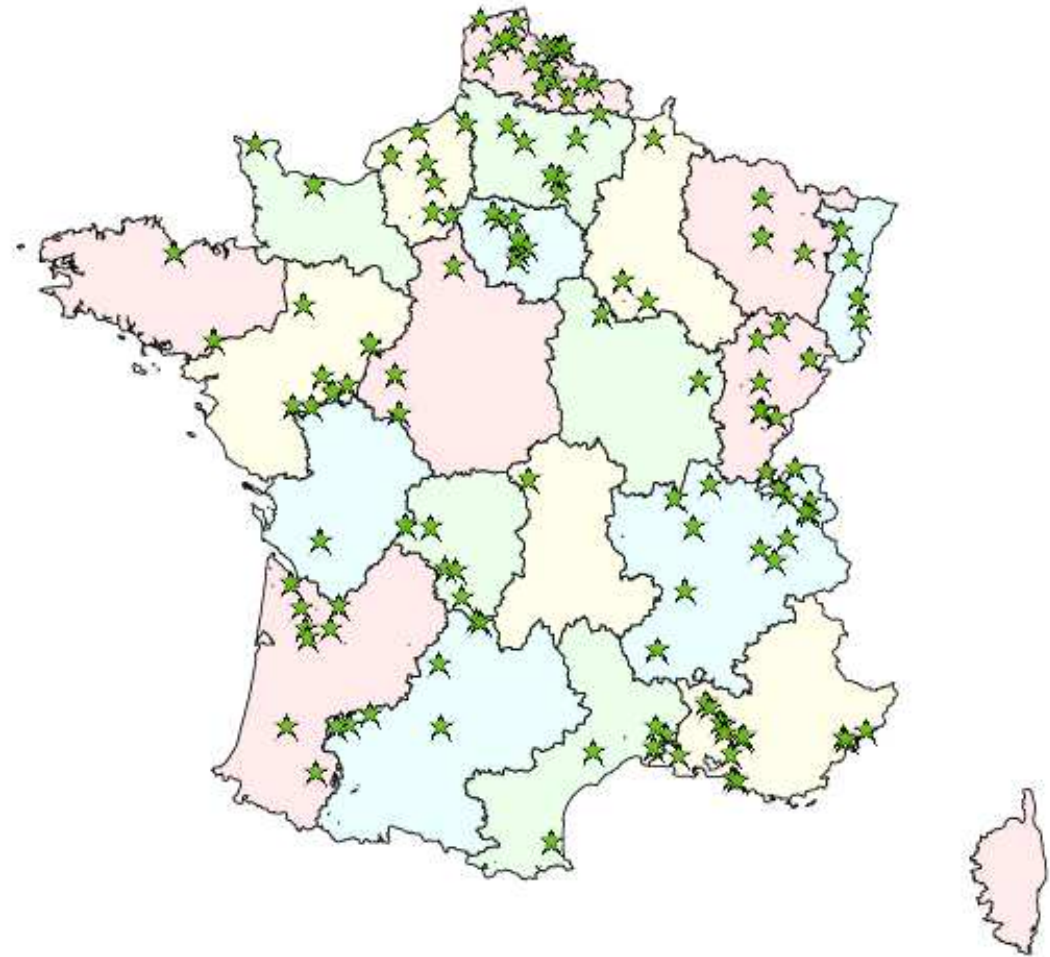
		Biodiesel	Ethanol	ETBE *
		29 units	20 units	4 units
2006	1,75 % _{PCI}	680 kt	140 kt	170 kt
2007	3,5 % _{PCI}	1 350 kt	340 kt	230 kt
2008	5,75 % _{PCI}	2 480 kt	720 kt	230 kt
2009	6,25 % _{PCI}	2 730 kt	870 kt	230 kt
2010	7 % _{PCI}	3 150 kt	870 kt	230 kt

* quantity = ethanol part

4. Mapping of Existing Biorefineries

Industrial biogaz

- 131 biogaz production Unit identified in 2005, data available (mainly from food industry, sewage sludge treatment plants and domestic wastes)



Source: ADEME - SINOE

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4. Mapping of Existing Biorefineries

Non-food Industry (materials, products, ...)

- *Chip- and fiber- boards production units in France in 2006*
- MDF Production (2005): **1 115 000 m³**
- OSB and other boards Production (2005): **4 670 000 m³**

- ▲ Chipboard
- Medium Density Fiberboard (M.D.F.)
- * Oriented Strand Board (O.S.B.)
- Hard and insulating fiberboard



Source: Union des Industries des Panneaux de Process

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4. Mapping of Existing Biorefineries

Non-food Industry (materials, products, ...)

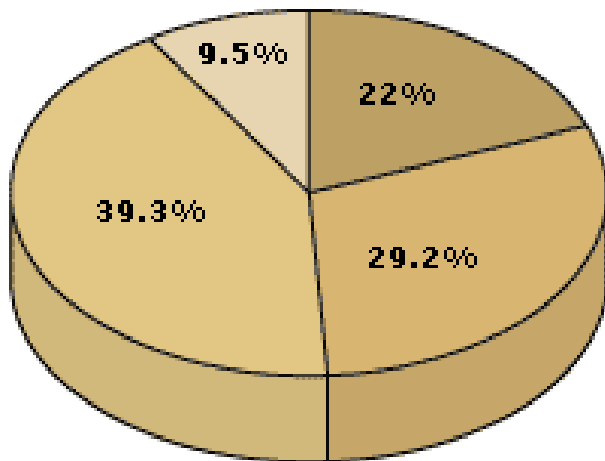
Others

- Novance (Oleochemistry for non-food markets)
 - Compiègne (60, Oise)
- Arkema (Rilsan®: polyamid 11 from castor oil)
 - Serquigny (27, Eure)
- ARD (cosmetics, surfactants, succinic acid....)
 - Bazancourt (51, Marne)
- DRT (chemicals from terpen and resin derivatives)
 - Castets, Lesperon, Vielle St Girsans (40, Landes)
- ULICE - Limagrain (biolice® bioplastic)
 - 63

4. Mapping of Existing Biorefineries

Feed Industry

- 213 companies
- Turnover: 6.5 billion €
- Production : 21.6 Mt/y



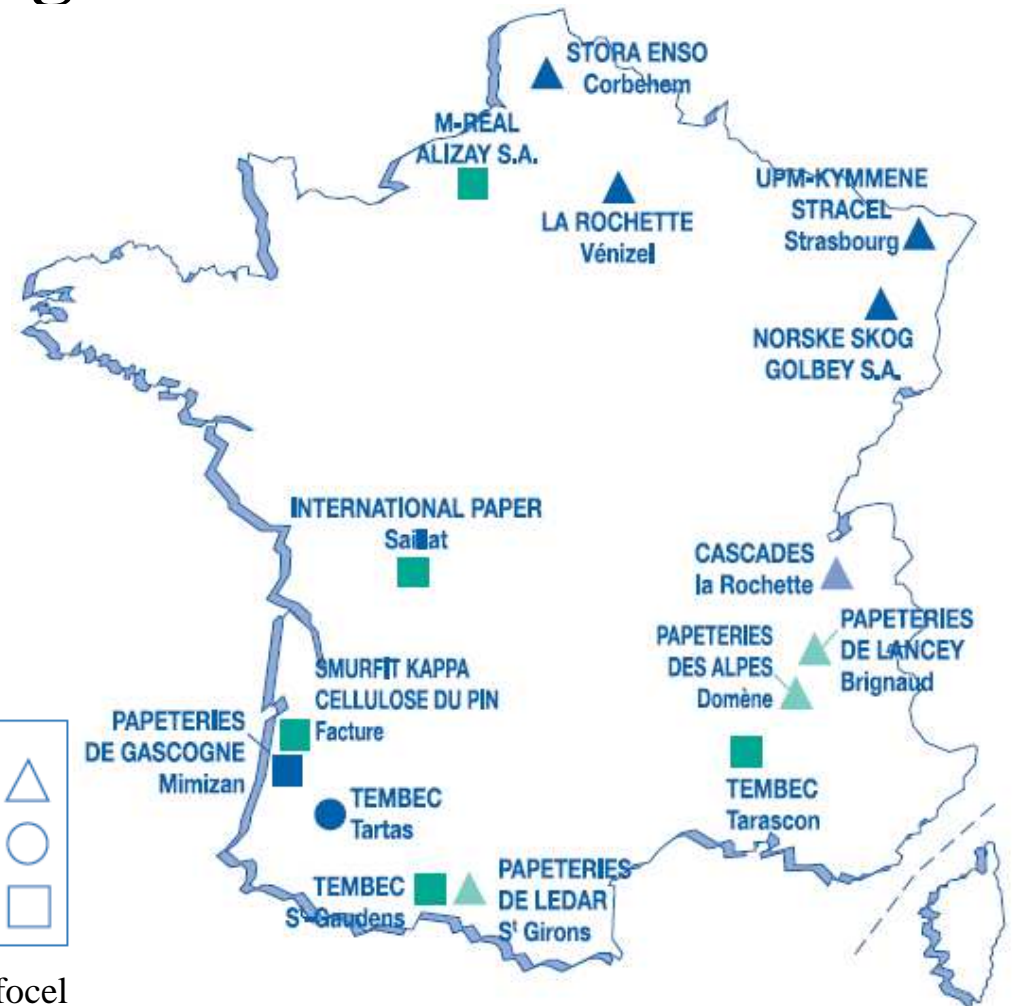
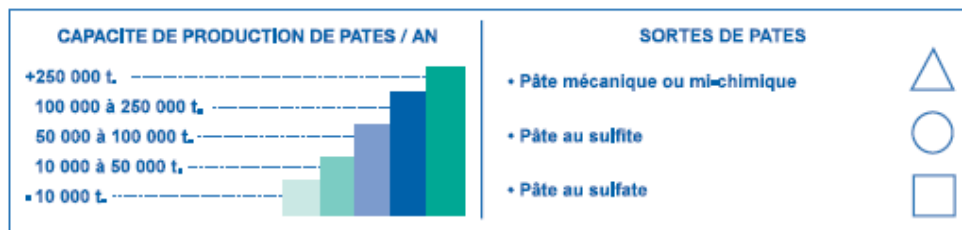
Source: SNIA

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4. Mapping of Existing Biorefineries

Pulp/paper Industry

- Cellulose pulp and paper production units in France in 2006
 - Pulp production (2005):
 - 2 597 000 t
 - Paper and Cardboard production (2005):
 - 10 322 000 t



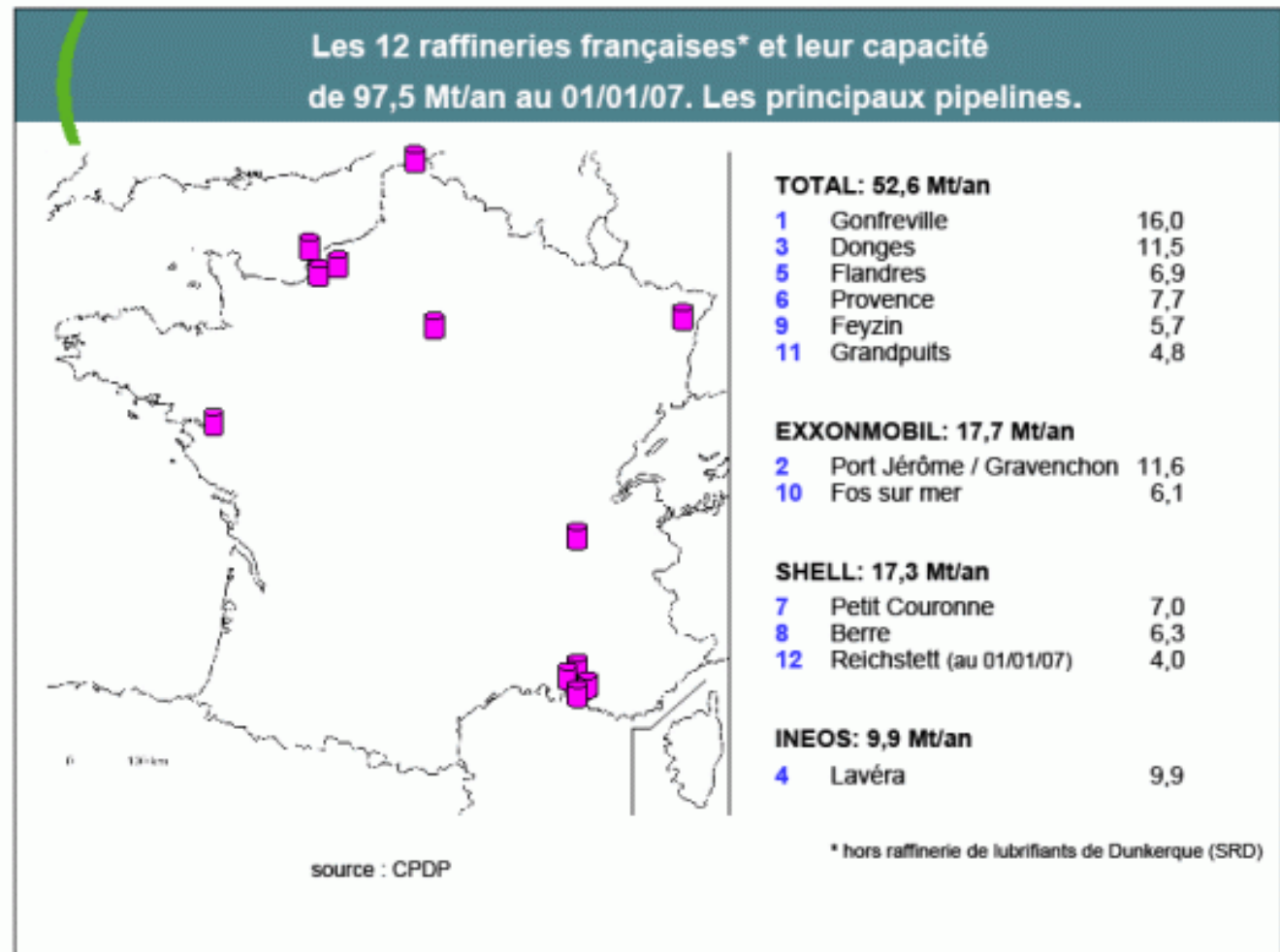
Source: Fédération Française des pâtes de cellulose / Afocel
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4. Mapping of Existing Biorefineries

Petrochemical Industry:

The 12 Oil Refineries in France

Refining capacity:
97.5Mt/year

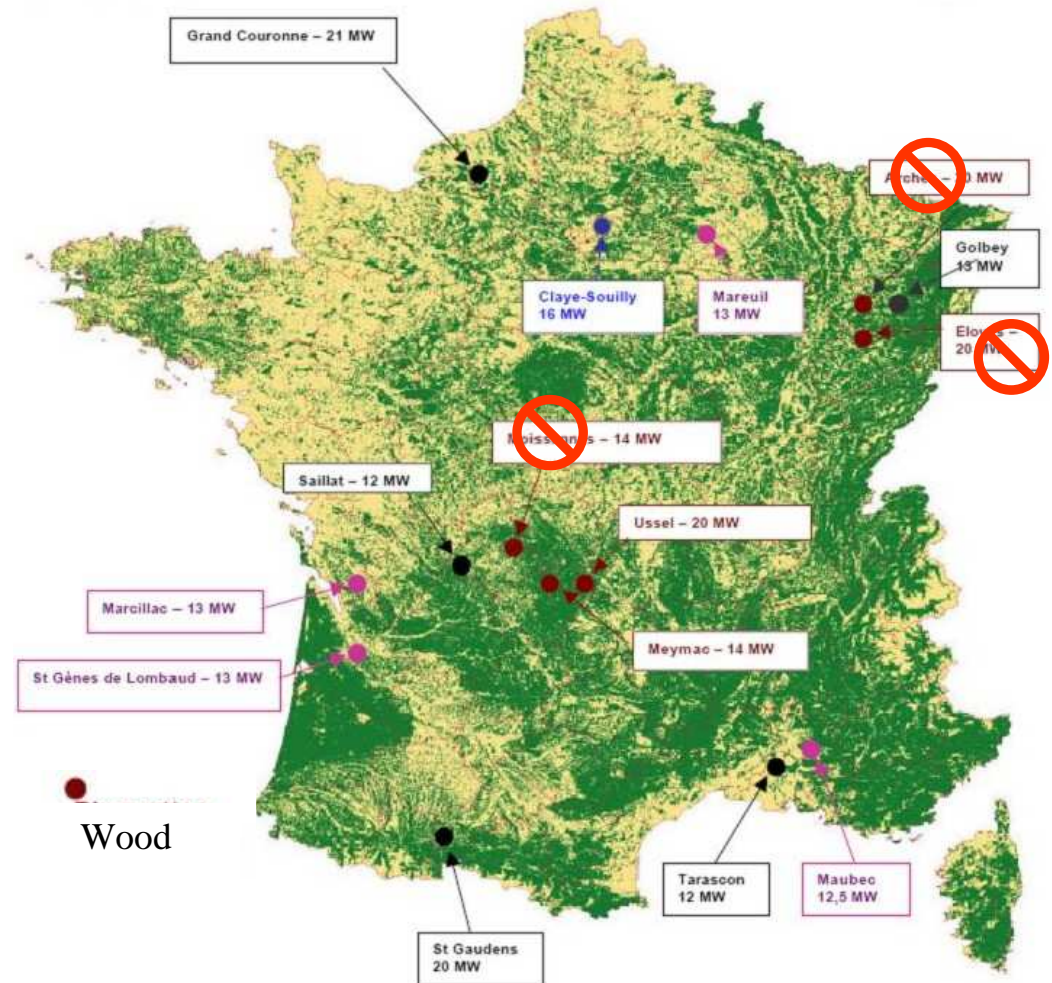
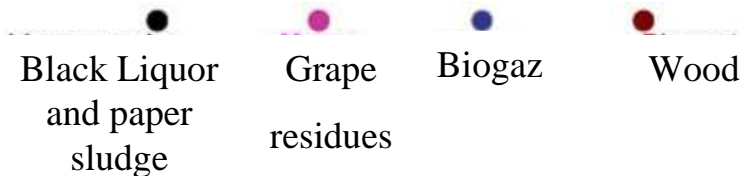


Source : UFIP

4. Mapping of Existing Biorefineries

Heat and Power

- 12 combined heat and power new production plants under construction in France (~180MWelec)
- Results of a new call for 300MWelec expected soon



Source: MINEFI

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5. RTD-activities

National Projects

- **Roquette** : The BioHub® program aims at getting the most out of agricultural resources by developing new chemical and biochemical processes to synthesize chemical products from Isosorbide. Investment: € 90 million over seven years.
13 Industrial and research partners.
Location: Lestrem
- **Soufflet** : Osiris project. Development of Biofuels, Food feed and biological crop protection products from cereals.
Investment: € 77 million over eight years.
Location: Nogent sur Seine

5. RTD-activities

Pilot Plants

- **Futurol** (planned): Pilot plant for the production of cellulosic ethanol on the existing sugar-beet and wheat biorefining site of Bazancourt
- **(Bure?)** (project) : Pilot plant for a lignocellulosic BTL unit)

5. RTD-activities

Demonstration Plants

- **Solvay:** Production of epichlorhydrin from glycerin (10 kt/y)
- **SICA Atlantique:** Pilot plant for the production of Fatty Acid Ethyl Esters (FAEE). MULTIVAL process. (10 kt/y)

6. Major National Stakeholders

Funding Agencies



French innovation Agency

SME development Agency



National Research Agency



French Environment and Energy
Management Agency



DG Enterprise

6. Major National Stakeholders

State-owned research institutes

CNRS	National center for scientific research
INRA	National Institute for agronomic research
IFP	French petroleum institute
CEA	French Atomic Energy Commission

Industrial research

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