

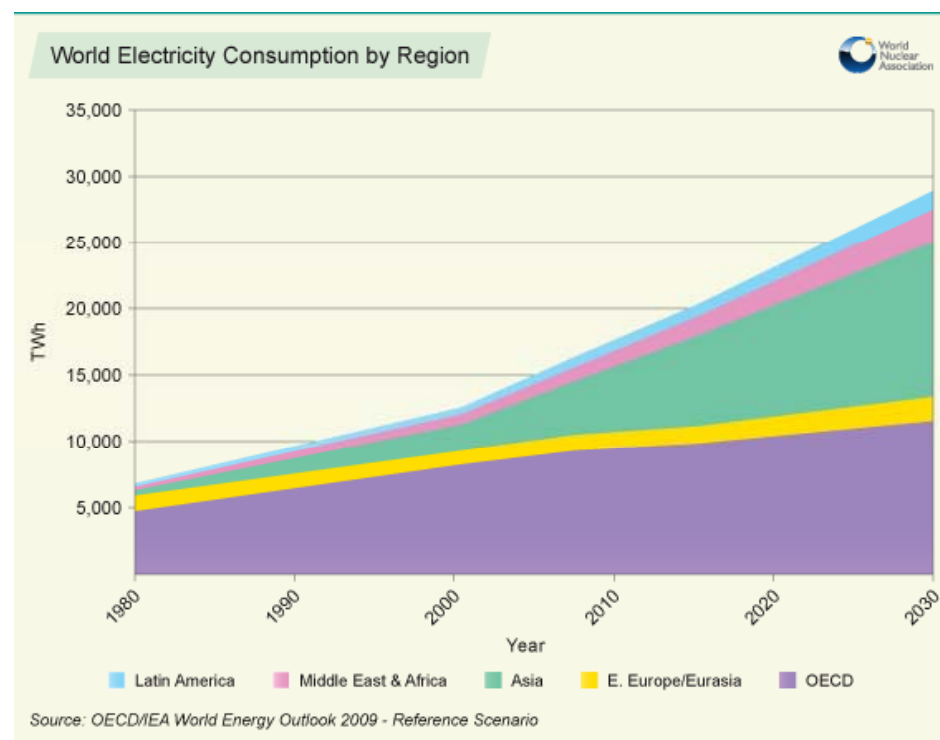
The Nuclear energy : a French perspective

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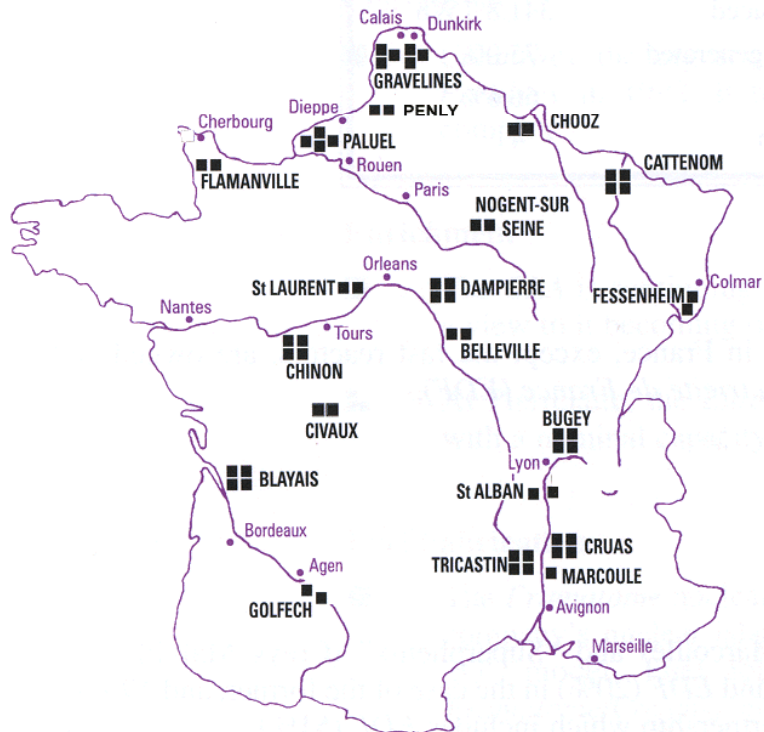


Global Nuclear Perspective

- There are now over 440 commercial nuclear power reactors operating in 30 countries, with 377,000 MWe of total capacity.
- They provide about 14% of the world's electricity as continuous, reliable base-load power, and their efficiency is increasing.
- 56 countries operate a total of about 250 research reactors and a further 180 nuclear reactors power some 140 ships and submarines.
- France is the world's largest net exporter of electricity due to its very low cost of generation, and gains over EUR 3 billion per year from this.



French nuclear policy

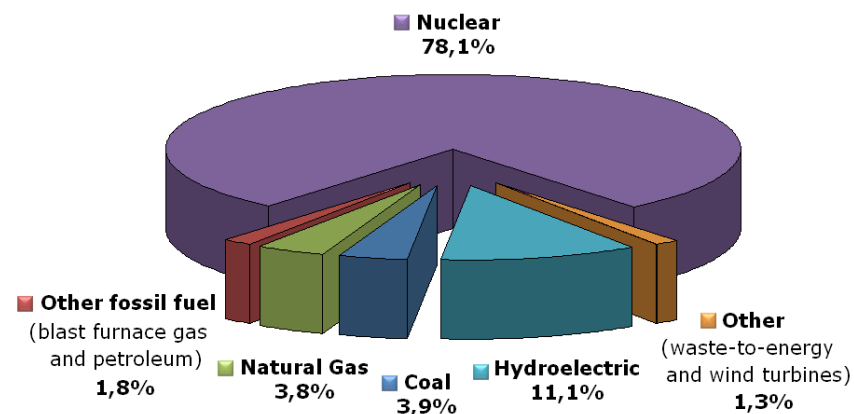


- Today, 58 nuclear reactors are in operation in France on 19 sites (= 63200 MWe).
- This long standing decision to rely on nuclear energy for the supply of carbon free electricity (80% of electricity produced comes from nuclear energy) has some “French specifics”
- The nuclear reactors in France are all standardized (PWR only – originally Westinghouse – then customized).

French Nuclear Policy

Statistics

- There is only one operator for all the French NPPs : EDF (State owned).
- EDF operates on a mostly regulated market (in 2010 93% of consumption sites (all categories, private persons and industry) were relying on regulated tariffs / representing 66% of the global electricity consumption in France).
- Therefore, nuclear energy stays an important tool in our energy policy (though the French government has also decided to diversify its energy mix) and, following President Sarkozy's decision in 2007, an EPR (3rd generation of reactors) is being built in Flamanville (Normandy). To prepare for the replacement of the construction of NPPs.





Safety is a priority in the French Nuclear Perspectives

• **Autorité de sûreté nucléaire (ASN)**, National and public agency. ASN is the central organization in charge of safety, control of current installations and plants, governance for the entire industry and public information. CRIIRAD, its equivalent but private and independent from public authorities and other actors of the nuclear industry.

• People do not realize the harm they are being done by the increasing pollution present in our atmosphere.

Fossil fuel plants are responsible for more than **700,000 cases of pulmonary diseases** and premature deaths, per year and more than **5,000,000 lost work days**.

The rate of deaths from energy production accidents is only 0.73% for Nuclear energy, in comparison 9.37% for Oil, 12% for Coal.

France's policy in the framework of the European Union

In the EU, every member State is free to choose to rely on nuclear energy, or not.

•**Firstly**, the EU has set up goals to combat climate change.

Greenhouse gas emissions should be reduced 20%, by 2020 (at 1990 levels).

Renewable energies should account for 20% in the final energy use, by 2020.

Total energy use should be reduced 20 % by 2020.

In France, nuclear energy will help to reach these goals and stay competitive.



•**Secondly**, The EU has set two legal frameworks (“directives”) for the use of nuclear energy:

In 2009 a directive establishing a community framework for the nuclear safety of nuclear installations.

In 2011 a directive establishing a community framework for the responsible and safe management of spent fuel and radioactive waste.

France's policy in the framework of the European Union continued...



France wanted to go even further!!!!

- It raised France's renewable energy objective to 23% of our total consumption, but in a context in which nuclear energy maintains its role.

- This September, the European Commission also issued a communication on security of energy supply and international cooperation : "The EU energy policy : engaging with partners beyond our borders." This communication intends to promote the highest safety, security and environmental standards globally. It also advocates for legally binding safety standards worldwide.
- Therefore, the French nuclear policy is not self-standing. It takes place in the framework of some elements of a broader EU policy.

Nuclear Waste in France and the EU



- On average, the EU creates about 40,000 cubic meters of radioactive waste per year. Eighty percent of that is short-lived low-level radioactive waste. France and the United Kingdom are currently the only EU countries that reprocess waste .
- However, the reprocessing of spent fuel in the UK is being phased out but is expected to continue in France. The countries that currently use this reprocessed fuel (MOX) include Germany, Belgium, France and Switzerland.
- Reprocessing spent fuel significantly decreases the amount and it produces the by-product plutonium. Although plutonium is regularly related to nuclear weapons, the reactor-grade plutonium created from these reprocessing facilities has too much of the isotope Pu-240, making them inefficient for nuclear weapon use.
- **In France, 84% of the total volume of nuclear waste is treated and disposed on an industrial basis by Andra**, the State-owned agency for radioactive waste management.
- Commissariat à l'énergie atomique et aux énergies alternatives (CEA), The remainder, 16%, has been dealt with since 1992 through an important and comprehensive three-way research programme managed by CEA in its final waste containment systems.





France mastered the nuclear process

Nuclear production activities are organized into five Business Groups:

- **Mines** groups the uranium mines exploration and operation activities.
- **The Front End** converts and enriches the uranium and designs the fuel for the nuclear reactors.
- **Reactors and Services** groups the activities of design and construction of nuclear reactors and propulsion and research reactors, and the activities of maintenance of the nuclear power plants.
- **The Back End** recycles the used fuel and provides transport, clean-up and dismantling services.
- **Renewable Energy** develops wind energy, bio energy, solar power and hydrogen power solutions.

The French policy after Fukushima



The French nuclear energy experience, though built on very specific features, is implemented in an internationally cooperative approach, in order to ensure the development of “responsible nuclear energy” worldwide.

- **President Sarkozy took major initiatives to enhance nuclear safety worldwide.**

At the French level, reviews of all installations are being conducted, taking into account first lessons learnt after Fukushima (earthquakes, loss of coolants, ...). A first report is expected September 15th.

- **At the European level** stress tests off all European installations have also been decided. First conclusions are expected by the end of the year. Implementation of the stress tests will rely on the different national safety authorities (there is no European centralized authority). The European Council also decided to promote the highest safety levels in Europe and in the world.

- **At G 8 level:** Deauville Summit declaration also referred to the promotion of the “highest levels of nuclear safety”.

Nuclear Energy for the Future

France's position about nuclear energy is shared internationally.

Mohamed El Baradei, the former director of the IAEA (International Atomic Energy Agency) and Nobel Peace Prize Winner in 2005 said :

" We can't live without nuclear energy which already provides 14% of global power, and it will be 24% in 2050. One and an half billion people have no access to power. And without power, there is no development ".





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