

## Possible Future Nuclear Generation Technologies at EDF

**J.M. Delbecq**    **Electricité de France R&D Division Paris France**  
**J.L. Rouyer**    **Electricité de France Energy Branch Paris France**

### Abstract

This paper considers the possible future nuclear generation technologies that EDF may utilize in a more or less far future.

They are analyzed with regard to their potential, the stakes for EDF and its strategy for nuclear energy.

The paper begins by a description of EDF nuclear fleet today, which is at 95% nuclear and hydro. Nuclear dominates, with 58 standardized PWRs, which has produced in 2003 420.7 TWh, for a total electricity production of 490.9 TWh.

Then, some worldwide prospective on energy and nuclear energy shows that nuclear technology will be needed in the future. Nuclear energy is a credible candidate in the 2050 energy mix, together with energy efficiency, renewables energy sources and clean coal.

Electricity demand will be large and hydrogen may emerge on new markets.

Should nuclear energy grow by a factor 5, sustainable nuclear energy is needed, based on breeder reactors of fourth generation.

EDF technical needs are industrially power reactor models and industrial reliability of fuel cycle.

EDF strategy is to keep the nuclear option open by:

- Maintaining on short and mid term a high level of safety and overall competitiveness (fuel performances in particular)
- Long term operation of existing NPPs (studies up to 50/60 years), periodic safety reassessment, experience feedback, backfitting
- Renewal of the nuclear fleet : first with advanced LWR (Generation 3): EPR (FOAK in 2012 before possible generalisation around 2015) and later when needed (2040/2050?), with Generation 4 systems
- Waste management optimization (2006)

Gen IV selected systems are Sodium Fast Reactor (SFR), Lead Fast Reactor (LFR), Very High Temperature Reactor (VHTR), Gas Fast Reactor (GFR), Super Critical Water Reactor (SCWR) and Molten Salt Reactor (MSR). Each system has R&D challenges ahead.