



# BULLETIN

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## Future of Nuclear Power in France

**Bartosz Wiśniewski**

*The coming months will witness confirmation of the declarations to diminish the role of nuclear power in France's energy mix. Renewable energy will continue to gain in prominence and new initiatives to boost energy efficiency are to be expected. The dominant position of nuclear power is not in question, but the long-term competitiveness of the French nuclear industry will be increasingly dependent on further international expansion. This rationale is driving interest in the Polish nuclear programme, too. Irrespective of the final decision about the supplier of nuclear technology, the extent of the benefits that could possibly go to the Polish entities involved in the programme will depend on an assessment of their expertise as participants in the nuclear supply chain.*

**Debate on the Future of Energy Policy.** Two main premises are guiding the deliberations launched in November 2012 about the future of France's energy policy. First, they were spurred by a declaration that the dependency of the electricity generation sector on nuclear power would be lowered from the current level of 78% to 50% by 2025. The declaration was made by François Hollande during the 2012 presidential campaign and confirmed after Hollande's electoral triumph. Aside from the need to provide new power generation capacities, this shift will necessitate additional investment in the electricity grid that would be better suited to accommodate intermittent energy sources, as well as in interconnectors to cover possible local power deficits. The French grid operator estimated the cost of these investments at €25–30 billion.

The second premise is that new momentum will be given both to the expansion of renewable energy sources as well as to more far-reaching cuts in greenhouse gas (GHG) emissions. In line with France's national action plan for the promotion of renewable energies for the years 2009–2020, the share of renewables in its primary energy structure is expected to climb to 23%. Currently, it stands at 8%, and hydro, wind (predominantly onshore; offshore development began only in 2012) and photovoltaic installations provide about 12% of electricity. The latter ratio is expected to grow along with the expansion of electricity demand. In addition, although nuclear dominates the electricity generation sector, the share of fossil fuels in final energy consumption stands at 70%. France is almost entirely dependent on oil and natural gas imports. Back in September 2012, Hollande declared that France would opt for more ambitious GHG reductions on the EU level—by 40% until 2030, and by 60% until 2040.

The political context of the debate is shaped by an alliance between the Socialists and Europe Ecology—the Greens party. The Greens' support for Hollande during the electoral campaign put their president, Cécile Duflot, at the helm of the Ministry of Territorial Equality and Housing. The ministry will play an instrumental role in the context of increasing energy efficiency. The French government plans to introduce new standards for efficiency in heat and electricity generation, which would apply to one million residential and public utility buildings. After a period of consultations, scheduled to last until July, a special bill will be drafted setting forth specific goals of the French energy and climate policy.

**Impact on the French Nuclear Industry.** The future of the nuclear power sector dominates the debate because of the unprecedented—at least in the French circumstances—declaration to dismantle a nuclear power plant. The facility in Fessenheim, nearing the end of its 40-year operational period (it was commissioned in 1977–1978), will begin to be dismantled in 2016, thus allowing Hollande to use this step in his re-election bid. The shutdown of Fessenheim will be largely symbolic, especially given the fact that it is not being driven by concerns about the safety of French nuclear power plants. France conducted its own stress tests following the Fukushima disaster. The report of the

French nuclear safety authority (Autorité de Sûreté Nucleaire, or ASN) from January 2012 found no grounds to shut down any of the 58 French reactors, provided that the safety procedures would be continuously perfected. The operator of the French nuclear power plants estimated the cost of implementing the recommendations submitted by ASN at €10 billion by 2022. Perhaps crucially, this seems to correspond with the estimated cost of implementing the findings of the European Commission concerning possible enhancements of safety procedures in nuclear power plants across the EU.

What is more, scrapping the two reactors at Fessenheim, with a total installed capacity of 1,800 megawatts, will itself have a fairly limited impact on the overall potential of the French nuclear array. By 2016, France will deploy its first Generation III+ reactor in Flamanville (European Pressurized Reactor, or EPR, with an installed capacity of 1,650 megawatts), with increased efficiency and additional safety features. The EPR's evolutionary design goes back to the first light water reactors developed in France in the 1970s.

At the same time, concern is mounting within the French nuclear industry that Fessenheim could constitute a precedent. By 2020, a total of 22 reactors will be nearing the end of their 40-year operational period. Given the plans to scale back the role of nuclear power in the electricity generation sector, it seems unlikely that the French authorities will be keen on commissioning more EPRs to guarantee that the current level of electricity production from nuclear sources is extended into the future even as older reactor types would be withdrawn from service. Back in 2009, the French government considered the construction of a second EPR, but public consultations on this project were cancelled following Fukushima. The French public is divided over its approach to nuclear power. A majority appreciate the benefits of the relatively cheap electricity supply, but 42% of French society sees more downsides to such a high degree of dependency on nuclear power, as opposed to the 47% that tends to underline the advantages of this situation.

Somewhat paradoxically, the scenario of getting to a 50% share of nuclear power in electricity generation need not undercut the position of the operator of nuclear power plants. These facilities will continue to provide baseline capacity, but thanks to the expansion of renewables they will no longer be used to satisfy demand at its peak. Instead, this function will be performed by the renewable energy sources, which are more suitable to balancing the electricity transmission system. As for the operator of nuclear power plants, such a shift would allow a more efficient approach to their management. In particular, the period between subsequent reactor refuelings could be extended, thus eliminating some of the costs associated with operations.

Scant prospects for new reactor orders in France, at least in the mid-term perspective, present the nuclear technology suppliers with a challenge. On the one hand, despite its relative visibility, reactor sales are a fairly small segment of their activities. French companies are active in every part of the nuclear fuel cycle, from uranium mining to spent fuel reprocessing, thus contributing to France's standing on the international nuclear market. Sticking to a closed nuclear fuel cycle, especially to expensive reprocessing, is grounded in plans to use some of the stockpiled plutonium to manufacture mixed-oxide fuel for Generation IV reactors. One of the benefits associated with this type of reactor is that they can utilise spent fuel, thus solving some of the problems with nuclear waste.

On the other hand, Generation IV reactors will not be introduced into commercial operation earlier than 2030. Meanwhile, as borne out by the delays in the construction work in Flamanville and the Finnish facility in Olkiluoto, enterprises as complex as these require maintaining the continuity of management procedures, including contacts with national nuclear safety authorities, as well as skilful handling of the nuclear supply chain (steel industry, heavy machinery manufacturers, engineering services). A gap in the procurement of new nuclear power plants in France led to atrophy of these capabilities and was not redeemed until the number of orders for new reactors had grown. Compared with the projects in Flamanville and Olkiluoto, the nuclear power plants being built by French companies in China are benefitting from the so called fleet effect: time needed for engineering and construction activities was shortened, and the nuclear supply chain has been built around contractors with previous positive track records in France and Finland. The French companies are likely to rely upon these assets during ongoing projects in China, the UK or U.S., or to solidify them via engagement in existing or planned enterprises in Finland, the Netherlands, Poland or Saudi Arabia.

**Conclusions for Poland.** France will remain the principal European advocate of civilian nuclear power and a valuable partner in terms of further perfecting nuclear safety standards, especially for a country such as Poland, readying to launch its own nuclear programme. On the EU front, France will continue to champion member states' autonomy in this sphere.

Expectations about the cumulative socio-economic impact, e.g., job creation, inflow of investment, or new opportunities for international expansion for domestic companies involved in the Polish civil nuclear programme will likely turn out to be a major criterion for choosing the supplier of nuclear technology and the strategic partner during the construction of the first Polish nuclear power plant. At present, any declarations made by potential bidders about the scope of involvement of Polish companies will necessarily be notional. It will be up to Polish entities to build up the necessary staff potential and implement adequate quality management systems, and thus to fulfil the requirements needed to enter the nuclear supply chain. Companies ready to undergo such adjustments should be aided by the relevant government authorities via targeted training schemes on international norms and standards, or encouraged to seek opportunities for building specialised supplier clusters.