

THE DEEP TECH EXPERT

by

OMNES



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questions for **Bernard Salha**

Chief Technical Officer at EDF



What are the major issues concerning our electrical energy needs? What are the different technologies to address them?

Our needs for electrical energy will grow because we are in a phase of massive electrification in all sectors: transport with the development of electric mobility, construction through heat pumps and their deployment, industry with the difficulty of supply of fossil of gas, etc.

There are two major technologies for producing zero carbon electricity: renewable energies and nuclear energy, which are highly complementary. In France, we are lucky enough to have already a very strong nuclear dynamic with large power plants. We also believe photovoltaic solar energy should develop mostly everywhere since it raises less social acceptability issues than onshore wind farms. This being said, there are not so much surface left in some countries, especially in Europe, because it is a "small garden". Offshore wind power should also develop strongly, with each plant able to produce several hundred megawatts and run 40% to 50% of the time allowing good production visibility. However, it is a heavy industry and it is to build in the same way as conventional power plants such as dams or thermal power stations.

The question of gas is a bit sensitive since it is mainly related to our flexibility and balance of energy mix. Everything must be done to increase the flexibility of demand. Thus, the use of gas should be limited for peaking generation.

"We are in a phase of massive electrification in all sectors"

How can we meet our short-term electrical energy need?

In the few years to come, the increase in electrical demand will remain gradual. Indeed, in the short term many people do not have the financial needs to invest in an electric car or a heat pump. As for power infrastructure, legal procedures can be very complex, often for good reasons, but we should try to simplify them without underestimating the acceptability and environmental issues. For reference, for the Saint-Nazaire offshore wind farm, it was the construction permit procedure that took the longest, not the construction itself.

Another possible solution is to rely on new technologies using the series effect, something effective in replicating projects more quickly, for both nuclear, offshore wind projects or photovoltaic farms.

"The body of legal procedures is very complex, we should try to simplify it"

Some companies are developing complex software to optimise our energy consumption. Do you think these new technologies are interesting?

It is true that energy demand depends massively on factors such as climate or customer usage, creating a need for consumption flexibility. Flexibility sources might come from different areas such as house thermal inertia in the construction sector, industrial processes optimization, or electric mobility in the transport sector. Nevertheless, it requires a clear vision of electricity variations rates to be in a position to make the best choices. Digital systems could definitely optimize power consumption in an efficient way.

Generation IV and fusion: promises and reality?

Nuclear power in the long term will need to close the uranium cycle. This is what Generation IV technologies are aiming at. But this is not for tomorrow since the need is not quite there yet. However, recently, we are seeing a whole series of start-ups and SMEs that are raising significant funds with strong ideas and technologies. At EDF, we are looking at these initiatives positively, but the technical challenges to overcome are huge.

Fusion is even more complicated than Generation IV technologies, especially from a material point of view. Technological progresses are quite likely, but they will need a lot of money over a long period of time. To help and innovate, we need above everything young people to come work on these exciting industrial subjects.

At EDF, we are actively hiring young engineers right now to grow the nuclear sector, life extension of existing plants and new plants.

- CTO of **EDF** since 2018
- Head of **EDF** R&D for 8 years
- **Head of the Nuclear Engineering Division** of **EDF** for 10 years
- Participated in the start of the **Chinese civil nuclear programme**
- Started his career at **Ministère des Armées**
- **Graduate** of **Ecole Polytechnique** and **Ponts et Chaussées**

Résumé of Bernard Salha

The Deep Tech Expert gives the floor to a significant leader to share their views on the Deep Tech ecosystem