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*New Technologies for Energy at CEA:  
Overlook and Elements of Programme Strategy*

***Paul Lucchese***  
***Programme Director***

# *The atom, from research to industry*

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cea

Energy



Defence & Security



Technologies for information and health

*French atomic energy commission*

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*Kick off meeting Nato Project Saharawind, Rabat, 29th November 2007*

# French atomic energy commission



1945 : CEA foundation

- Atom and its applications for France : defence, energy, research, industry

Today : from research to industry

- Reference institution at worldwide level for nuclear energy
- Based on its nuclear activity, developments inducing new activities and employments
- Guarantee a perennial nuclear deterrence without nuclear tests ...

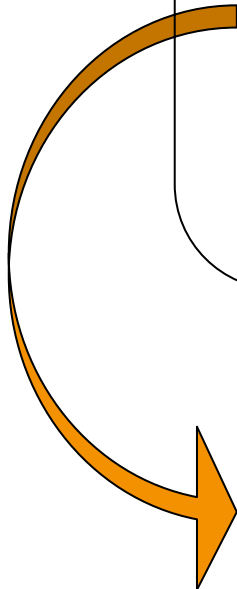
Tomorrow

- Reference institution at worldwide level for nuclear energy
- Leading European body for technological research

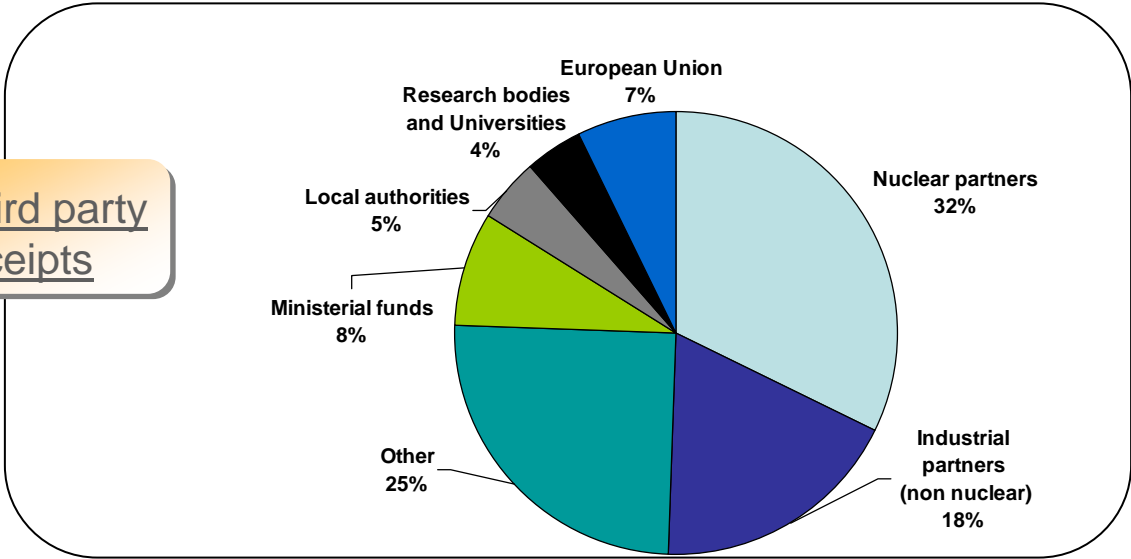
# CEA main figures (year 2006)



	Civil	Defence	Total
<b>Staff</b>	10,844	4,487	<b>15,331</b>
<b>Financing (G€)</b>	2.0	1.3	<b>3.3</b>
<i>Subsidies</i>	43%	93%	63%
<i>Third party receipts</i>	36%	3%	22%
<i>Dedicated decommissioning/ remediation fund</i>	20%	4%	14%



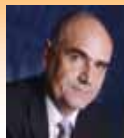
Third party receipts



# CEA : Organization



## General Management



Alain Bugat  
Chairman and  
Chief Executive Officer

Jean-Pierre Le Roux  
Deputy CEO



## High Commissioner for Atomic Energy

Bernard Bigot

National Institute  
for Nuclear  
Sciences  
and Techniques

### 4 Operational Divisions

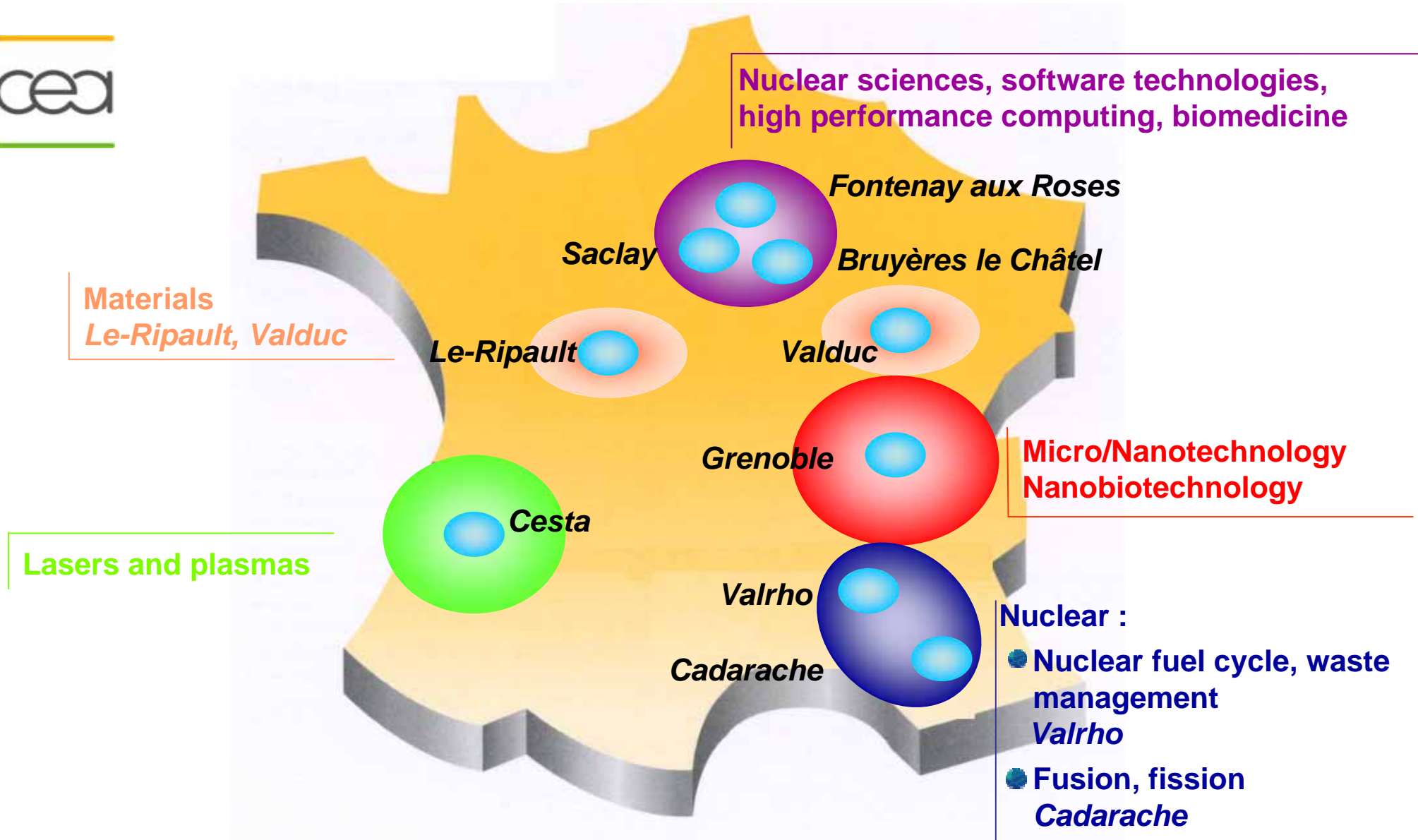
### 4 Functional Divisions

Defence	Nuclear	Technological Research	Fundamental Research		Risk Control	Strategy and External Relations	Information and systems management	Human Resources and Training
			Physical Sciences	Life Sciences				

### 5 Transverse Programmes

NTE	Security	Materials	Technologies for Health	Nanosciences
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# CEA : local actor with the French Regions



## *CEA main figures – Civil Activity*

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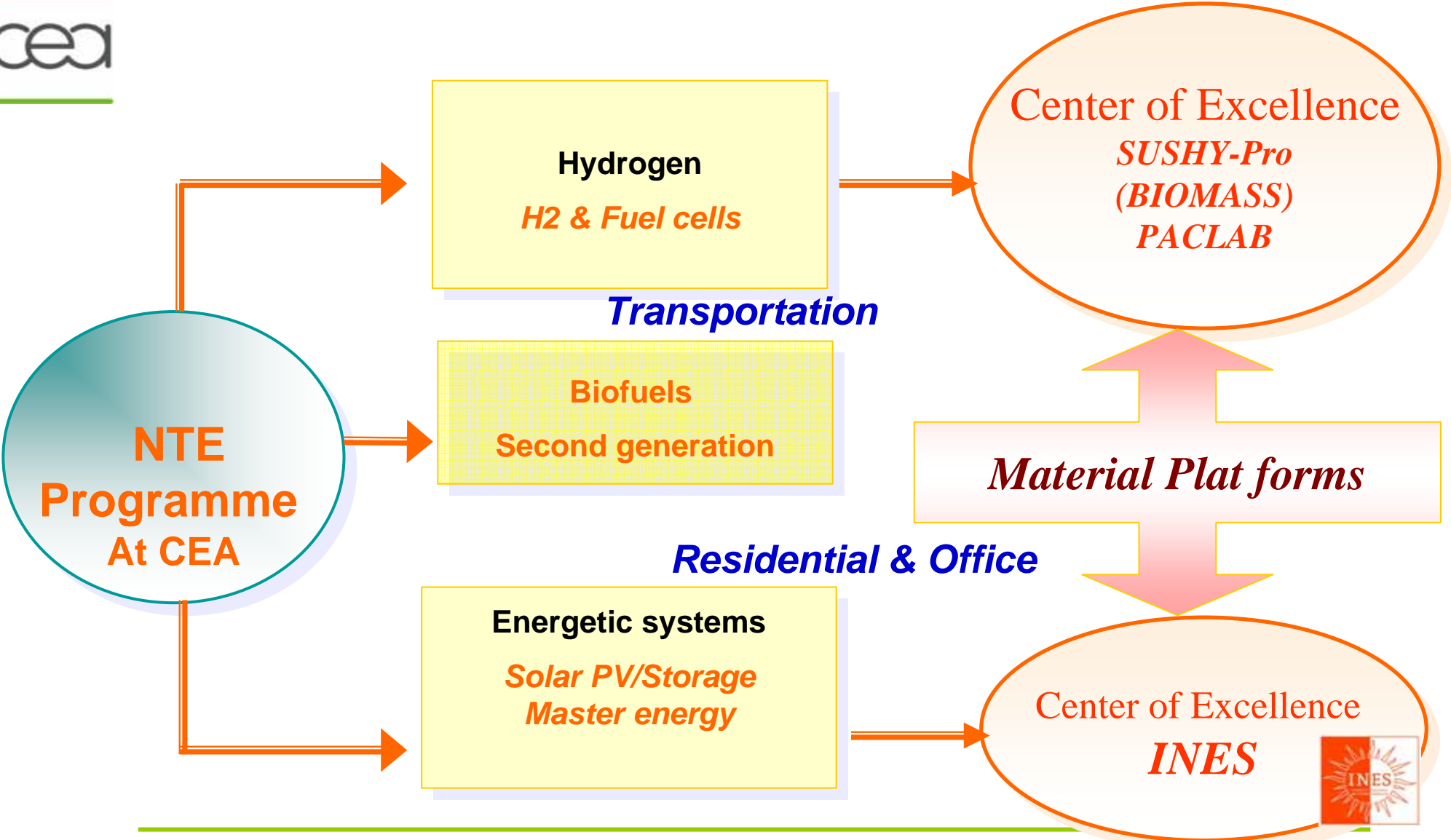


- 10,844 employees
- Budget : 2 G€, including governmental funding 0.86 G€
- 1041 ongoing PhD thesis
- 297 post-doctoral researchers
- 973 invited researchers (stay > 3 months)
- 2097 priority patents
- 1250 priority patents issued
- 317 new priority patents in 2006
- 351 active licensing agreements
- 97 high-tech spin-offs from CEA since 1984

*CEA is main Shareholder of AREVA group (~ 80 %)*

*⇒ 59,000 employees and 10 G€ sales*

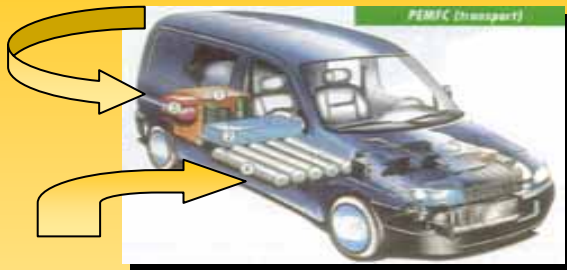
NTE programme at CEA : 350 people





# CEA N.T.E. Programme: Main targets

## FUEL CELLS AND HYDROGEN



- Cost *Fuel cells, Hydrogen, storage*
- Sustainability: *Hydrogen*
- Reliability *Fuel cells*
- Storage capacity: *Hydrogen*
- Safety *H2&FC*

### Objectives:

- French Energy policy:
  - Hydrogen economy feasibility
  - Use of sustainable energy: renewables&nuclear
  - Public acceptance
- Technology transfer for early markets
  - Creation of employment and
  - support to first H2/FC companies

## BIOFUELS FROM BIOMASS



- Large Biomass resources utilization & bio-carbon efficiency
- Cost & Energy Efficiency

### Objectives:

- French Energy policy:
  - Lack of diesel
  - CO2 emission&oil dependency
- French agricultural policy and social/economical policy (employment)

## PHOTOVOLTAIC POWER AND ENERGY STORAGE

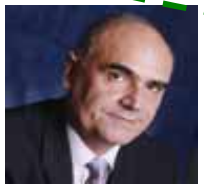
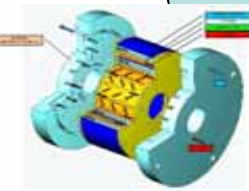
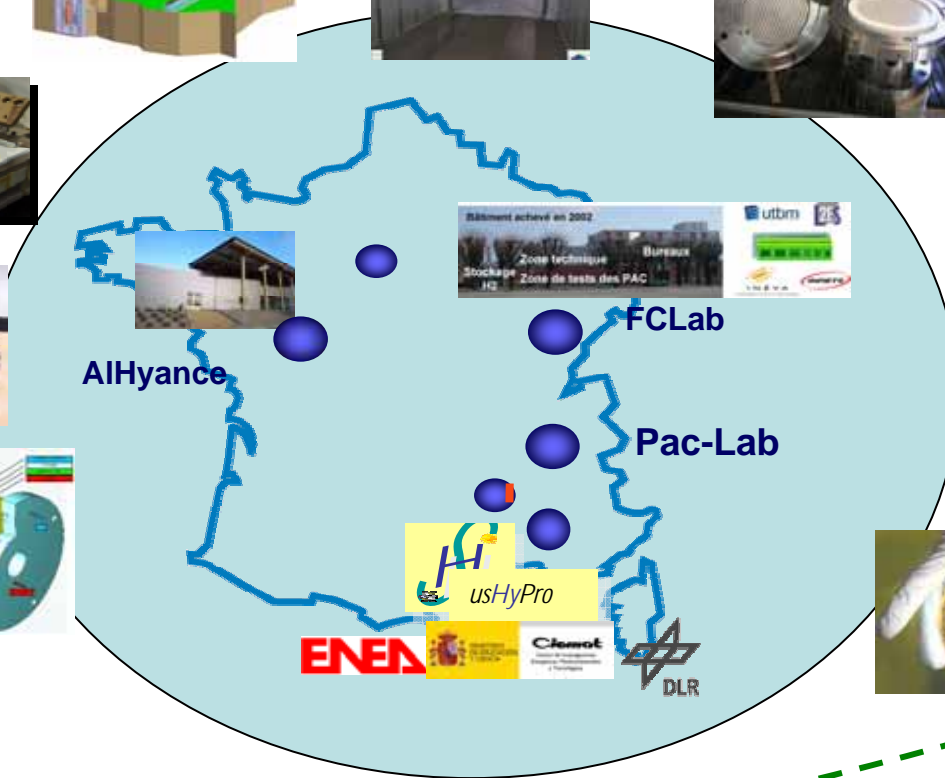
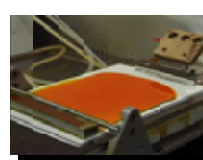
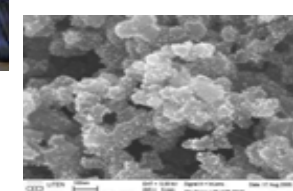


- Cost
- Efficiency
- Storage and system efficiency
- Integration in Building

### Objectives:

- Technology transfer:
  - Creation of employment in France for French PV industry
- French Energy policy(Building)
  - CO2 emission&oil dependency

Hydrogen and Fuel cells at CEA: Staff: 200 people plus+40 PhD/post doc



Représentative FRANCE



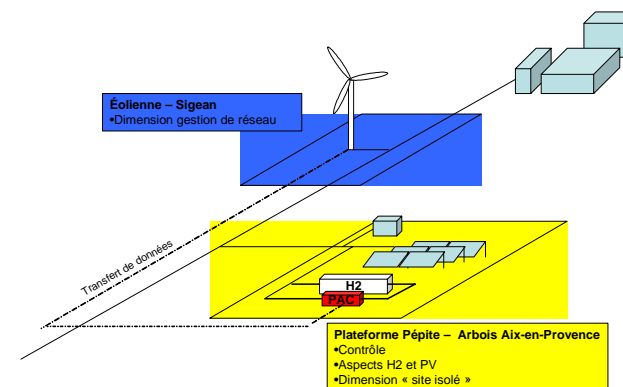
**Task 18 of HIA**

Alain Bugat Vice President HFP  
Research representative  
Leader Research grouping

# MYRTHE Project in Corsica



- Installation of 6 MW PV plant
- Experimental platform to test hydrogen technologies and PV
  - 600 kW power from PV
- Project start 2008 up to 2012
- Partnership with HELION, Université of Corsica
- CEA team involved in :
  - developing tool for design
  - development of technologies
  - Technical economics analysis



*Institut de Technico-Economie  
des Systèmes Energétiques*

*Institute for Techno-Economic analysis  
of Energy Systems*

*I-tésé*



## I-Tésé Objectives,

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- **Coherency of CEA communication, both internal and external :**
  - develop and qualify multi-criterion comparison methods for **energetic systems**, from primary sources to final needs
  - federate, from internal and external sources, energetic systems techno-economic **databases**, perform costs assessment in order to enable pertinent evaluations and comparisons,
  - enlighten correlated issues, for insiders and outsiders, and show **visible and coherent interface** for CEA vision in this domain.
- **Help to decision making:**
  - **Clarify current state of affairs and enlighten forthcoming perspectives** in order to provide decision makers with enabling elements for identification of technological breakthroughs, with respect to techno-economic issues,
  - ensure **pertinence of choices** relating to energy strategies (choice of models, partnerships, importance of allotted resources).

**Evaluation criteria : techno-economics**  
(costs using current technologies, possible costs reduction)

**Environment preservation and sustainable development :**  
green house effect, wastes, risks, availability of mineral resources, geopolitics and national self sufficiency ...

**Actor's play (market reality and financing availability, posturing and driving issues for industrial players, social acceptance, employment, public bodies actions with respect to regulation, taxes, grants,...)**

**Introductory dynamics**

