



EDF AND THE FRENCH NUCLEAR FLEET: A SYSTEMIC RISK FOR THE EUROPEAN UNION

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Introduction

Over the past few years, *Electricité de France* (EDF) and the French government - its main shareholder, pursued a suicidal strategy for the future of the public company. These strategic errors, including a wrong management of the existing nuclear fleet and terrible economic development prospects of the group, reached their climax in the recent weeks, so high that the whole of Europe is wondering: How a possible bankruptcy of EDF would impact our nuclear safety and influence the winds of change blowing through the European electricity market in France and in neighbouring countries (Germany, Belgium, Luxembourg, Switzerland)?

1. The European energy companies in the eye of a storm

In the early 2000s, EDF (but also its European counterparts) made a major mistake by ignoring the electricity market's shifts, undervaluing the emerging trend towards decentralisation and more renewable energy.

The energy transition in Europe is the result of the 2008 energy and climate package. The gains of 20% energy efficiency by 2020 must imply a drop in energy demand and a stabilization of electricity demand. At the same time, renewables are expanding from 10% to 20% of the energy mix over the same period (and from 15% to 35% of the electricity mix). This political development has been a strong signal to energy players. However, the majority of energy oligopolies have underestimated this signal and are very slow in investing in new segments such as renewable energy and energy efficiency. Quite the contrary, they continue investing in fossil fuels and nuclear energy and show no intent to phase-out old inflexible power plants, despite the huge overcapacity. Oligopolies are also pushing European policymakers not to correct the ETS gauging mistakes which resulted in massive over-allocations. At the same time, nuclear costs have critically increased while the cost of renewable experienced a reverse curve. For example, the EPR at Hinkley Point C in the UK amounts to 118 €/MWh today while onshore wind in this country is estimated around 95 €/ MWh.

EDF has deliberately turned its back to the energy transition, insisting on an "all nuclear" approach. This is incompatible with the energy transition that has been initiated in Europe by other actors, both in Germany

(where about 50% of capacity production of electricity from renewable energy sources are made by the citizens individually or grouped in cooperatives) and in France:

- Cities such as Paris which are pushing for a 100% renewable development;
- Progressive companies, such as *La Poste* which became the first French company to join the 100% renewable movement "RE 100" and institutional investors who turn their backs to fossil fuels and nuclear energy to avoid financial risks and are heavily investing in renewable energy;
- Citizens' cooperatives such as *Energie Partagée* and *Enercoop*.

EDF is certainly not the only energy company to neglect new markets such as renewables and energy services. While in 2012, renewables represented only 8% of the EDF portfolio, it accounted for 5.5% for RWE, 6% for CEZ, E.ON 12%. But unlike EDF, some of its counterparts have been able to react on time. E.ON has split into two subsidiaries to separate growth-oriented sectors like renewables, smart grids and energy efficiency in a viable and sustainable entity on one hand, fossil assets in a business unit (Uniper) in charge of managing the end of life of these units on the other hand. RWE is doing the same while DONG, ENEL, ENGIE announced a planned phasing-out of coal, although these intentions are still to be followed by deeds. Conversely, the first European electrician persists in the all-nuclear strategy in France: as a matter of fact only 15% of the activities of *EDF Energies Nouvelles* are located in France!

2. The impossible financial equation of EDF

This blindness has led EDF to a dead end, a scenario which sadly recalls Areva story, the former nuclear giant to the brink of bankruptcy. In addition to the 37 billion euros of existing debt, EDF is also facing massive additional investment to come in the close future. This massive new investments are so high that the Chief Financial Officer (CFO) of the company, Thomas Picquemal, slammed the door of the group in March 2016. Interviewed by the French National Assembly in May, he confided his "*despair*" concerning these risky policy decisions.

- Hinkley Point C: The investment is estimated around 24 billion euros. While internal voices within EDF and within the British government doubt more and more openly the merits of the project, François Hollande and Emmanuel Macron do not want to lose face and are pushing EDF in the wrong direction,. This decision is even more incomprehensible that there is no export market for the EPR given the fiasco in Olkiluoto and Flamanville construction sites. The development of a new "light" version of the EPR is at little progress and will take several years to emerge, if ever it does. It is time to realize that Europe is not on the verge of a nuclear renaissance as expected and will never be.
- The costs of nuclear decommissioning of the existing fleet are deliberately and systematically underestimated by EDF (300 million euros on average per reactor) while a recent document of the European Commission (PINC) figures the needs of about 1.3 billion euros per reactor in other European countries. Decommissioning is therefore expected worth at least 75 billion euros for EDF, but only 18 billion are being set aside so far.

- The Court of Auditors estimated the cost of the LTO (long-term operation, i.e. life-time extension) of the existing fleet to about 100 billion euros to be spent in a relatively short period, if EDF continues to consider operating its existing nuclear fleet for a longer period.
- The purchase of a part of AREVA is valued at about 2.5 billion euros. To this sum, one should add the inherited debt from the failure of the construction of the EPR of Olikuoto, Finland.

It is thus a huge investment of at least 200 billion € that EDF is facing in the near future. These figures illustrate the impossible financial equation of the company!

3. The EDF debt: a safety problem for Europe

It is illusionary to imagine that a recapitalization by the French government of 3 billion € as announced by François Hollande (if ever it is authorized by the European Commission), will be enough to bridge this gap. Even the most questionable accounting tricks (such as the inclusion of the distribution network managed by ERDF in the accounts despite the fact that local authorities are actually the owners of the grid) fail to hide the seriousness of the situation.

In addition, the wholesale electricity price risks to remain at very low level, and significantly lower than the 42€ set by the state as regulated access prices to historical nuclear energy (ARENH). The introduction of a carbon floor price, proposed by Ségolène Royal and François Hollande, would drive up electricity prices in Europe and the sales revenue of EDF. However, it is unlikely to be established in the short or medium term because of the chosen policy strategy to link it to the ETS revision and the reluctance of many Member states.

Other measures in force or foreseen are nothing but a bandage on a wooden leg. The capacity mechanism developed by RTE and the regulator will generate at best just a few million euros for EDF. Furthermore, it is under investigation of the Directorate General for Competition of the European Commission.

An indebted company on the verge of bankruptcy has much higher chances not to be able to ensure the safe operation of its nuclear fleet. The recent months have already shown major dysfunctions:

- A nuclear reactor of Paluel, the showcase of LTO, will not be restarted before at least one year due to damage caused by the fall of a steam generator on 1 April 2016;
- Recurrent leakages of tritium from the nuclear plant of Bugey have still not been explained;
- The investigation of the incident of Fessenheim in 2014 is relatively vague and a German counter inquiry illustrates the gravity of the situation;
- Diesel generators of nuclear power stations are in a terrible shape and EDF prefers threatening the Journal of Energy who revealed the information rather than to improving the situation;
- The top and the bottom of the new vessel in the EPR of Flamanville pose major problems and starting the power plant cannot take place under these conditions
- Shortcomings have been identified in Le Creusot factory that is manufacturing key nuclear components including some expected to be installed in Hinkley Point C.

These repeated failures are particularly worrying in light of the recent statement by Pierre-Franck Chevet, president of the Nuclear Safety Authority (ASN): *"a major accident such as Chernobyl and Fukushima, cannot be excluded nowhere in the world, including Europe."* Europe finds itself in a vulnerable position

because of the risk that the French power plants are posing to the entire continent. Concerned and increasingly alarmed neighbours, such as the district of Geneva, Luxembourg, the German "Länder" bordering France and lately even the German Federal Minister are on the frontline facing the deteriorating state of the park operated by EDF.

4. A "New EDF" must emerge in Europe

France must admit that Europe has the right to know the truth. It cannot continue in denying the enormous financial problems of EDF and AREVA that could threaten the security of its immediate neighbours. It is urgent to take note of this technical and economic deadlock and launch a regional reflection on the best way to progressively frame and orderly phase-out nuclear power in France:

- Abandon the extension of the entire French nuclear fleet and target only LTO of some few reactors which would accelerate the necessary investments in safety and security and thus also reduce the huge overcapacity on the "Central-West Europe" power market;
- Coordinate a carbon floor price in partnership with Germany and Benelux to correct ETS failure and internalize the real costs of fossil fuels;
- Giving up ruinous investments such as Hinkley Point C to make room for financial manoeuvres;
- Regroup a part of AREVA and EDF in a centre of expertise which would become a world leader in the growing market of nuclear decommissioning,;
- In the spirit of the French law on the energy transition and green growth, the emergence of a "new EDF" towards lucrative and innovative segments such as energy services and renewable energy in France should include:
 - Wind power onshore but also offshore via fixed and floating structures, a sector where France has a recognized expertise (in partnership with GE/Alstom) which should be translated into an ambitious goal for 2025 in partnership with the countries bordering Northern Seas;
 - Solar energy became unavoidable thanks to significantly lower costs of PV panels;
 - Electro-mobility, including the Alsace region to compensate for the closure of the Fessenheim plant;
 - Biogas through anaerobic digestion of organic waste (from agricultural sector and household waste) and the conversion from renewable electricity into gas;
 - Smart Grids supporting investments for the future of RTE and ERDF, while accepting to open the capital of these entities to public banks and/or local authorities.

At the same time, a dialogue must be established between the "old" EDF and the government in order to find a solution to decommissioning and nuclear waste management following the model of the Agreement between utilities and the German government obtained in April 2016: the committee chaired by Jürgen Trittin helped bringing transparency and predictability on the real costs of nuclear power. The final deal is that utilities will not only cover the full costs of decommissioning but also fund a state up to 23 billion euros to cover future liabilities for waste management, topped-up by public resources.

Such strategic thinking is the only way out of EDF's industrial and economic deadlock that would reassure European partners currently under the threat of seeing EDF unable to ensure the safe operation of its nuclear fleet.

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