Ambassade du Danemark
Colloque Energies d'Avenir

French renewable energy policies and « Grenelle de l'Environnement »

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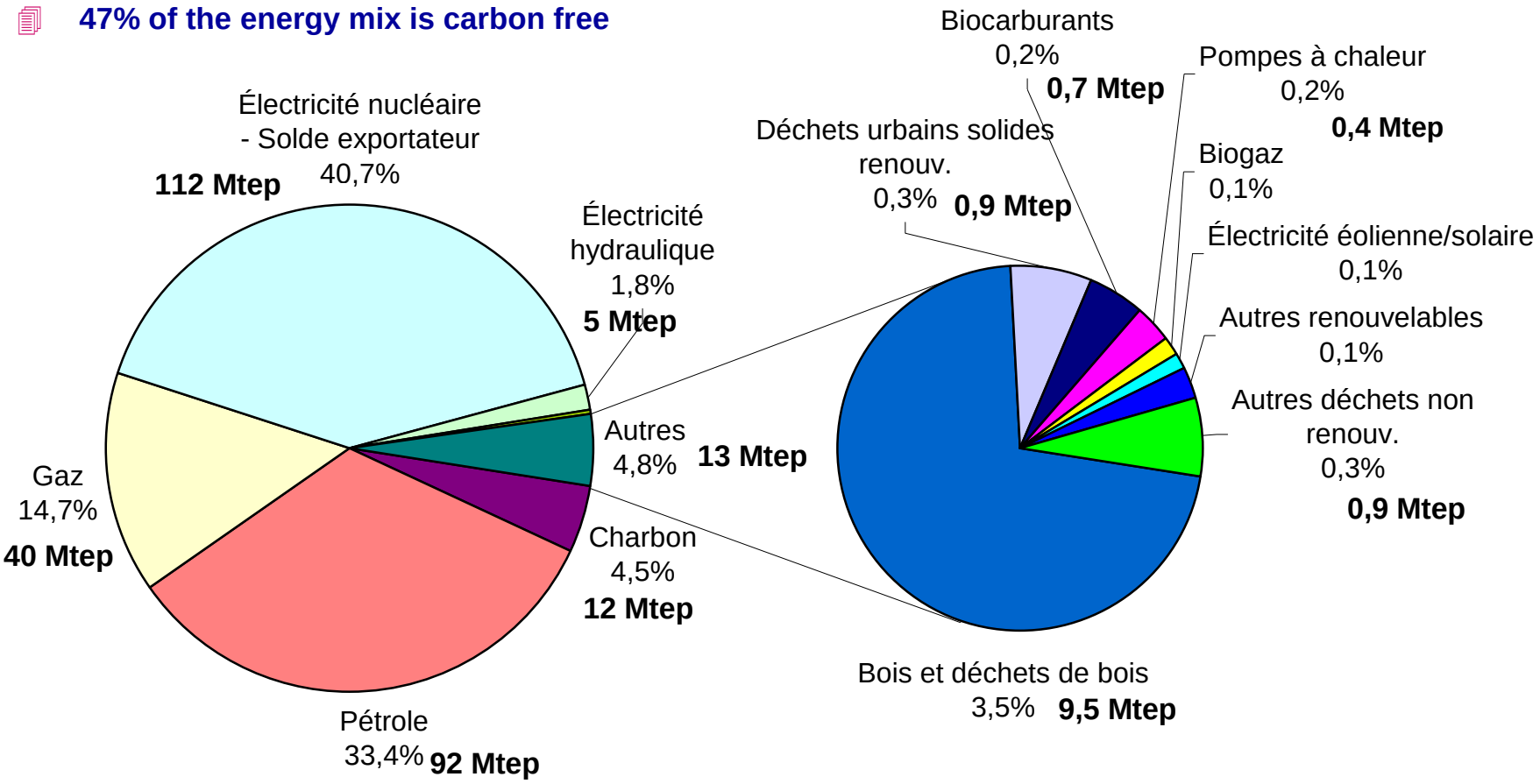
France Primary Energy Mix (2006)

- **No short term signicative evolution (275 Mtep)**
- **47% of the energy mix is carbon free**

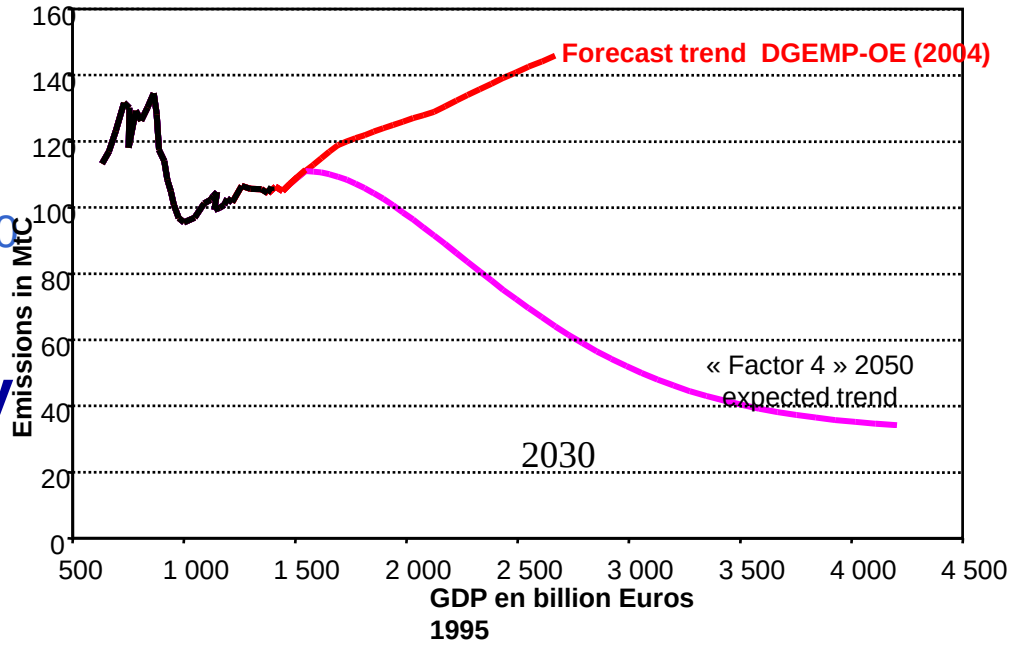


Since 2005, clear ambitious targets…

13 July 2005 French "POPE" Law on Energy
(Loi de Programme fixant les Orientations de la Politique Energétique)

GHG reduction

The "Factor 4 objective"
A 3 % yearly reduction
to cut by 4 the emissions by 2050



Final Energy Intensity

- 2% per year (2015)
- 2,5 % per year (2030)

Renewable Energies 2010 targets

10 % of total primary energy consumption from RES (6,13% in 2006)
21 % of electricity consumption from renewable sources (14 % in 2006)
+ 50 % contribution from thermal renewables compared to 2004
(meaning + 4Mtoe)
7 % of biofuels in transports (1,75% in 2006)

… reinforced by the «Grenelle de l'environnement» conclusions

- **"Grenelle" objectives:** A clear national strategy to reinforce France commitment toward sustainable development and "Factor 4"

- **" Tackle climate changes & energy management"**

  French position in line with the "3x20 in 2020" European objective

- **CO2**: -20% in transports and more than 20% reduction in buildings
- **Additionnal 20 Mtoe of renewables** by 2020 (from 17 to 37 Mtoe)
- **Energy Efficiency** :
  - 20% of energy consumptions reduction in service sector buildings
  - 12 % reduction in residential buildings within 5 years and one third by 2020

  ⇐ Renewable would then represent 25% of the energy mix

- **R&D**: Plus 1 G€ over 4 years,

1 € for nuclear = 1 € for « New Energy Technologies »

« Grenelle de l'environnement » action plan for GHG emissions reduction

- Programmes in favour of renewable energies: hydro, wind, biofuels, geothermal, photovoltaic, solar thermal.
- RES Heating and Cooling Fund
- Increase renewable energies consumption from 30 to 50 % in overseas departments and communities by 2020.
- Research for second-generation biofuels development
- R&D programme for CO2 geologic catching and storage
- Plan for energy efficient agricultural exploitations
- Commitment for all ministries and administrations to draw up their carbon balance and improve their energy efficiency by 20%
- Revision of the public procurement code to make environmental clauses compulsory
- Consider a « climate-energy » tax on fossil fuels

The building « Grenelle » objective …

Ambitious programme for new buildings

- in 2010 : reach the VHEP label level (-20 % compared to 2005 Regulation)
- in 2012 : reach the low consumption building label level (50 kWhpe/m².year adjusted according to geography and altitude)
- in 2020 : buildings to be passive (< 15 kWhpe/m².year) or positive energy ones

Launch of an unprecedented thermal refitting programme for existing buildings

- Energy improvement for every private housing property transfer and study for a refitting obligation (class B or C)
- Refitting of 400 000 public housings per year
- Market exclusion of all obsolete components or technologies
- New public buildings to be conformed to the best energy efficiency standards
- Thermal refitting (-20 %) of all state buildings
- Creation of a thermal refitter branch and launch of a large professional training plan (100 000 professionals to be trained in 10 years)
- Implementation of strong incentive mechanisms in partnership with banks

Renewable energies development

- « bâtiment-soleil » national plan
- 60 000 RE professionals to be trained in 10 years

...strenghtened by an existing supporting framework

R&D: technological evolutions and demonstrative buildings

- PREBAT: a national deployment programme for energy in buildings (15 M€/annually) www.prebat.net
  Creating a virtuous circle: regulation -> R&D - > regulation
  demonstration -> field evaluation -> corrective actions

Communication: behaviours and uses modifications

- Knowledge acquisition, information, communication, training
- Advices in the local « Point Info Énergie »
- Audiovisual communication national campaigns

Regulations and incentives: obligations and voluntary implication

- Thermal regulations (new and existing building) revised every 5 years
- Energy performance diagnostic (DPE)
- Financial instruments (income tax credit, reduced rate loans, zero rate loans, White certificates (CEE), COS exceeding…)
- Integrated photovoltaic electricity feed-in tariff

Training : jobs evolution and new professions

- Professional qualifications (Qualit'EnR, Qualibat)
- New jobs (energy advisors, refitters)
- Global services offers (guarantee of results, financial products…)

Feed in tariffs: a key incentive for renewable electricity

	Decree	Contract duration	Tariffs
Hydropower	1st March 2007	20 years	**6,07 c€/kWh** + 0,5 to 2,5 c€/kWh premium for small installations + 0 to 1,68 c€/kWh premium depending on the production regularity
Biogas and methanisation	10th July 2006	15 years	**Between 7,5 and 9 c€/kWh** depending on the power + 0 to 3 c€/kWh premium for energy efficiency + 2 c€/kWh premium for methanisation
Wind power	10th July 2006	15 years 20 years for off-shore	**on-shore: 8,2 c€/kWh** during 10 years, then from 2,8 and 8,2 c€/kWh depending on the location **off-shore: 13 c€/kWh** during 10 years, then from 3 to 13 c€/kWh depending on the location
Photovoltaic	10th July 2006	20 years	**30 c€/kWh** **+ 25 c€/kWh premium for building integration** Corsica, overseas departments and Mayotte: 40 c€/kWh + 15 c€/kWh premium for building integration
Geothermal energy	10th July 2006	15 years	**12 c€/kWh** + 0 to 3 c€/kWh premium for energy efficiency Overseas departments: 10 c€/kWh + 25 c€/kWh premium for building integration

- A useful tool to structure a field: the BIPV premium example

Tax credits : a very efficient incentive for renewables at home

Income tax credit launched in 2004

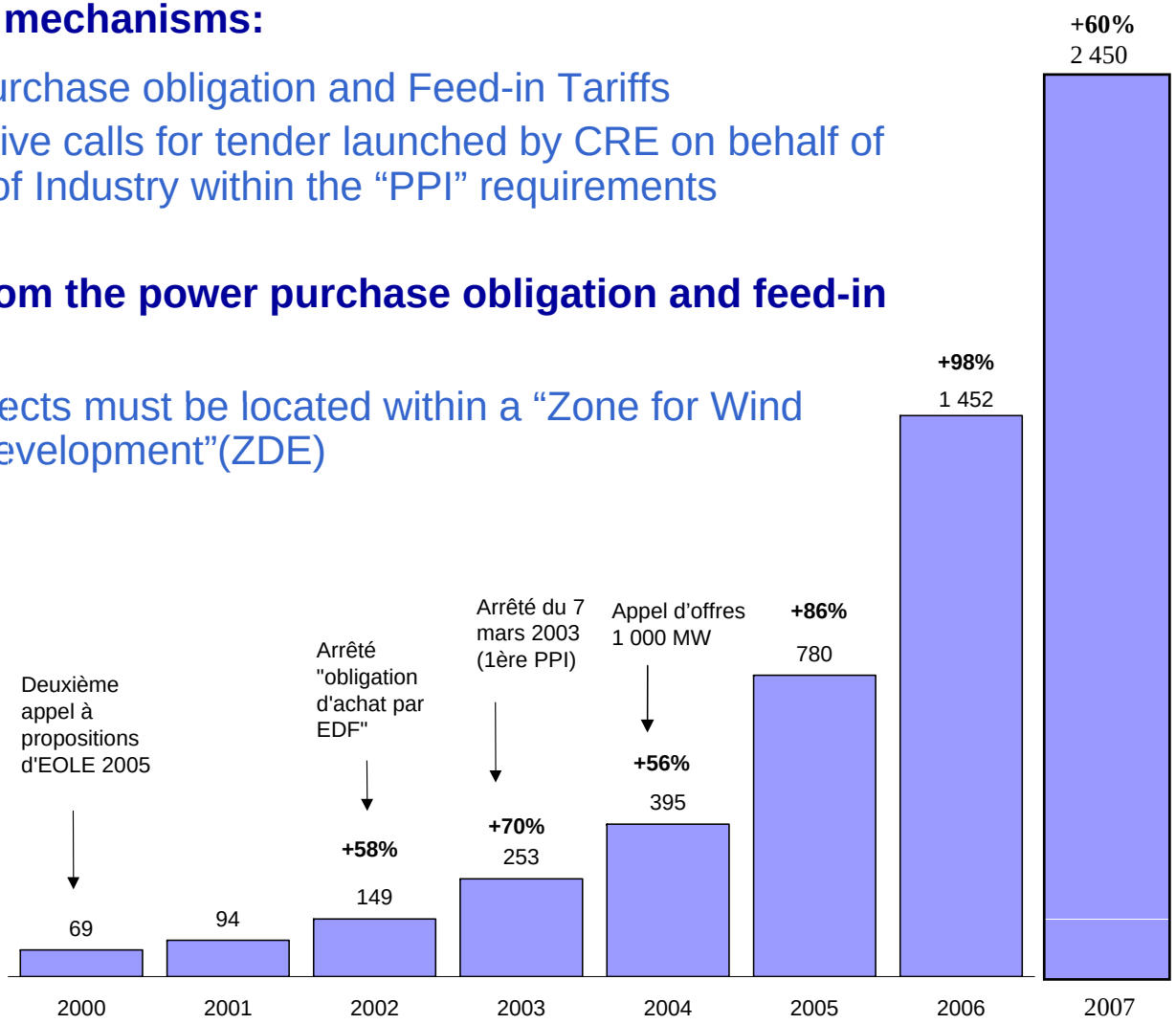
From 40% to 50% for renewables equipments in January 2006

	2004	**2005**	**Increase rate (2004-2005)**	**2006**	**Increase rate (2005-2006)**
Solar thermal: domestic hot water systems	8 150	14 000	**72%**	26 200	**89%**
Solar thermal: combi-systems for hot water and heating	600	1 500	**150%**	4 100	**168%**
Solar photovoltaic		450		1 606	**156%**
Wood - independent heating systems	324 000	409 000	**26%**	529 000	**29%**
Wood - boilers	8 800	18 500	**100%**	28 400	**53%**
Heat pumps: geothermal and air-water	18 000	27 000	**50%**	59 150	**119%**
Heat pumps: air-air		38 225		50 500	**32%**

Wind Power: an increasing market

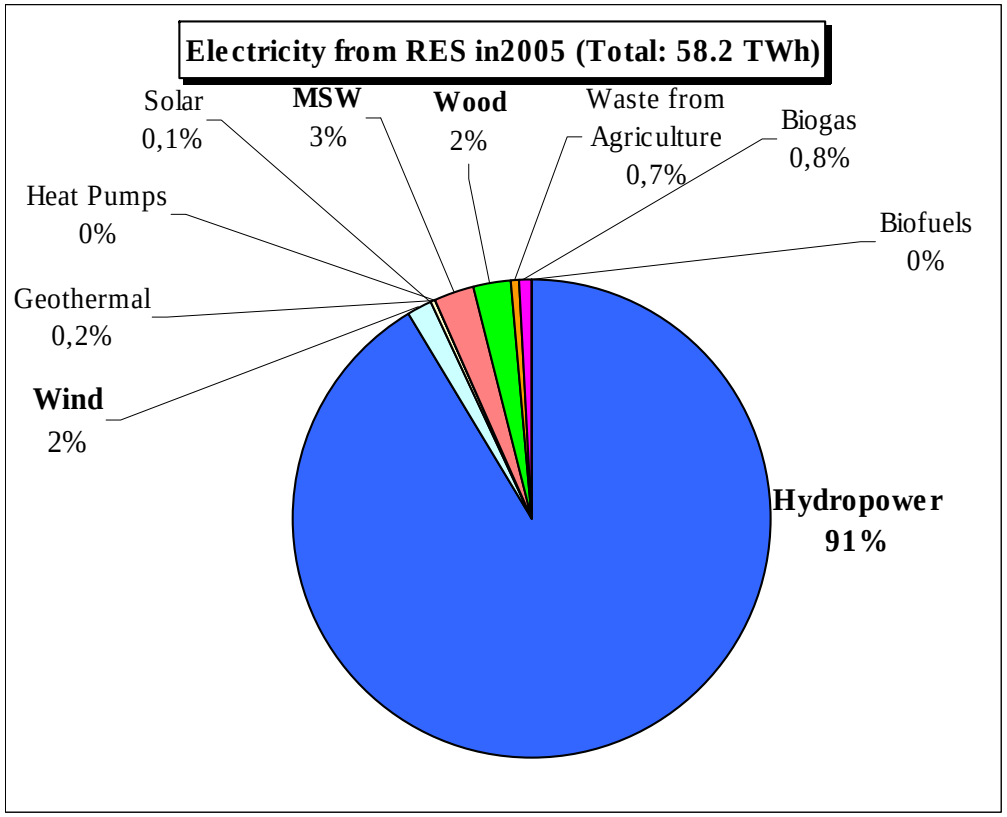
- **Two parallel mechanisms:**
  - Power purchase obligation and Feed-in Tariffs
  - Competitive calls for tender launched by CRE on behalf of Ministry of Industry within the “PPI” requirements

- **To benefit from the power purchase obligation and feed-in tariffs:**
  - New projects must be located within a “Zone for Wind Power Development”(ZDE)



Hydropower : a stable but a key contribution

- **A key component of the energy mix to respond to demand variations**
- **Main development have already been achieved**
- **Ongoing potential studies by river basin**



- **The Pluriannual Programmation of Investment (PPI) for electricity production objectives:**
  - **from 0 to 4 additional TWh in 2010**
  - **from 0 to 7 additional TWh in 2015**

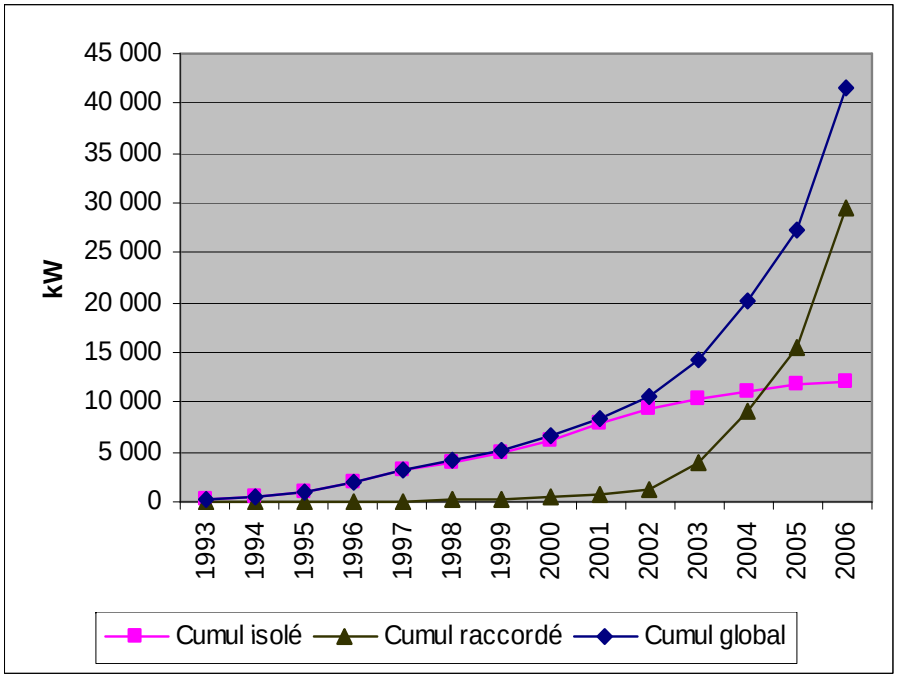
Photovoltaic: a building integration (BIPV) strategy

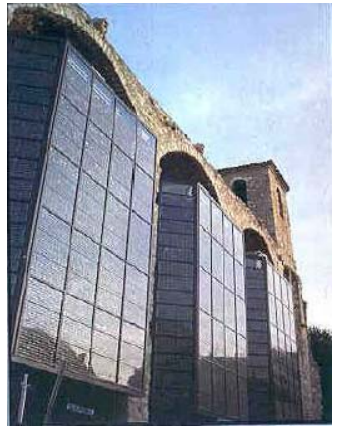
R&D priorities

- Improve cells and modules efficiency
- Solar silicium production cost reduction
- Building integration (Prebat)

Financing incentives

- Income tax credit and feed-in tariff
- A premium to BIPV





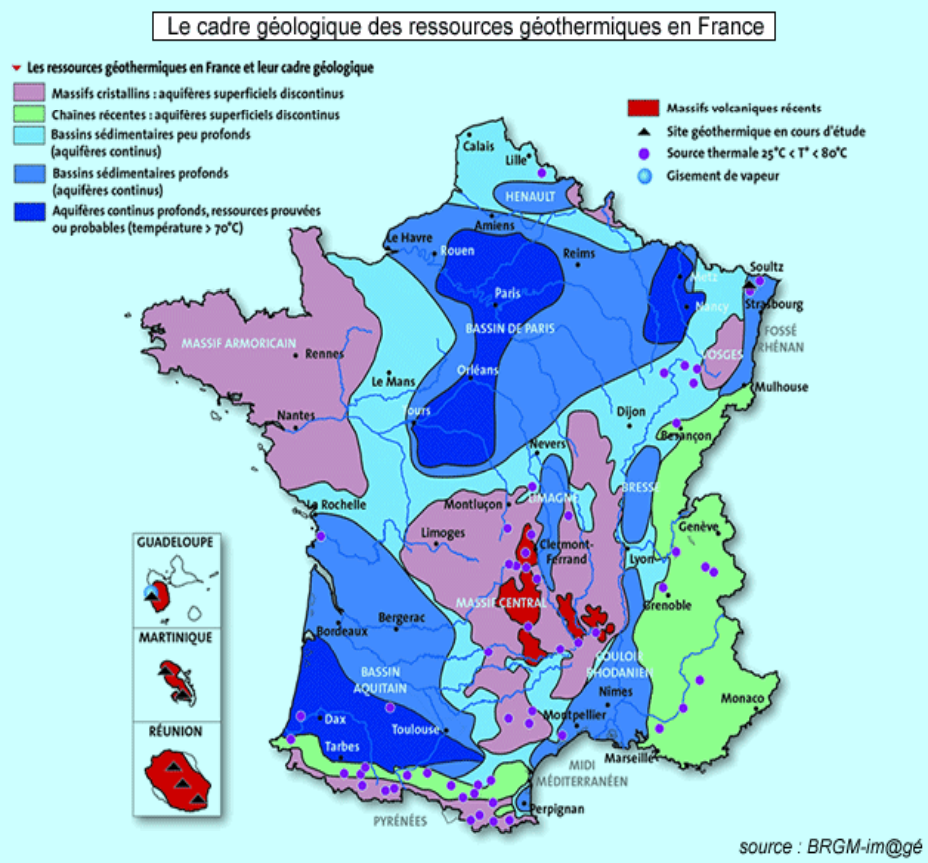
Geothermal energy heating systems

- Paris basin : 31 geothermal installations including 29 district heating producing 130 000 toe/year

- A key success factor for the deployment of geothermal energy in France : risk coverage.

  Insurance mechanisms for short (geological) and long term (technical) risks coverage

- Subsidies schemes reinforced through ADEME in 2007



Heat pumps: toward a quality approach

Heat pumps sales	2002	2003	2004	2005	Evolution 2005 / 2004
Ground direct exp. / Ground direct cond. Ground direct exp. / Water	7 700	5 400	6 800	7 800	+ 15%
Brine / Water Water / Water		3 600	4 900	5 400	+ 10%
Air / Water	4 400	4 700	5 600	12 000	+ 114 %
Source : AFPAC Total	12 100	13 700	17 300	25 200	+ 46 %

- Demand is very high but a too fast, uncontrolled development of the market could lead to mistakes and thus to a degradation of the image of heat pumps
- Working on a quality approach

  - Existing quality charter for drillers and a guarantee fund for water to water heat pump systems (AQUAPAC)

  -Work under progress to issue a quality label for machine

  - Work under progress to create a quality charter for fitters, defining the quality standards of installations, including training courses, technical documents and sizing tools, paying attention to the case of existing dwellings

Biomass for heating: developping equipments efficiency

- 9 Mtoe in 2006
- 85 % of consumed wood fuel is for single family houses heating (6 millions of households)

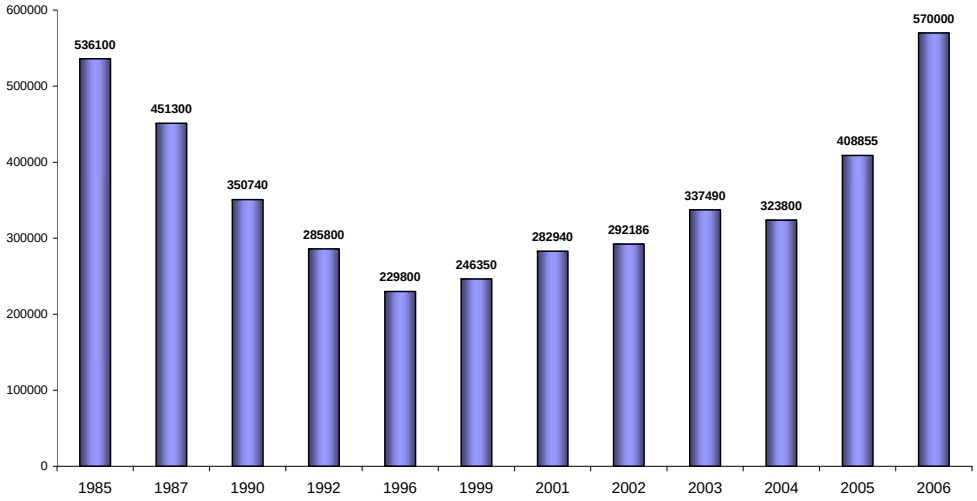
  Promoting the modernization of the devices stock

  - Flamme Verte and NF bois de chauffage labels
  - Increasing know-how

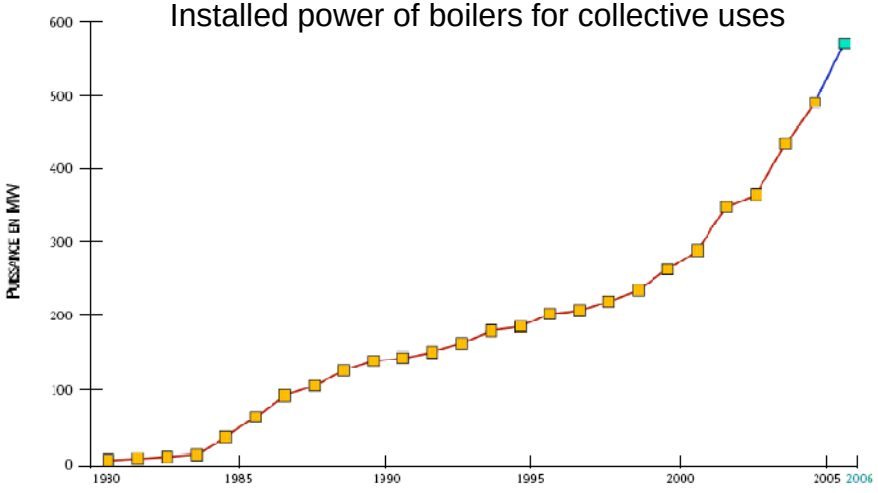
- 15% of consumed woodfuel is for heating for industry, as well as multifamily and tertiary-sector building

Evolution des ventes annuelles d'appareils de chauffage au bois entre 1985 et 2006 (inserts et foyers fermés, poêles, cheminées, cuisinières)

ADEME/Alkaest - Carrière consultatn - GMV Conseil



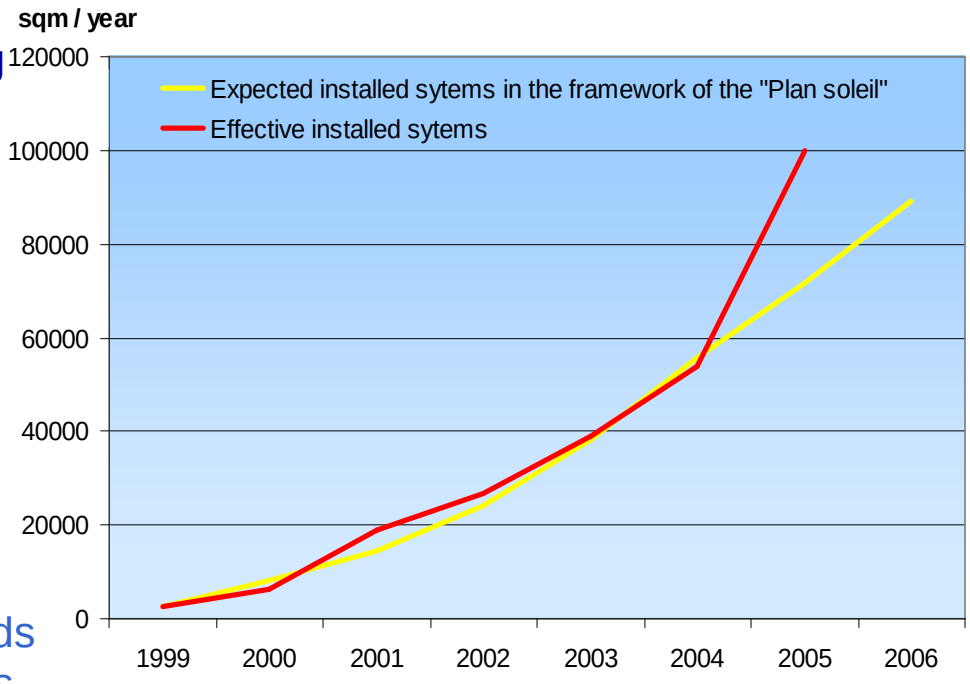
Installed power of boilers for collective uses



Source ADEME

Solar thermal : a 35% to 40% increase since 2000

- In 2006, 220 000 m² installed in Metropolitan France representing a 80% growth compared to 2005



Support mechanisms

- Collective installation / Tertiary – ADEME & Local territory Communities in the former “Plan Soleil” now “Plan Face Sud”
- Since 2005 : tax credit instead of subsidies for individual households (50% rate in 2006) and incentives from local communities
- Qualification of installers : 500 end of 2000 and more than 12 000 in 2007
- Manufacturers : 2 in 2000, > 50 in 2007

Not to forget: the need to mobilize all potential public levers

- **Financial incentives**

  Feed-in tariffs, income tax credit, subsidies for demonstration projects, etc.

- **Awareness raising**

  Information campaigns, «espaces info énergie» local information points, best practices promotion, etc.

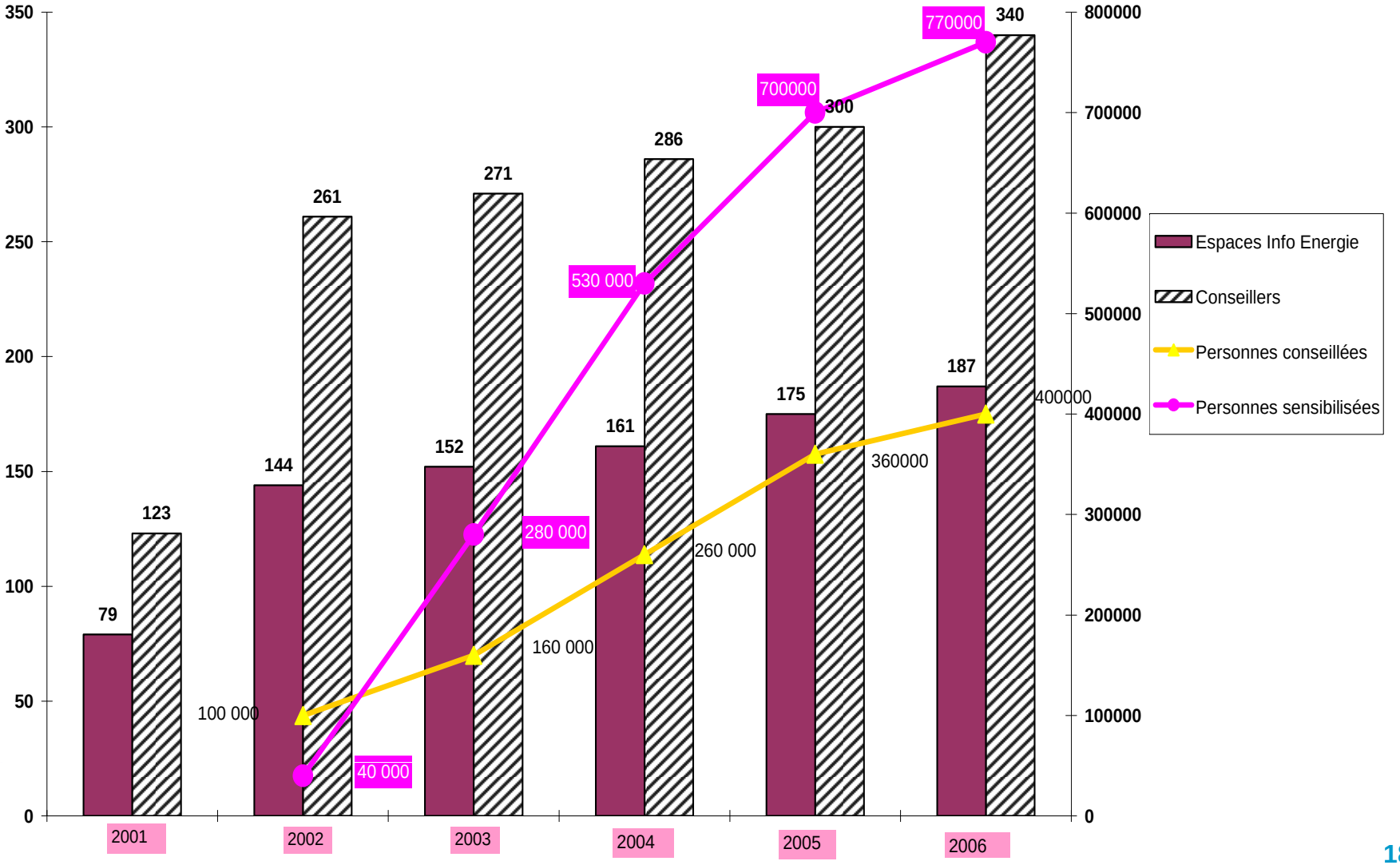
- **Regulations**

  Labelling, Thermal regulation for new and existing buildings revised every 5 years, Energy Performance Diagnostics, COS exceeding, etc.

- **Innovative tools** combining constraint and market dynamics

  - White certificates
  - Co2 emissions quotas

The «espaces info énergie» local information points experience



R&D : an ambitious and long term strategy

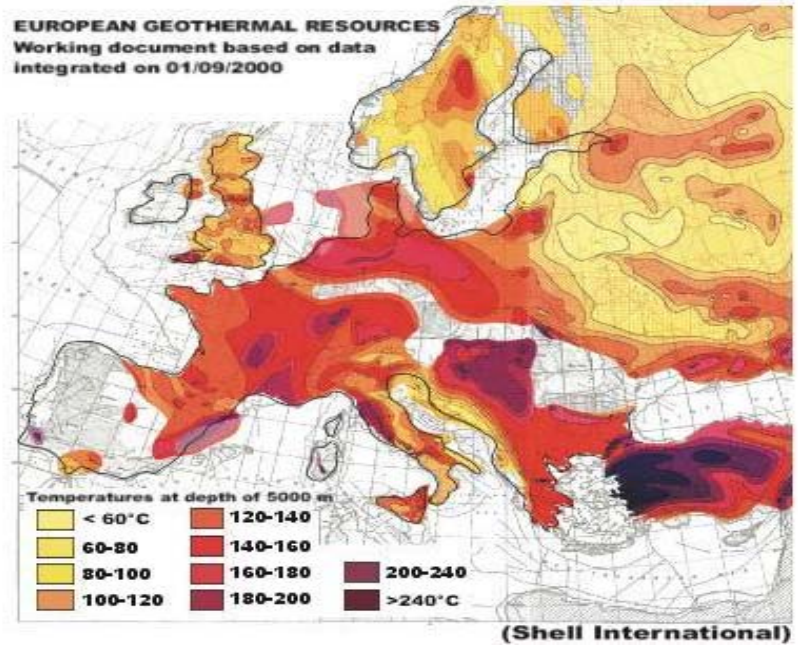
- **A need for a technology break**
  - Bioenergies, PV, passive housing, …
  - Smart grid, energy storage
- **Existing instruments :**
  - Competitivity cluster
  - Public Research Organisms: CEA, IFP, CNRS, BRGM…
  - Public Agencies : ADEME, Oséo, ANR (~100 M€ on New Energies Technologies
- **Needs of Pilot Plants**
  - Marine Currents, Waves and other Ocean Energies
  - 2nd generation biofuels plant
  - Geothermal plants
  - Solar Thermoelectric Plants

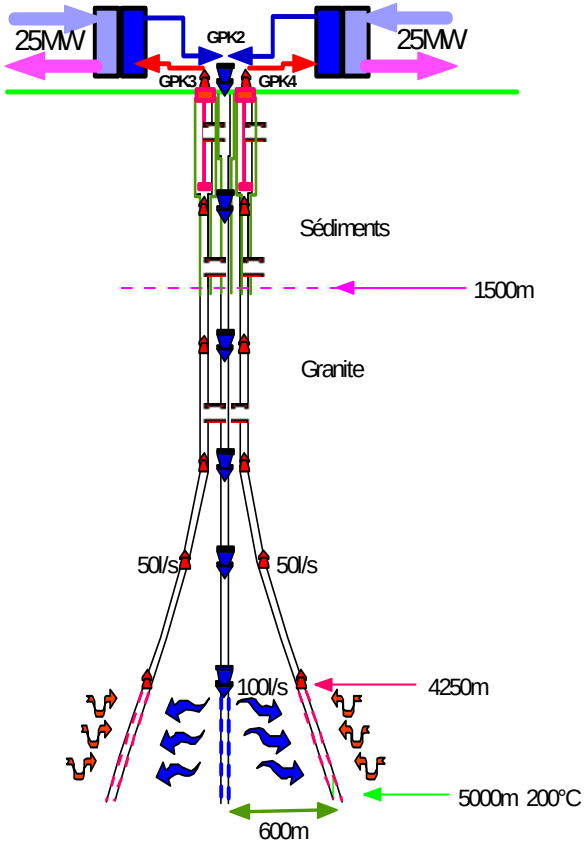
The geothermal energy example: the hot dry rocks Soultz R&D programme

- Launched in 1987
- European consortium (EDS, EDF, ENEL, SHELL int., Pfalzwerke) supported by the European Commission, the German and the French Governments (through ADEME support)

  2001-2004 : Scientific pilot with three 5 000 m drills

  2004-2008 : Pilot Power Plan (1,5 MW installed)
- A significant potential





Conclusions

- **The French policy is clearly based on the sustainable development three pillars**
  - environment (renewables, GHG emissions reduction)
  - Social (housings, energy precariousness)
  - Economic (energy supply independence, competitiveness, development of job intensive fields)
- **Regulation framework for Grenelle's objectives implementation to be developed in the coming months**
- **France's leading role, inviting other countries to set up ambitious policies**
- **A major issue for the future France EU Presidency**