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BY LINDA PENTZ GUNTER
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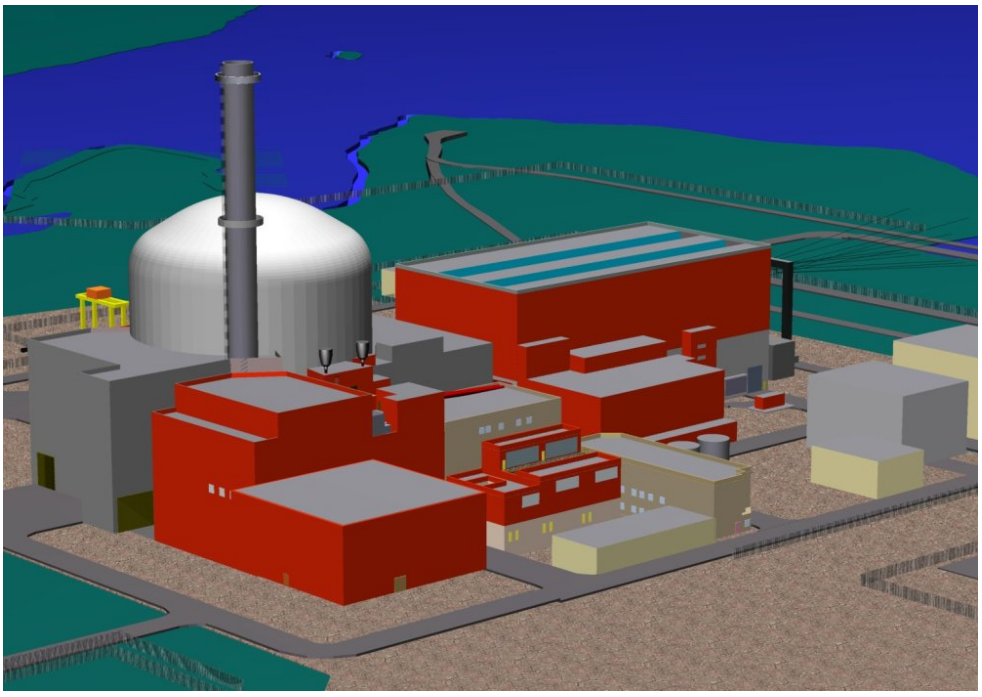
Macron's French Nuclear Farce



(Image: EPR design, Framatome ANP/Wikimedia Commons)

French president, Emmanuel Macron, is still trying to sell the EPR, a reactor that ended up mostly on paper.

I've been searching for the equivalent word in French for 'chutzpah' but so far 'insolence' or 'audace' just doesn't quite cover President Emmanuel Macron's renewed pitch to sell French nuclear technology to the United States.

Nevertheless, that was a central purpose of Macron's state visit to the nation's capital last week. In a mise-en-scène worthy of a Feydeau farce, he even brought a whole atomic entourage with him including representatives from the state regulator (Autorité de sûreté nucléaire) as well as cabinet members and the (bankrupt) French nuclear power industry.

It's chutzpah because the backdrop to Macron's nuclear promotional tour is the most breathtaking pile of wreckage imaginable. Sacre bleu! If you wanted to paint a picture of a complete industrial fiasco, you need only look at today's French nuclear power industry.

And yet, here is Macron still blithely attempting to sell the French "flagship" reactor, the EPR, likely second only to the breeder reactor as the most abject failure in nuclear power plant history. EPR stands for Evolutionary Power Reactor. With it, France has achieved the unimaginable, to send evolution in reverse.

Macron has not abandoned the beloved breeder either, which also managed to reverse the legend of its namesake — Phénix — by descending metaphorically into the ashes of nuclear history. And oulàlà, a similar fate befell the Superphénix, a bigger breeder and an even bigger fiasco that cost $10.5 billion and produced power only sporadically before it was permanently shuttered.

French Green Party politician, Dominique Voynet, called Superphénix "a stupid financial waste," which accurately describes any and all of today's new nuclear power aspirations.

And yet, last February, just before the elections that saw him retain his throne in the presidential palace, Macron announced the country would go full (radioactive) steam ahead. France would build between 6 and 14 new EPR-2 reactors (yes, the "new improved" EPR!) in the name of climate, extend the operating licenses of the entire current reactor fleet, initiate projects for small modular reactors, and resume exploration of so-called Generation IV (read "fast" or "breeder") reactors.

Macron bragged that France would build six of the new reactors on three existing sites, with the first start-up date around 2035 and at an estimated cost of $52 billion.

Whatever Macron's smoking, they're not Gauloises.

On December 1, after Macron's meeting with Biden, the White House put out a "joint statement" from the two leaders covering a variety of topics, including energy, under which they stated that "the United States and France plan to set up a nuclear energy small group within the Partnership's framework," and that "The Partnership will promote advanced nuclear power globally, which has a key role to play in order to reduce global CO2 emissions, while continuing efforts to limit the spread of sensitive enrichment and reprocessing technology."

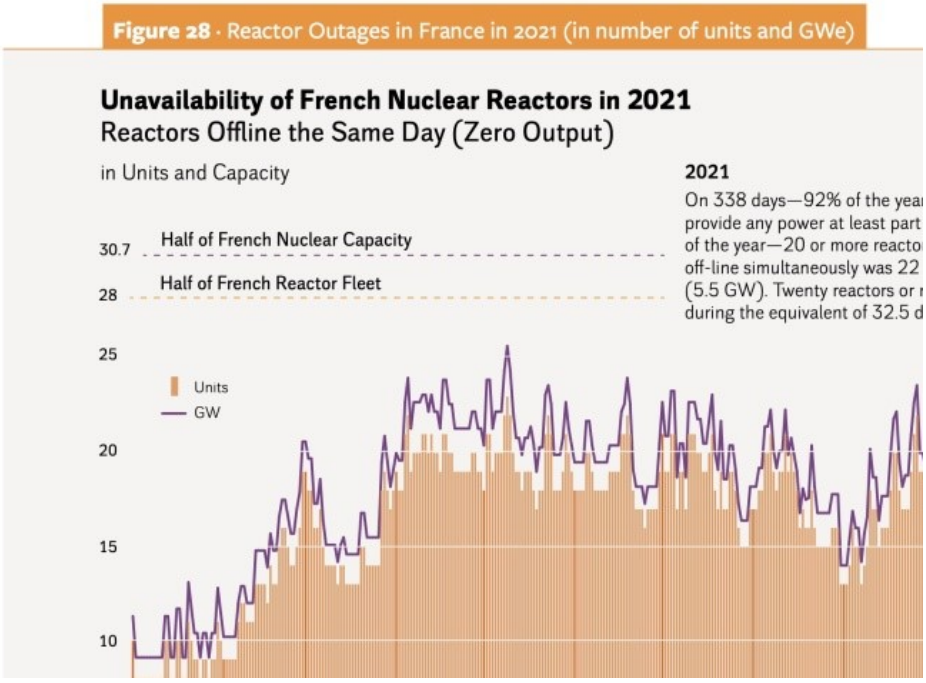
All of this, fantastically, is being played out during a period when the French nuclear sector has arguably reached its nadir. Half of the country's 56-reactor fleet are still offline, a crisis that has persisted for months. Some went down due to summer heatwaves or routine maintenance outages, but many of them are closed for safety reasons after the

discovery of severe corrosion in piping. Repairs have turned out to be more complicated than expected, pushing back restart dates.

That has forced France to import power, something that happens routinely in winter anyway as French homes rely on electric heat, a demand the domestic French nuclear sector cannot actually meet even on good days.

Now, as winter sets in, there are warnings of power outages. The French have been advised to limit their use of electricity-guzzling gadgets like dishwashers and washing machines.

So much for reliable nuclear power. As Matthew Dalton wrote in *The Wall Street Journal* in October, "France's vaunted nuclear fleet has been about as effective as the Maginot Line, the French fortifications that did little to stop the German invasion during World War II."



Graph from 2022 World Nuclear Industry Status Report.

A year ago, even before the latest rash of safety flaws emerged, shares in EDF, the French national utility, plunged when cracks were detected on pipes of the Civaux reactor, causing the precautionary shutdown of the similar Chooz reactor as well.

This likely precipitated Macron's decision to fully nationalized EDF earlier this year, after the utility predicted it was "expecting a hit of roughly £28billion ($34.4 billion) to its full-year core earnings".

French nuclear manufacturer, Areva, formerly Cogema, effectively went bankrupt in 2015 and was rescued by the government while its reactor business was handed over to EDF.

(As with many such corporate embarrassments, the company emerged under yet another new name, Orano.)

It was the Areva forge at Le Creusot that was caught falsifying quality control documents and even manufacturing defective safety components, one of which appears to have ended up in the unfinished Flamanville 3 reactor.

That project, on the Normandy coast, was intended as the French EPR flagship. But it is now 12 years behind schedule and the latest — and unlikely — start date is projected to be 2023. That would be 13 years after construction first began. The original $3.7 billion budget has now ballooned to at least $21.5 billion and climbing.

This makes Macron's claim that yet more new French reactors could be running by 2035 beyond laughable.

Then there is the other EPR flagship — Olkiluoto 3 in Finland — where construction began in 2005. Riven with lawsuits, corporate walkouts and technical failures, the reactor fired up for a testing phase in March 2022, 12 years late and at triple the original projected cost. But the reactor was abruptly shut down in April, and again in August and September, due to problems with feed water pumps and steam turbine failures. It's now expected to be delivering electricity to the Finnish grid by the end of the year, assuming no other technical failures occur.

Even in China, the only place the EPR is actually operating, and where reactors are usually built with speed (although possibly with questionable quality control) the French EPR Taishan Unit 1 had to be shut down in July 2021 due to damaged fuel rods and remained disconnected from the grid for a year.

It was just predicted that the two EPRs being built in England at the Hinkley C site are likely delayed until 2036, ten years later than the recently announced 2026 startup date. That tab will also likely also soar well beyond the latest $31 billion. And while EDF just got a handy windfall in the form of a $815 million UK government subsidy for its at-sea-level Sizewell two-reactor project in Suffolk, UK, the actual estimated cost is at least $31 billion, so this is more like a transfusion than an infusion of needed cash. A year ago, EDF had announced the premature closure in 2028 of its Heysham 2 and Torness nuclear power plants in the UK, two years earlier than planned.

But here is Macron in Washington, talking about a nuclear "renaissance." He actually used that word and seems to have missed the memo about the previous "renaissance-that-never-was" in the US when combined construction and operating license applications were filed

for 28 new reactors, including four EPRs. (Additional EPR sites were considered but no other applications were filed.)

The first of the EPR suite was supposed to be built at the existing two-reactor Calvert Cliffs nuclear power plant in Maryland. Indeed, Calvert Cliffs-3 was to be the very first reactorin the entire US nuclear "renaissance", having become, in July 2007, the first company in 30 years to submit a new construction and operating license application to the US Nuclear Regulatory Commission. Another "flagship".

But when US partner, Constellation Energy, pulled out of the Maryland project, EDF could not go forward as the sole foreign owner, illegal under the Atomic Energy Act. It went looking for new domestic partners. No one stepped up.

The US EPR plans, like almost all the others, vaporized, leaving only two Westinghouse AP1000 reactors still under construction, at Plant Vogtle in Georgia, years behind schedule and wildly over-budget. Only two others, the V.C. Summer AP1000 reactors in South Carolina, ever broke ground, only to be abandoned amidst scandal and cost over-runs.

All of this leaves Macron looking like a carnival barker, or worse, a snake oil salesman.

"Who will buy my sweet red roses? Two blooms for a penny", sang the rose seller in Lionel Bart's musical, *Oliver!* About now, French reactors probably aren't worth much more than that.

This first appeared on *Beyond Nuclear*.

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