

Nuclear revival: a societal choice that involves us all

An article by Claude Fischer Herzog following Emmanuel Macron's statements in Belfort



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France is going to revive its nuclear industry. With six EPRs scheduled for construction by 2035 and 14 by 2050, and the extension of the life of existing plants, it is taking up the torch for nuclear energy and sending a very strong message to Europe and the rest of the world. France is a force to be reckoned with. It's a big decision with major implications both at home and abroad.

Some are questioning whether we can pull it off. Too many bad decisions have been taken, which have dragged the industry down. But EDF has said time and again that it's ready! And if the president has been able to announce the construction of new reactors, it is thanks to EDF and other companies in the sector that have managed to maintain the fleet and build a third-generation EPR – whether their detractors like it or not. This EPR is currently proving its worth in China and Finland and will be the first of several in France, which, as a result, will remain at the forefront of nuclear development in Europe and worldwide.

A choice for the future

It is a choice that involves us all, not just the nuclear industry – a choice for the future. As we enter a new electric era, nuclear energy will be our ally in building a low-carbon economy and transitioning seamlessly to new lifestyles and production methods. It is a public good that has played a key role during the pandemic and the economic crisis, offsetting shortfalls in wind and solar supply and keeping tariffs down when gas prices were soaring... The European

Commission has acknowledged that it will be impossible to achieve our carbon reduction targets without nuclear energy, and that it has a valuable role to play in the energy mix alongside renewables. Its decision to include it in the taxonomy provides a very strong incentive for its development. The goal now is to develop a new regulatory framework and build a new mixed economy, in which the public and private sectors will have to work together in the general interest.

Overcoming the obstacles

“It’s the start of a new chapter”, says Jean-Bernard Lévy with delight, and to make sure it is successful, we will have to overcome the obstacles that successive governments and the European Commission have been placing on the path to nuclear revival for far too many years. Allow me to list three such obstacles: French legislation itself, which has curbed nuclear development; the European electricity market, which discourages investment and works against power production companies; and the state management of EDF, which has deprived it of all control over its management and forced it to prioritise its competitors over the general interest. So there are three battles to fight at the same time, and we must all get involved.

1. Revising the multi-annual energy plan

The plan will be reviewed in 2023. It is crucial that we come up with a plan to move away from governance by numbers and develop a more coherent strategic approach to energy policy. When the president tells us that our priority is to reduce energy consumption by 40% in order to cut our greenhouse gas emissions by 55% by 2030 (100% by 2050), he needs to explain how he intends to restore growth and reindustrialise our country. By cutting the consumption of energy or producing it differently? It’s not the same thing. Reducing our greenhouse gas emissions will mean drastically decreasing the share of fossil fuels in the energy mix (which currently stands at 67%) and substantially increasing the share of low-carbon electricity. The proposal to increase electricity’s share by 60% by 2050, bringing it to 53% of overall final energy consumption (1,800 TWh in 2019), doesn’t add up. Finding the means to achieve that goal will also be a challenge.

Nuclear and renewables: we have to strike a balance!

“Standing on two feet”, with nuclear accounting for 40% (vs. 70 today) and renewables for 60% (vs. 24 today, including hydropower) does not guarantee an even balance! Renewables are not equivalent to nuclear, and some renewable energy sources are more reliable than others. Wind and solar power are intermittent (unlike thermal renewables and hydropower). Subordinating our electricity market to variations in the weather is costing a lot of money and is very inefficient: in the past 10 years, we have spent 150 billion to replace 2.5% of low-carbon nuclear electricity¹. French people are dubious. They don’t want any more wind turbines in their gardens. Fair enough, says the president, we’ll build them in the sea! 50 wind farms to produce 40 GW by 2050, in addition to 100 GW of solar power and 37 GW of onshore wind power. These figures fail to take into account the pernicious effects that an excess of intermittent renewables will have on France’s electricity system and grid.

Why stifle the nuclear industry?

It provides a controllable base to offset power fluctuations when renewable sources fail. A relative drop in production would mean relying on gas (or coal) to keep the grid running, both of which emit greenhouse gases and other air pollutants. But above all, it is a public good, and it provides a continuous, safe, plentiful and affordable power supply to all, households and businesses alike. It should be protected and developed! Reason seems to be prevailing in France, with a proposal having been made to renew our nuclear fleet (the second most powerful in the world after the United States!). However, the targets should be flexible. The president has proposed to build six EPRs, or 14 by 2050. The Court of Audit has suggested that 30 are needed to maintain production levels. Nuclear is an industry of the future. Its revival is crucial to the survival of a sector of excellence, which we have been working on for two years now, our key objectives being standardisation to reduce costs and the creation of a post-secondary trade school focused on training and new jobs. In addition, France has a considerable advantage in the waste sector, with their recycling into MOX which will supply future reactors (EPR2 and later those of generation 4), and with

¹ Renewables require an installed capacity that far exceeds power demand and a controllable base able to supplement that capacity where necessary. At the moment, they enjoy grid priority and a guaranteed purchasing price, the difference between that and the market price being paid by the taxpayer (7 billion per year). In short, they are beyond competition and the exemptions made for them are having many damaging effects on the markets. They are partly responsible for spot price volatility and the sharp hike in gas demand and prices.

the geological storage of the most radioactive (vitrified HA waste) for which CIGEO has obtained recognition of public utility. We must make a start, set the ball rolling, and keep our options open as far as our objectives are concerned.

Meeting plant productivity challenges

The proposal to scrap plans to shut down 12 reactors (after Fessenheim) and to extend their life – and that of 44 others – to over 50 or even 60 years depending on how safe they are, is also a sensible one, not just in terms of meeting demand but also protecting the climate and giving EDF and the industry time to build the new fleet of EPRs. But two challenges must be addressed: the productivity of the fleet, which never operates at full capacity² because it is hampered by mandatory ten-year inspections and the need to adjust to variations in renewable energy production; and the economic equilibrium of the plants, which have very high production costs due to the way in which electricity prices are regulated in France. There's the rub, and it goes some way to explaining EDF's 40 billion debt.

2. Reforming the electricity market: driving the debate forward

When it agreed to open up its domestic market to competition, France also agreed to base the market price of electricity on the cost of the final kWh required to meet demand, starting with renewables, which have priority on the grid, followed by nuclear, coal and gas. Wholesale prices are constantly fluctuating, and France's nuclear industry is being asked to pay up! France has tried to negotiate a mechanism allowing regulated access to historic nuclear electricity (ARENH), but EDF is having to sell some of its production cheaply, below what it actually costs. With average electricity costs in Europe standing at €220, the government – which has chosen (and always will choose) to “control household bills” – has prevented EDF from increasing its regulatory tariffs and forced it to sell larger quantities of cut-price electricity to its competitors. This has knocked 8 billion off its revenues according to EDF's CEO, further weakening its investment power. Should this mechanism be abolished? Reformed? Should

² France's nuclear fleet is much less productive than the American fleet: production per installed gigawatt was 30% higher in the USA in 2019, with almost 8 TWh per GW of capacity in the USA compared to 6 in France. In 2020, when the pandemic was in full swing, the USA even produced 45% more per GW than France. See Véronique Le Billon in Les Echos, 9 November 2021.

EDF's status be changed? The debate is on, and the president, who has failed to address the subject, must answer the questions being asked.

Towards new regulations

The president – who is also the president of the European Union – must drive forward the debate on electricity market reform. The competition rules are unsuited to the specific challenges of the nuclear industry, which requires very substantial investment with deferred returns: yet there is no shortage of projects! They are worth over €500 billion according to the Commission itself. The Member States need cooperation and new regulations offering public guarantees with respect to tariffs, without which they will not be able to make long-term investments. They must be able to attract institutional and private investors with financial arrangements that guarantee profitability.

Winning the taxonomy battle

Thanks to the taxonomy, private investors will be able to include their investments in their balance sheet with European “sustainable finance” labels. They are ready to take that step. After an epic three-year battle, France and other nuclear states must now take the fight to the European Parliament, which is yet to deliberate.

3. Giving EDF control of its management

The company must find 50 billion for the six EPRs. The president has promised tens of billions of state aid. But the state is in debt, and with another financial crisis looming due to the probably sustained rise in inflation – which means that interest rates are likely to go up – it will have to seek funding from “patient” investors. Will it be able to mobilise savings through a government borrowing scheme? Which financial arrangements will appeal the most?

Will EDF and the government open up projects to the private sector? That would be contrary to our culture... The so-called “regulated asset base” model (RAB), which is already used for large infrastructure projects with substantial fixed costs, is attracting interest: under this mechanism, funding from investors is reviewed periodically by an independent regulator, which analyses actual expenditure against forecast expenditure and guarantees the contract over the

long term. These costs are then recouped from customers, which provides for a return on investment.

Given the current state of the market and EDF's status, the projects will have to meet the requirements of the European Commission's Directorate-General for Competition, which ensures that financial arrangements comply with competition rules. Could EDF circumvent these rules?

Obtaining SGEI status

Penalised by the European competition rules and by French legislation, and weakened by its controlling shareholder, it needs to regain control of its management. I'm not sure that "renationalisation" is the solution. Or that it should be treated like "any other company" in the market. Neither nationalisation nor privatisation! A third type of company should be invented, whose capital and management committee are open to all stakeholders including local authorities, and whose public and private shareholders and lenders are interested in projects of general interest. Nuclear energy is not just another commodity. It is a public service. If it were recognised as an SGEI (Service of General Economic Interest), as defined in the Lisbon Treaty following the Herzog report (2004) and the Mario Monti initiative (2007), EDF – which must fulfil its public service obligations in France and perform its public interest role in Europe – would no longer be subject to the competition rules in force in the European market. Thus, it could develop and at the same time continue to pursue its business objectives in Europe and worldwide, as there is no doubt that nuclear revival in France will change our country's position in the resurgent global market³.

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³ These questions will be on the agenda of the seminar on March 3, 2022, organized by ASCPE with GIFEN, the French nuclear industry union, CLEEE, representing large electricity consumers in industry and the tertiary sector, the FNTP, the federation of public works and civil engineering companies, and X-Sursaut, engineers from the Ecole Polytechnique, with the participation of the European Commission.