

Nuclear Power is a Very Good Solution for the Climate

Should France Do Without It, Considering it an Energy of the Past?

The peremptory assertion that nuclear power is an "energy of the past" is at best an ill-informed and at worst a malicious interpretation of the history of nuclear power worldwide, and particularly in France.

It could lock us into two formidable traps: on the one hand, the suspension sine die of R&D on fast neutron reactors, which are essential for sustainable nuclear power and thus for sustainable energy, and on the other hand, the loss of attractiveness of the discipline for young talent.

Experts characterize the current development of nuclear power with four phases (or generations) that mark a constant progression towards the satisfaction of increasingly demanding energy needs, the latest being a sustainable, dispatchable and massive low-carbon energy supply (electricity, heat, even hydrogen).

The first generation is largely unknown to the general public, it was that of pioneering tests, of all-out research. The second generation was that of choosing among many concepts, based on criteria of technical feasibility, uranium availability, and overall cost. Safety, with learning from mistakes, improved constantly as the various industrial systems were perfected.

The best reactors from this selection provide us today with safe and competitive electricity as well as some heat. A major collateral benefit is that this energy is both dispatchable and largely carbon free.

The third generation, at the initial production stage, has been designed with a view to reinforced safety, as well as the possibility of producing and recovering the plutonium necessary for the next generation. This is the time of maturity, both in industrial and safety terms. It is the time of the EPRs, already in operation in China and Finland.

The fourth generation of nuclear reactors, which is in the works, is the one that will lead to sustainability and thus to the complete maturity of the nuclear power industry. It goes beyond the partial recycling of fissile and fertile materials that is already possible in generations II and III. It is that of a nuclear industry that is safe, reliable, dispatchable, resource-efficient and clean, both in terms of carbon emissions and ultimate waste.

The politically motivated shutdown of the French industrial prototype Superphénix in 1997, followed by the abandonment of the Astrid research prototype in 2019, have seriously delayed progress towards the sustainable maturity of French nuclear power. However, these unfortunate domestic episodes have little effect on global research on fast neutron reactors (FNR), which features production pilots (Russia), prototypes (China, Russia), acquired experience (Japan, France) or

projects (India, Russia, USA). Competition will be fierce to master the only nuclear power generation that offers sustainability through extensive radioactive material multi-recycling.

At a time when nuclear power is more than ever the key to mitigating climate change and dealing with present and future energy crises, the narrow and distorted view of nuclear power as "without a future" is a real handicap in a scientific, technological and industrial field where France can still remain at the forefront.

Aware of the time wasted and the harm already done, but convinced that nuclear power is an essential component of a sustainable energy mix, "Save the Climate" is convinced that the only strategy for France is to now launch without delay a concerted research and industry development program, along two lines:

- on one hand, a concerted build of several dozen EPRs to renew the existing fleet and be able to satisfy the electricity demand which will at least double by the end of the century;
- on the other hand, a large scale R&D program led by scientists with recognized expertise whose mission will be to develop as rapidly as possible a prototype FNR that meets the 4th generation safety requirements. This fast neutron prototype will be developed along with a fuel reprocessing-fabrication demonstration unit, allowing France to achieve as soon as possible the necessary transition of its PWR and EPR fleet to sustainable nuclear power.

This news brief relies on an in-depth analysis of the above issues. The full text of Claire Kerboul (in English) by following this link : [Nuclear Power: The Low-Carbon Energy of the Future](#)

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