Smaller nuclear reactors (SMRs) are a costly dead end, especially for AI

Trump's tariffs and other policies make them even more of a losing bet

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Executive Summary

For decades, prices for new nuclear plants kept rising, and they are now the most expensive form of power. But solar, wind, and battery prices kept dropping, becoming the cheapest. New reactors grew so costly the U.S. and Europe all but stopped building any. Nuclear's share of global power peaked at 17% in the mid-1990s but was down to 9.2% by 2022 and 9.1% in 2024.[1]

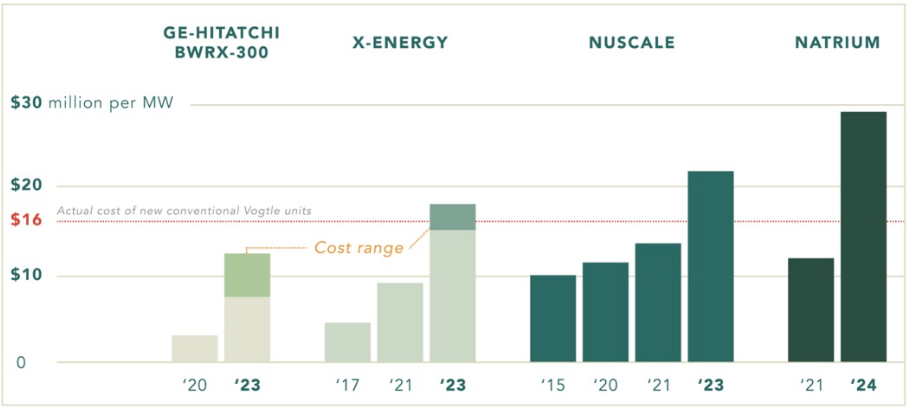
New reactors are inflationary and lead to higher energy bills for consumers even if they're never turned on. The only U.S. plant built in decades, the $35 billion Vogtle plant in Georgia, is "the most expensive power plant ever built on earth," with an "astoundingly high" estimated electricity cost.[2]

Georgia ratepayers' bills are rising by over $220 a year. In 2023, state regulators made customers pay for most of the cost of the reactors—"on top of a monthly surcharge"[3] they've had to *pre-pay* for years, totaling $1000.[4] South Carolina consumers still pay for two never-completed reactors.[5]

Since these 1100-megawatt (MW) reactors are so costly, "small modular reactors" (SMRs) under 300 MW have been hyped, especially for AI data centers and hydrogen. But **SMRs are a dead end—with high risks of cost overruns, delays, and reliability/safety problems.** That's why efforts to commercialize them have failed for decades. Worse, **Trump's policies "severely increase the risk of expensive, unexpected nuclear accidents,"** *Scientific American* warned in March.[6] SMRs also have tariff risks since they need foreign sales, foreign uranium, and foreign components to succeed.

For decades, reactors have kept getting larger to capture economies of scale. So, SMRs face significant shrinkage diseconomies and a higher cost per MW than large reactors like Vogtle. Cost escalation is endemic to SMRs (see figure).

SMR Construction Costs Are Already High—And Rising



Source: IEEFA data, Penn Center for Science, Sustainability and the Media (PCSSM).

So, SMRs would mean even *higher* rates for consumers than big reactors. In 2025, solar, wind, and batteries represent 93% of planned U.S. utility-scale electric-generating capacity additions.[7] Also, recent studies find advanced geothermal energy is on track to provide baseload and potentially dispatchable power three times cheaper to build than Vogtle by 2030.[8]

SMRs are "rhetorical visions imbued with elements of fantasy"

This research paper explains why *new* nuclear power plants—and SMRs in particular—are unsuited to power data centers or anything else. As a March 27 *Financial Times* article comparing various generation technologies noted, SMRs are the "most expensive energy source."[9] Or they would be, if someone ever finishes building one here.

The only new nuclear reactors the U.S. successfully built and started in recent decades are Units 3 and 4 of the Vogtle plant in Georgia. The total cost was $35 billion or about $16 million per MW. It is "the most expensive power plant ever built on earth," as *Power Magazine* wrote in 2023, with an "astoundingly high" estimated electricity cost.[10]

"There are three operating SMRs in the world (two in Russia and one in China)," which saw cost overruns of 300% to 400%, as JP Morgan explained in its March 2025 *15th Annual Energy Paper*.[11] The paper added, "Some Western SMR projects may cost between $15 and $20 million per MW by the time they're completed."

Indeed, the first SMR the U.S. tried to build—by NuScale—was canceled in 2023 after its cost soared past $20 million per MW, higher than Vogtle. In 2024, Bill Gates told CBS the full cost of his 375 MW Natrium reactor would be "close to $10 billion,"[12] making **its cost nearly $30 million per MW—almost twice that of Vogtle**—even without the cost escalation during construction that every other U.S. nuclear plant has had.

Such pricey outcomes were predicted by a 2015 *IEEE Spectrum* article subtitled, "Economics Killed Small Nuclear Power Plants in the Past—And Probably Will Keep Doing So."[13] A 2024 analysis of proposed small modular reactors (SMRs) that are 300 MW or less found none "are fit for necessary rapid decarbonization due to availability constraints and economic challenges."[14]

Indeed, a major December 2023 report from Columbia University's Center on Global Energy Policy concluded that **"if the costs of new nuclear end up being much higher" than $6,200/kW ($6.2 million/MW) "new nuclear appears unlikely to play much of a role, if any, in the US power sector."**[15] But as we've seen, there is every reason to believe SMRs will be well over twice that price.

The claim that abandoning the economies of scale that have driven reactors for decades to 1000+ MW would lead to a *lower* cost per MW is magical thinking, defying technical plausibility and historical reality. A 2014 journal article concluded, "We argue that scientists and technologists associated with the nuclear industry are building support for small modular reactors" by putting forward "rhetorical visions imbued with elements of fantasy."[16]

The Department of Energy, which promotes SMRs, modeled a median cost per MW over 50% higher for SMRs than for large reactors in its 2024 "Liftoff Report" on advanced nuclear power.[17] So, if they ever become commercial, **SMRs might lead to the highest electricity price rises ever seen**. The report makes clear we wouldn't pursue countless SMR designs if we were serious about nuclear. Savings from modularity require mass-producing one or, at most, two designs. The current strategy means virtually all SMR companies will fail, and costs will remain very high for a long time.

"Small modular reactor" is just rebranding. **They aren't small, they aren't modular—and few, if any, will become commercial reactors**. JP Morgan's March paper, in a section titled, "A nuclear renaissance in the OECD? Wake me when we get there," says "SMRs are still lottery tickets," and is "very skeptical of the ability to modularize and shrink the world's most capital-intensive projects."

SMRs are a hypothetical solution in search of a real problem. **While nuclear power has been touted for making hydrogen, that will make no sense from an economic, climate, or safety perspective for decades, if ever**—as discussed in my new book, *The Hype About Hydrogen: False Promises and Real Solutions in the Race to Save the Climate*. Compared with using reactors to make hydrogen by electrolyzing water, nuclear power can reduce far more heat-trapping carbon dioxide far more cheaply by directly replacing fossil fuels. That will be true until we have eliminated at least 90% of CO_2 emissions in the economy. A 2024 study concluded that "dedicated production of clean hydrogen via electrolysis for use as a power plant fuel is unlikely to yield an effective decarbonization outcome."[18]

From a safety perspective, hydrogen is a uniquely hazardous chemical, one that the nuclear industry has studied and worried about for decades. Hydrogen was a major concern during the 1979 Three Mile Island nuclear accident. The scientific literature clearly shows that putting a system to generate hydrogen close to a nuclear reactor is extremely risky.[19] Yet, as discussed below, the Trump administration is *weakening* regulatory oversight of nuclear energy.

Multiple unprecedented risks make nuclear/SMRs a bad bet for AI

The most hype for nuclear and SMRs has been around AI and data centers. But DeepSeek, a Chinese AI chatbot—that may be as much as 95% cheaper and more efficient than many U.S. AIs—calls into question a key premise of the SMR gold rush. "**Does America need the huge uptick in electricity generation** that has fueled a run-up in utility stocks?" the *New York Times* asked in January. The same month, Nasdaq.com reported, "Uranium Stocks Sink as DeepSeek Sparks AI Data Center Energy Concerns."[20] Even before DeepSeek, we knew AI electricity usage "is not a crisis," as leading expert Dr. Jonathan Koomey told the *Atlantic*. "There is no explosive electricity demand at the national level."[21] There was 2% growth in 2024, driven by many causes.

In February, Microsoft CEO Satya Nadella said that "there will be an overbuild" of data centers.[22] Nadella said that even though he intends to build many data centers, he also plans to lease them from others: "I am thrilled that I'm going to be leasing a lot of capacity in '27, '28." In March, Bloomberg reported that Microsoft has "walked away from new data center projects in the US and Europe that would have amounted to a capacity of about 2 gigawatts of electricity."[23] They cite TD Cowen analysts, who "attributed the pullback to an oversupply of the clusters of computers that power artificial intelligence."

In late March, MIT's *Technology Review* published an article on how China's "data center gold rush is unraveling as speculative investments collide with weak demand, and DeepSeek shifts AI trends."[24] According to people who spoke to the magazine, "including contractors, an executive at a GPU server company, and project managers, **most of the companies running these data centers are struggling to stay afloat**. The local Chinese outlets … report that **up to 80% of China's newly built computing resources remain unused**."

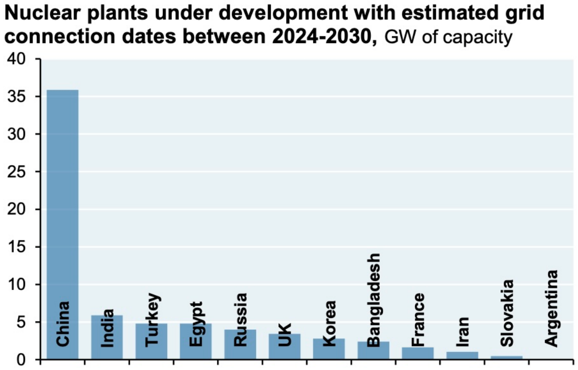
In any case, however fast or slow the AI market grows, **SMRs are not the answer for data centers for the foreseeable future, if ever**—especially compared to the competition, as we'll see. They have several severe limitations that combine to create an unprecedented risk for data center owners.

SMRs have high cost-overrun and timing risks. A 2023 analysis of energy projects by BCG found "new nuclear power projects might witness up to a staggering 400% in overruns." JP Morgan's March analysis noted that large "nuclear power/storage projects are associated with the largest cost overruns of all megaprojects," and "the cost overrun on the China SMR was 300%, on Russian SMRs 400%" and so far, there's a 700% overrun on an SMR under construction in Argentina.

We've already seen tremendous cost escalation of U.S. SMRs, as shown in this report's page one chart. But in reality, no one knows their upper bound price or construction time since they keep getting canceled or delayed. Reuters noted in March, "the only countries that have built SMRs also have centralized governments, which has helped projects secure financing and decide which SMR fuel types and coolants to use."[25]

In December 2024, HSBC Global Research noted, "Construction timelines for nuclear are typically 10-12 years" in the U.S. and Europe.[26] But "time is of the essence for data center customers," the Wall Street Journal reported in March, so "they may prefer to ink contracts that involve less regulatory uncertainty" than nuclear.[27]

Even China can't build SMRs quickly or cheaply compared to renewables—and they are the only country actually planning to build many new nuclear plants by 2030—about 35 GW (see chart). But **compare that to the 350 gigawatts of solar and wind China built—*just in 2024***.


Nuclear plants under development with estimated grid connection dates between 2024-2030, GW of capacity

Source: World Nuclear Association, JPMAM, 2024

China's first SMR (105 MW) was supposed to take 4 years. It took 12. The *World Nuclear Industry Status Report* 2022 noted, "Delays and cost escalation in this project offer an excellent illustration of why SMRs are likely to be no different from reactors with higher power ratings."[28] The Chinese admitted in 2021 that **the cost per MW of their second SMR (125 MW) will be "2 times higher than that of a large" nuclear power plant, and the cost per kilowatt-hour is likely to be 50% higher when it is finished.**

That's why under 1% of the total capacity of the Chinese reactors under construction is from small reactors—and over 95% of the total capacity will be from reactors of 1150 MW or larger.[29]

SMRs have a huge reliability risk since they are largely experimental technologies with decades of failure being built by companies with no experience constructing SMRs. "Data centers need power 24/7 for energy and cooling purposes," Reuters noted in 2025.[30] But SMRs have no long-term data on reliability or availability—creating a **huge risk of economic (and brand) damage from extended outages**. Even big companies constructing large traditional nuclear plants routinely have extended outages. As JP Morgan noted in March, "Vogtle 3, completed in Georgia in 2023 after extensive delays and cost overruns, was offline for 9.5 out of its first 48 weeks in 2024 due to feedwater pump blockages or failed heat exchangers."

Given that their reliability is unknown, these new experimental SMRs will have to be fully backed up by the electric grid and insured at a high cost for failure—making their overall exorbitant cost even higher. In Russia, for example, two SMRs began commercial operation in May 2020 after significant delays and cost overruns.[31] In 2021, the reactors' load factors were only 45% and 18%, respectively. Load factor is how much power a reactor actually delivers compared with what it would deliver running at maximum power.

SMRs have many long-term risks. Since the vast majority of SMRs are startups, a data center owner is taking the risk—if something goes wrong—that the SMR company may not be around years later or if it is, that it simply declares bankruptcy.

The owner is also taking all the risks and costs associated with nuclear waste. For instance, the lead author of a 2022 Stanford-led study explained, "Our results show that **most small modular reactor designs will actually increase the volume of nuclear waste in need of management and disposal, by factors of 2 to 30**" for reactors they analyzed.[32] The study warns that SMRs are "incompatible with current technologies and concepts for nuclear waste disposal."[33] As a result, SMR waste will need special treatment, conditioning, and packaging: "These processes will introduce significant costs—and likely, radiation exposure and fissile material proliferation pathways—to the back end of the nuclear fuel cycle and entail no apparent benefit for long-term safety."

Trump tariffs on China (and other countries) could create multiple risks for SMRs

Any success the U.S. might have with SMRs depends on foreign sales, foreign uranium, and foreign components. So, Trump's ever-shifting tariffs—as well as his alienation of major U.S. trading partners like Canada and Europe—make SMRs an even riskier bet than they already are. Also, if the economy shrinks due to Trump's policies, so does demand for new electric power plants, particularly the most expensive and risky experimental plants, like SMRs. And the twin threats of inflation and higher interest rates both increase the risk of even bigger construction cost overruns.

The nuclear supply chain is heavily dependent on foreign countries like China. The DOE's September 2024 "Pathways to Commercial Liftoff: Advanced Nuclear" report, for instance, warns that we do not have "significant domestic suppliers" for key materials used to build nuclear reactors, and "Of particular concern are Hafnium, Niobium, Yttrium, Chromium, and Nickel." **Significantly, export controls on yttrium were one of the retaliatory measures that China put in place in early April in response to Trump's tariffs**.

Canada and Europe have not only been top tariff targets—but also they are currently some of the first customers for U.S. SMRs, as noted in the March analysis, "Trump's Tariffs on Canada Could Kill the U.S. Nuclear Energy Revival."[34] The authors warn, "U.S.-based companies marketing small modular reactors, from NuScale to GE-Hitachi, have received their first crucial orders from European and Canadian customers. **Without these demonstration projects, their reactor designs will remain confined to paper**."

The analysis also notes that "the leading U.S.-based vendor of reactor technology, Westinghouse Electric Company, is now Canadian-owned." Indeed, as Westinghouse itself explained in 2025, it is "owned by Canadian energy powerhouses Brookfield and Cameco" and is "the only nuclear vendor with an advanced, proven and fully operational advanced Generation III+ reactor technology"—the AP1000, used for the recent Vogtle reactors—that can be built "and generate electricity by as early as 2035."[35]

The DOE’s recent nuclear *Liftoff* report extensively discusses the U.S. nuclear industry's dependence on foreign suppliers for both its “nuclear fuel supply chain” and “component supply chain.” The report notes, “As of 2024, there is limited domestic capacity for making nuclear-grade forgings.”

We rely on foreign suppliers for over 90% of our reactors’ uranium fuels. Canada is the single biggest supplier, providing over a quarter of our imports. “The nuclear industry depends on a global supply chain that can take uranium concentrate from Kazakhstani mines, for instance, convert it to uranium hexafluoride in Canada and enrich the product in France, before finally delivering it to a U.S. fuel fabricator,” the March paper notes. Trump’s tariffs would “make that exceedingly complicated, costly and precarious, to the great detriment of the U.S. nuclear sector.”

Even without the tariffs, Canadians' anger over Trump’s trade policies and repeated claims that he wants the country to become the 51st state has seriously undermined the prospects for collaboration between the two countries on nuclear energy.

The March analysis notes that “North America’s largest manufacturing facility for commercial reactor equipment, for instance, is the BWXT factory in Ontario, where the pressure vessel for GE-Hitachi’s BWRX-300 reactor is supposed to be fabricated—that is, if the BWRX project is not canceled” as a result of turmoil between the countries.

In short, the U.S. needs to have a positive working relationship with Canada, China, and other countries to consider significantly expanding nuclear power or mass-producing SMRs—assuming we ever figure out if any of the dozens of experimental designs being pursued are practical and affordable.

Trump’s orders “severely increase the risk of expensive nuclear accidents”

Finally, no tech company should take the **unprecedented brand risk of a possible nuclear accident** from experimental products made by start-ups. **The accident risk for SMRs is of special concern because of Trump’s efforts to gut regulatory oversight and because of “skimpflation,”** which is when “companies sometimes use cheaper materials to save on costs.”[36]

Trump issued an executive order in February that stripped the independent oversight authority of the U.S. Nuclear Regulatory Commission (NRC), so the NRC’s strong safety protocols for new reactors may be eviscerated. Currently, the NRC is the world’s “Gold Standard” for “nuclear regulation,” as Dr. Allison Macfarlane, former NRC chair, notes in the February *Bulletin of the Atomic Scientists*.[37]

But she issued a dire warning, explaining that Trump’s order gives the Office of Management and Budget (OMB) “power over the regulatory process of until-now independent agencies,” including the NRC. It “implies there are no longer independent regulators” in this country, ones that are “free from industry and political influence.”

Dr. Macfarlane explains that the new order kills independence by requiring OMB to “review” these previously independent regulatory agencies’ obligations “for consistency with the President’s policies and priorities.” This means “subordinating regulators to the president.” She offers a cautionary tale of the Fukushima nuclear disaster in Japan, which had direct economic costs of some $200 billion, where “Overnight, the agricultural and fishing industries near Fukushima were devastated”:

> An independent investigation by the Diet (Japan’s house of parliament) into the cause of the Fukushima accident concluded unequivocally that: “**The TEPCO Fukushima Nuclear Power**

> **Plant accident was the result of collusion between the government, the regulators and TEPCO, and the lack of governance by said parties. They effectively betrayed the nation's right to be safe from nuclear accidents**."

She warns that because of Trump's order, SMRs could—as promoters have been demanding—become "exempted from the requirements that all other designs before them have had to meet: detailed evidence that the reactors will operate safely under accident conditions." That would "essentially give them a free pass to deploy their untested technology across the country."

A March *Scientific American* makes a similar point.[38] The three authors are a former Department of Energy (DOE) assistant secretary for nuclear energy, the chair of the University of Wisconsin–Madison's department of nuclear engineering and engineering physics, and a former president of the American Nuclear Society. They write, "we foresee that this proposed regulatory capture by the Executive Office of the President—where decisions are made for political reasons and not for the benefit of people served—will severely increase the risk of expensive, unexpected nuclear accidents in the U.S."

The authors point out how **a lack of regulatory independence led to the Chernobyl disaster**: "When Soviet leadership and its captured regulator prioritized national pride over safety, a known flaw in nuclear reactor control rods (which slow the rate of atomic fission in a reactor) went unchecked, safety protocols at the Chernobyl Nuclear Power Plant went unheeded, and in 1986 the worst nuclear power accident in history resulted."

This Trump order increases the risk of a nuclear accident from a future SMR in particular since the vast majority are entirely new designs from startups that have no experience building anything as complex as a new nuclear reactor. **Such companies need *more* oversight—not *less*—through every step of the process from design and construction to operation.** An increased accident risk undermines the business case for any company considering a deal to power their data center with an SMR.

The Dangers of Nuclear Skimpflation

In a 2024 article on how "companies are downsizing products without downsizing prices," the *New York Times* explains that "while 'shrinkflation' gets measured [by inflation statistics] 'skimpflation' does not."[39] Skimpflation is when "companies sometimes use cheaper materials to save on costs." That appears to be a strategy used by many SMRs.

Consider NuScale. Physicist and nuclear safety expert Dr. Edwin Lyman noted that while developing the reactor, "NuScale made several ill-advised design choices in an attempt to control the cost of its reactor, but which raised numerous safety concerns."[40] For instance, "the design lacked leak-tight containment structures and highly reliable backup safety systems." Some of the money-saving choices were justified on the basis that the reactor was "passively safe," but one of the NRC's own experts raised serious questions about the passive emergency core cooling system late in the design certification process.[41] Similarly, two other leading experts cast doubt on the reactor's safety and the NRC's certification process.[42]

Yet even with all this apparent skimping on safety and backup systems, the reactor design still turned out to be unaffordable. And NuScale had been hyped as "the Future of Small Modular Reactors" in a 2014 Harvard Business School case study[43] that claimed it was "the leading modular nuclear reactor in the United States. This Reactor will be the safest and simplest ever built." In September 2020, *Popular Mechanics* asserted, "This Tiny Nuclear Reactor Will Change Energy."[44]

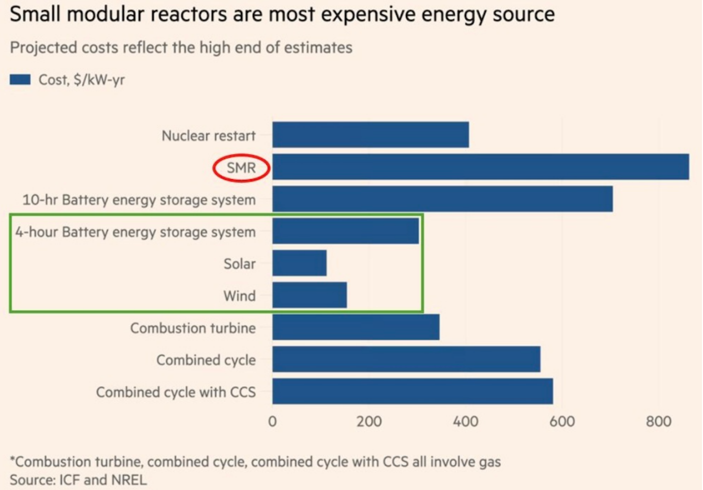
But just three years later, NuScale and the local utility canceled the contract after seeing the projected cost jump 75% in just eighteen months—making it more expensive per MW than the new Vogtle reactors.[45] That in turn led to a 50% surge in the projected price of electricity—"more expensive than most other sources of electricity today, including solar and wind power and most natural-gas plants," *Technology Review* explained in 2024.[46] Moreover, there's every reason to believe NuScale's cost overruns would have continued to escalate through construction since that's the overwhelming historical trend. On a conference call explaining the decision, NuScale CEO John Hopkins said, "Once you're on a dead horse, you dismount quickly. That's where we are here."[47]

Ultimately, SMRs "still look to be too expensive, too slow to build, and too risky to play a significant role in transitioning from fossil fuels in the coming 10-15 years," as one 2024 report concluded.[48] But what are the alternatives in the face of rising electricity demand?

Real low-carbon alternatives to SMRs are here now—and better ones are coming

SMRs have many unsolved risks of unknown size, as we've seen. "I don't believe that anyone has figured out exactly who's going to carry the cost overrun risk," explained top cleantech commercialization expert Jigar Shah in a 2025 podcast interview with Michael Liebreich, the former chair and founder of Bloomberg New Energy Finance.[49] From 2021 to January 2025, Shah headed the DOE loan office, which put out the "Liftoff" reports, and he oversaw $100 billion in loans to the next generation of clean technology. "Until we've solved that problem," added Shah, "then we're unlikely to have liftoff" of successful commercialization of new advanced nuclear reactors.

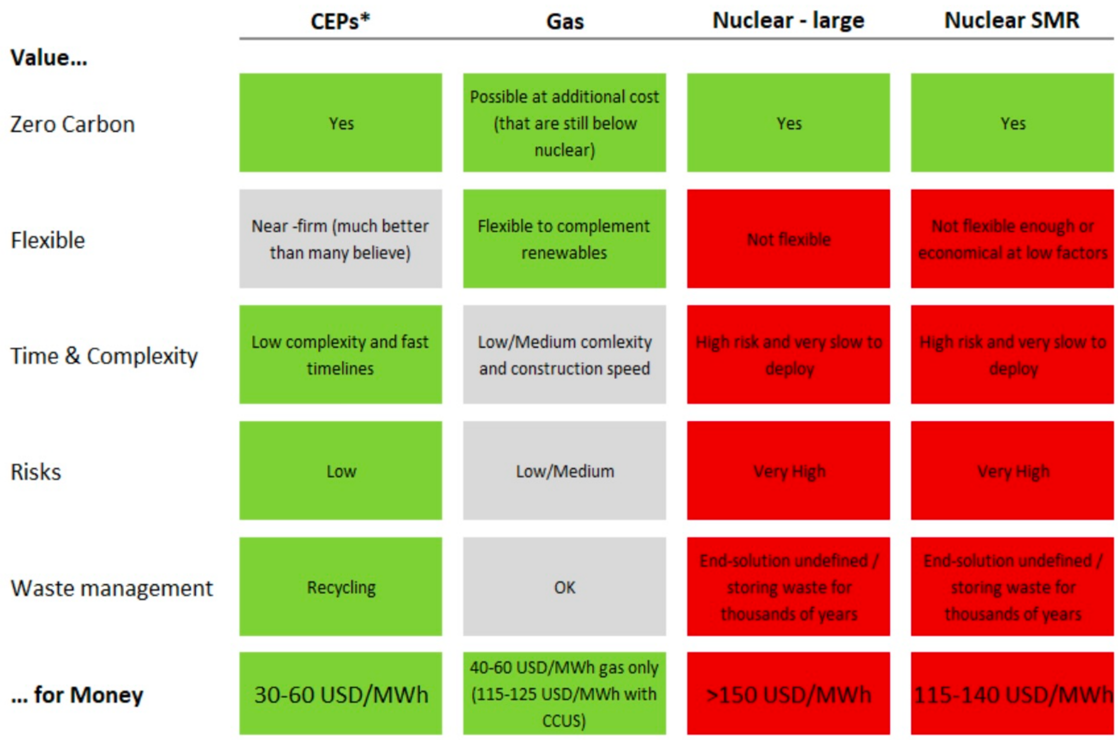
A March 27 *Financial Times* article, "Why the nuclear renaissance is 'far from certain'," compared various generation technologies and concluded SMRs are the "most expensive energy source" (see chart below of projected 2035 costs).[50] Significantly, the only technologies on the chart that continue to come down a cost curve are solar, wind, and battery storage.



*Combustion turbine, combined cycle, combined cycle with CCS all involve gas
Source: ICF and NREL

As HSBC's 2024 report concluded, "SMRs are also 10 years away (if they prove to be economically viable)." Their chart below compares large and small nuclear plants with new gas plants and clean energy portfolios (CEPs) of wind, solar, storage, and flexible demand. "Compared to CEPs, new nuclear is poor value for money," HSBC says—even with their overly optimistic projection that electricity costs will be *lower* for SMRs than large plants, when the reverse is far likelier.

New nuclear's high cost and drawbacks far outweigh the benefit of being zero carbon



Value…	**CEPs***	**Gas**	**Nuclear - large**	**Nuclear SMR**
Zero Carbon	Yes	Possible at additional cost (that are still below nuclear)	Yes	Yes
Flexible	Near -firm (much better than many believe)	Flexible to complement renewables	Not flexible	Not flexible enough or economical at low factors
Time & Complexity	Low complexity and fast timelines	Low/Medium comlexity and construction speed	High risk and very slow to deploy	High risk and very slow to deploy
Risks	Low	Low/Medium	Very High	Very High
Waste management	Recycling	OK	End-solution undefined / storing waste for thousands of years	End-solution undefined / storing waste for thousands of years
… for Money	30-60 USD/MWh	40-60 USD/MWh gas only (115-125 USD/MWh with CCUS)	>150 USD/MWh	115-140 USD/MWh

* Clean energy portfolio of wind/solar/storage/flexible demand

Source: Cost from NextEra elaboration on WoodMack LCOEs; HSBC analysis

As for natural gas plants, the U.S. Energy Information Administration projected in January[51] that domestic gas prices will double from 2024 to 2026, largely because of increasing liquefied natural gas (LNG) exports—something Trump has vowed to accelerate. Shah noted that "natural gas is not fast or cheap." For many people building gas plants today, the "cost, according to NextEra, is close to $100 a megawatt hour." He added, **"most of the big players with combined cycle gas turbines are sold out through 2031, so it's not even fast."** Indeed, an April 8 *New York Times* piece notes that wait times for gas plants "have doubled in the past year as companies scramble to build data centers for A.I."[52]

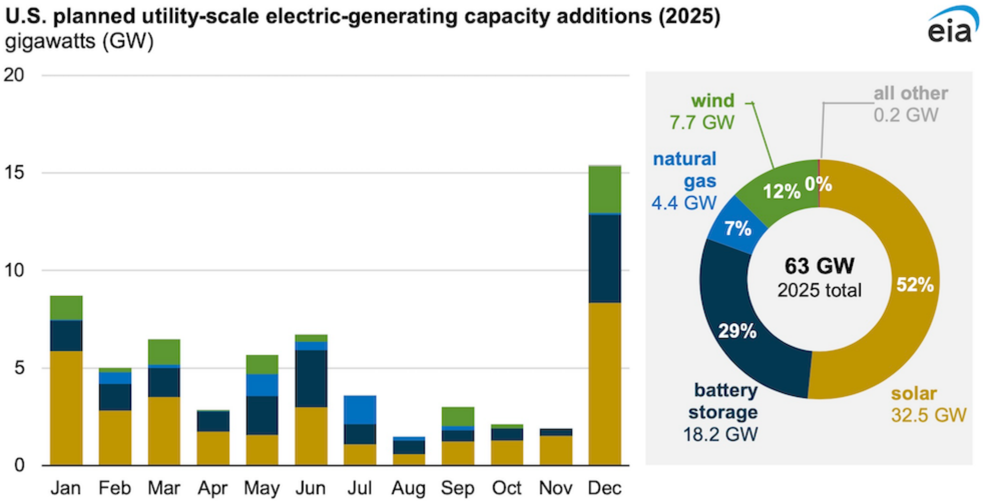
Even Texas is canceling big gas plants "for failing to meet due diligence requirements," as grid expert Doug Lewin told Latitude Media in February.[53] "The reality of the situation is that it takes a long time to build gas." Lewin, who writes the *Texas Energy and Power Newsletter*, adds, "And the costs are spiraling upwards…not just like in line with even high inflation."

So, what is a faster and cleaner choice? Nothing can compare with the combination of speed, low cost, and zero emissions of renewables coupled with batteries.

The *New York Times* notes, "The cost of building gas power plants has also soared—so much so that in some parts of the country, solar panels and batteries are likely to be cheaper, energy executives and consultants said. By some estimates, it now costs two or three times as much to build a gas-fired power plant as it did a few years ago."

In January, NextEra Energy CEO John Ketchum told investors "Renewables are here today," and as Latitude Media reported, the world's largest renewable power company is itself partnering with GE Vernova to expand gas generation.[54] Yet on the company's fourth-quarter earnings call, Ketchum explained the big advantage of clean energy: "**You can build a wind project in 12 months, a storage facility in 15, and, you know, a solar project in 18 months**."

That's why those three technologies represent 93% of planned US utility-scale electric-generating capacity additions in 2025, as the U.S. Energy Information Administration reported in late February (see figure below).[55]



"Today, Google is entering a strategic partnership with Intersect Power and TPG Rise Climate to synchronize new clean power generation with data center growth in a novel way," the tech giant wrote in a December 2024 blog post.[56] This $20 billion partnership will put data centers near new solar, wind, and battery storage, with the goal of "reducing both the timeline to operation and the amount of new transmission required."

A December 2024 analysis found that by running a data center *off the grid* with solar, wind, battery storage, and some gas, you can get a microgrid that is 82% to 90% renewable for just over $100/MWh, which could be further optimized to under $100/MWh.[57]

A 2025 RMI analysis found building a data center along with wind, solar, and batteries near an existing grid-connected gas plant "can fast-track electricity needed for AI."[58] Their model identifies 20 GW of new load that is 80% to 95% carbon free for under $100/MWh.

Enhanced Geothermal Energy

Even better low-carbon power may be near. A 2025 *Nature* article found that by 2027, "in the USA, enhanced geothermal is expected to achieve plant capital costs (US$4,500/kW) and a levelized cost of electricity (US$80/MWh)."[59] It would be baseload and potentially even dispatchable power three times cheaper to build than the Vogtle reactors.

"The EGS [enhanced geothermal system] approach is distinct from traditional geothermal systems due to its use of horizontal drilling and hydraulic fracturing," explains a *September 2024 JPT* *article*, which reported on some breakthrough test results from DOE and the geothermal company Fervo.[60] "With optimal well spacing, this combination creates extensive flow paths between injection and production wells. Energy is extracted from the hot water using generators equipped with closed-loop turbines." The fact that this was in the *Journal of Petroleum Technology* is exactly why this technology may see support from the new administration. Indeed, Trump's Secretary of Energy Chris Wright is an investor in Fervo.

Furthermore, a Princeton news release "Flexible geothermal power approach combines clean energy with a built-in 'battery'" for a 2024 study explained: "By leveraging the inherent energy storage properties of an emerging technology known as enhanced geothermal, the research team found that flexible geothermal power combined with cost declines in drilling technology could lead to over 100 gigawatts' worth of geothermal projects in the western U.S."[61] And that is "a capacity greater than that of the existing U.S. nuclear fleet."

Since EGS companies are making use of technology proven in the oil and gas industry, advances are coming very fast, leading to faster drilling and lower overall cost. Enhanced geothermal is not a sure thing, but right now, it's far closer to commercialization liftoff than SMRs. A March study finds advanced geothermal could "meet 100% of data center demand growth in 13 of the 15 largest markets" by early 2030s at low cost.[62]

Liebreich asked Shah to rank his level of "optimism" about the chances some of these technologies would achieve commercialization liftoff. He wanted Shah "to rank the chances that [on a] one to five scale — this is nailed, and it's gonna just absolutely fly or, you know, after all that we've done, I don't really see it." **On advanced nuclear, Shah replied, "we're probably at a two right now." Significantly, when he was asked about "next generation geothermal power," Shah said,** "**We're firmly at a five on that**."

A (Brief) History of Nuclear Power Plants

Let's step back and see how everything that is happening now with nuclear reactor price escalation is simply a continuation of trends that have been going on for many decades. As a 2019 analysis, "The Historical Development of the Costs of Nuclear Power," concluded, "**from the first wave of nuclear reactors deployed, construction costs have been on an escalation course**."[63]

Nuclear power may be the original overhyped energy technology, as an article on the U.S. Nuclear Regulatory Commission (NRC) website makes clear.[64] In a 1954 address to science writers, Atomic Energy Commission chairman Lewis Strauss said, "Transmutation of the elements, *unlimited power*, ability to investigate the working of living cells by tracer atoms, the secret of photosynthesis about to be uncovered—*these and a host of other results all in 15 short years. It is not too much to expect that our children will enjoy in their homes electrical energy too cheap to meter*." Strauss—the Robert Downey, Jr. character in *Oppenheimer*—repeated the idea just days later on a *Meet the Press* radio broadcast, saying that he expected his children and grandchildren to have power "too cheap to be metered." That time, he said, may be "close at hand. I hope to live to see it."

The United States did develop a nuclear industry and ultimately built over 100 reactors, more than any other country. But the industry did not see reactor prices going down an experience curve, where increased sales over time lead to economies of scale, improvements in technology, and overall gains in experience that translate into steady cost reductions—as they have in recent decades with solar energy, wind power, batteries, and LED bulbs. Instead, new nuclear power plants have steadily risen in price. This "negative learning" as one article called it, happened in both the United States and France.[65]

As a result, nuclear power has largely priced itself out of the market in the industrialized world. "Western nuclear completions since 1990 took many years and resulted in massive cost overruns," as JP Morgan explained in a 2024 analysis.[66] "We estimate that levelized nuclear costs were 2x–4x higher than a baseload power system derived from wind, solar and sufficient backup thermal (natural gas) capacity."

I have been involved with nuclear energy policy and analysis for over thirty years. When I first came to the DOE in mid-1993, I spent two years as special assistant for policy and planning for the deputy secretary, who oversaw all DOE energy programs. My focus was helping him oversee the billion-dollar Office of Energy Efficiency and Renewable Energy, which was—and still is—working to develop and commercialize the key technologies that have now won in the cleantech marketplace. These include solar, wind, advanced storage, alternative fuel vehicles, various energy efficiency technologies, including LED lighting and heat pumps, and industrial efficiency. In 1995, I became principal deputy assistant secretary of that office, and in 1997 was named acting assistant secretary.

One of my duties for the Deputy Secretary was to review policy and analysis coming from the Office of Nuclear Energy. In the 2004 edition of my book on hydrogen, I noted that a major 2003 interdisciplinary study by the Massachusetts Institute of Technology, *The Future of Nuclear Power*, highlighted many of the "unresolved problems" that have created "limited prospects for nuclear power today."[67] The study found that "in deregulated markets, nuclear power is not now cost competitive with coal and natural gas"—and that the challenge of siting new nuclear power plants is exacerbated by public concern about the safety, environmental, health, and terrorism risks associated with nuclear power. It found that "nuclear power has unresolved challenges in long-term management of radioactive wastes." The authors described possible technological and other strategies for addressing these issues but noted, for instance, that "the cost improvements we project are plausible but unproven."

Such improvements never happened. In 2008, I testified on nuclear power economics to the Senate Committee on Environment and Public Works Subcommittee on Clean Air and Nuclear Safety.[68] As I explained, the cost of new nuclear power had more than doubled from what the Massachusetts Institute of Technology report assumed in its base case just five years earlier. From 2000 through 2007, nuclear plant construction costs—mainly materials, labor, and engineering—rose by 185%.[69]

That meant a nuclear power plant costing $4 billion to build in 2000 cost over $11 billion to build seven years later. An industry trade magazine, *Nuclear Engineering International*, titled a 2007 article "How Much? For Some Utilities, the Capital Costs of a New Nuclear Power Plant Are Prohibitive."[70]

The only new nuclear reactors the United States successfully built and started in recent decades are Units 3 and 4 of the Vogtle plant, operated by the Southern Company and its subsidiary, Georgia Power. A 2006 *New York Times* article posing the question "A Nuclear Renaissance?" reported that Westinghouse told the paper, "The cost will ultimately be somewhere between $1.4 billion and $1.9 billion" for each AP1000 reactor.[71] Yet the *Wall Street Journal* reported two years later that "the existing Vogtle plant [Units 1 and 2], put into service in the late 1980s, cost more than 10 times its original estimate, roughly $4.5 billion for each of two reactors."[72] The same article suggested the two planned units would cost $14 billion total.

Ironically, that *Journal* article hyped the supposed nuclear Renaissance, asserting, "Nuclear power is regaining favor as an alternative to other sources of power generation, such as coal-fired plants." But that part of the story was inaccurate, as the few nuclear plants then under consideration were canceled one by one until only the two Georgia reactors were left. By the time they were turned on, seven years late, one in 2023 and one in 2024, their total cost had hit $35 billion,[73] making it "the most expensive power plant ever built on earth," with an "astoundingly high" estimated electricity cost, as *Power Magazine* wrote in 2023.[74]

Back in March 2016, Georgia Power had put out a news release declaring, "the expected completion dates of June 2019 for Unit 3 and June 2020 for Unit 4. **Once the new units come online, they are expected to put downward pressure on rates and deliver long-term savings for Georgia customers**."[75] In reality, Georgia ratepayers' bills are rising by over $220 a year. In 2023, state regulators made customers pay for most of the cost of the reactors —"on top of a monthly surcharge"[76] they've had to *pre-pay* for years, totaling $1000.[77] South Carolina consumers still pay for two never-completed reactors.[78]

And that isn't just the U.S. experience. France's government-owned electric company, EDF, has had the same outcome with the 1,600-megawatt European pressurized-water reactor (EPR) Generation III+ reactor design developed with Germany's Siemens. As of 2024, the only reactor project currently being constructed in France was a single EPR plant at Flamanville. The original cost estimate was €3.3 billion. The current cost estimate is nearly six times as high, €19.1 billion ($19 billion).[79] Similarly, the Olkiluoto nuclear plant in Finland "was scheduled to be completed in 2009; it was completed in 2023 and cost $12 billion, three times its original estimate," as JP Morgan noted in 2024.[80]

In a 2008 "White Paper on Nuclear Power," the British government's Department for Business, Enterprise & Regulatory Reform estimated a "total cost of £2.8 bn to build a first of a kind plant with a capacity of 1.6 GW" for a single reactor.[81] That analysis asserted, "Even on cautious assumptions, the cost of nuclear energy compares favourably with other low-carbon electricity sources."

Again, this was more empty hype. The country pursued two EPRs, 3,200 megawatts total, at the Hinkley site in southwest England. This plant would have been the country's first two new reactors since the 1990s. In January 2024, the BBC reported, "EDF now estimates that the cost could hit £46bn" ($59 billion).[82] That is a price per reactor eight times higher than the 2008 report had projected. The start date was pushed back to at least 2029. China General Nuclear Power Corp, which owns about a third of the project, with EDF owning the rest, halted funding in December 2023, and EDF has warned the halt could become permanent.[83]

"It seems the golden rule of nuclear economics is to add a zero to industry estimates, and your estimate will be far closer to the mark than theirs," notes nonprofit news service Climate & Capital Media in a January 2024 report.[84]

The Hype About SMRs

More than eight decades—and trillions of dollars—after the world's first artificial nuclear reactor was built in 1942 at the University of Chicago, new large nuclear reactors are clearly not an affordable, scalable solution to climate change, nor is it plausible to think they will be any time soon. And that means they're not a plausible way to reduce carbon-free hydrogen prices to affordable levels.

So, in one of the great rebranding moves, the nuclear industry and its supporters have been promoting SMRs—those 300 megawatts or smaller. They've pushed the idea that SMRs are a new and qualitatively better type of reactor that we should believe has a very real chance of solving all the problems that made large nuclear plants figuratively radioactive to utilities: "**poor economics, the possibility of catastrophic accidents, radioactive waste production, and linkage to nuclear weapon proliferation**," as a 2014 article in the journal *Energy Research & Social Science* put it.[85]

But that's all hype. As many studies and experts make clear, SMRs aren't new, they aren't qualitatively better, and there is little chance they could solve the first problem of "poor economics," let alone all four.

So SMRs will likely have a higher cost per MW—and may also have higher waste, the same or worse safety, and the same or worse proliferation risk (which is the risk that certain types of nuclear reactors will facilitate the spread of the development of nuclear bombs). Indeed, as the 2014 article argued, trying to address the economic problem will probably make at least one of the others worse.

China is often held up as a country that doesn't have the same challenges as the United States in building nuclear plants, and indeed they are now building many large plants. But the problems with SMRs are universal. China's first SMR was connected to the grid in December 2021, a 105-megawatt high-temperature gas-cooled reactor pebble-bed module. *The World Nuclear Industry Status Report 2022* explained, "Delays and cost escalation in this project offer an excellent illustration of why SMRs are likely to be no different from reactors with higher power ratings."[86] Initially, the CEO of the joint venture between the state-owned China Nuclear Engineering Group and Tsinghua University's Institute for Nuclear and New Energy Technology said construction would start in spring 2007, with operation beginning "by the end of the decade." When construction actually started in 2012, the estimated completion time had increased to fifty months. It actually took twelve years.

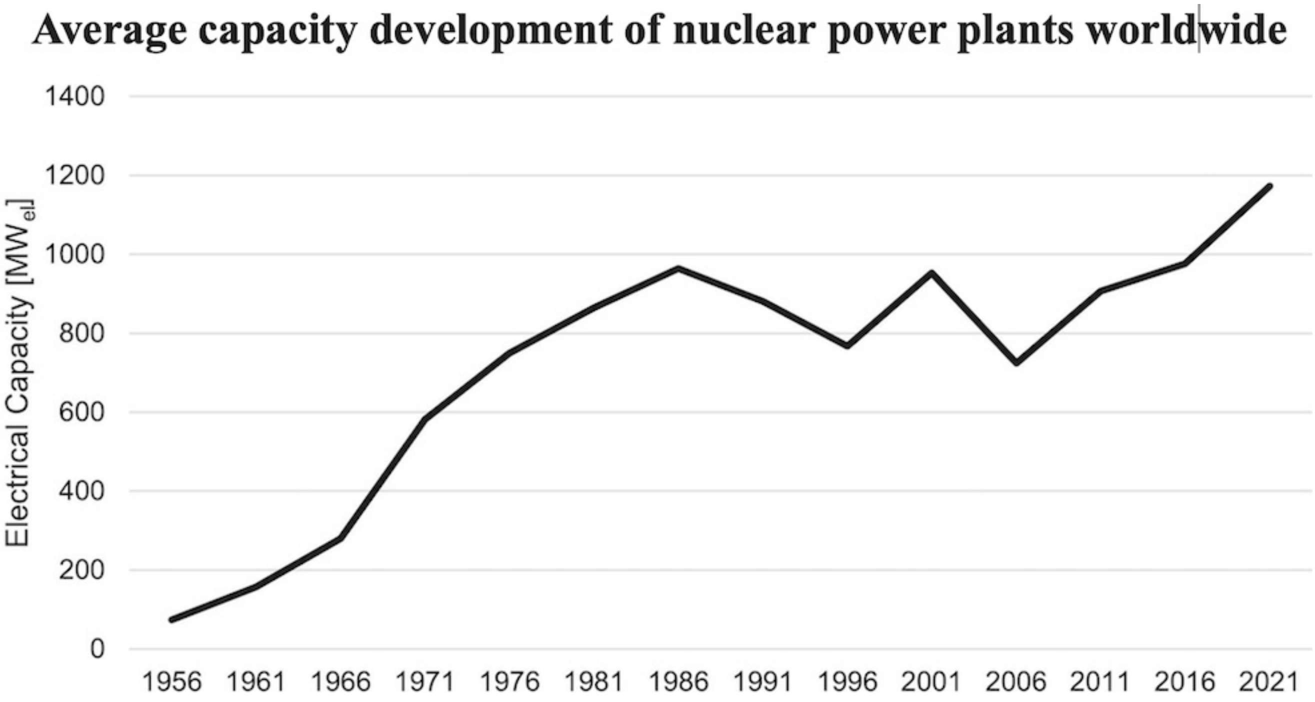
In 2021, the Chinese started building a second SMR design: the 125-megawatt ACP100 reactor. A Chinese National Nuclear Corporation official said construction would take nearly six years. As the *World Nuclear Industry Status Report 2022* explained, "by the time construction started in 2021, this SMR was at least six years late," and "the reactor will also not be economical." The Chinese National Nuclear Corporation admitted in 2021 that the cost per kilowatt of the proposed ACP100 demonstration project "is 2 times higher than that of a large" nuclear power plant, and the cost per kilowatt-hour is likely to be 50% higher.

The delays and rising costs of SMRs worldwide should not have been a surprise. The history of nuclear power reveals the repeated failure of commercial SMRs to prove practical or affordable and an endless push to capture economies of scale, as the *IEEE Spectrum*, the leading publication of the Institute of Electrical and Electronics Engineers, made clear in a 2015 article.[87]

Most of the expenses of building and running a nuclear plant do not increase directly in proportion to the power it generates. Building a 300-megawatt reactor doesn't require half as much steel and concrete as a 600-megawatt reactor. It requires *more* than half. And it requires more than half as many people to run.

According to the standard "power rule" used in industries such as nuclear for the capital cost of production facilities, a 300-megawatt plant would have nearly twice the cost per megawatt of capacity as a 1,000-megawatt plant. **The reverse of economies of scale is diseconomies of shrinkage**.

It is no surprise, then, that “the pursuit of economic competitiveness drove the attempt to reap economies of scale, resulting in larger unit sizes,” as an April 2024 “techno-historical” analysis documented (see figure below).[88] The average electric capacity of nuclear reactors worldwide, which was below 300 megawatts from the mid-1950s to the mid-1960s, rose to nearly 1,000 megawatts by the mid-1980s. Over the next two decades, the capacity fluctuated downward to under 800 megawatts but then started climbing again to nearly 1,200 megawatts in the early 2020s. This recent rise occurred as new reactor builds all but stopped in the United States and Europe, while the big new nuclear plant builders, like China, all saw the benefit of economies of scale.



Average capacity development of nuclear power plants worldwide

Source: Böse et al., Energy Research & Social Science, April 2024

Significantly, not only were the plants getting bigger, but even the bigger plants were sited together. As a 2018 Nuclear Energy Institute report noted, “approximately 80% of the electricity generated from nuclear power in the U.S. comes from plants with multiple reactors.”[89]

A major reason for this is that one of the most significant costs and delays with any proposed nuclear plant is getting every necessary approval from the various constituencies in a state or the local community that can delay or block siting and construction. After all, a great many people do not want to live or work near a major nuclear power plant. So, as the power plant manufacturer and utility go through this lengthy process, they naturally want to cram as much power into the site as possible. This is another economy of scale that drives power plants to be so big.

The possibility that siting smaller nuclear plants is somehow going to be much faster and smoother has not been seen historically. And that’s why we already see multiple SMRs typically sited together, as was the case with NuScale. But that raises a question: If most of the applications for an SMR are going to involve multiple units in the same place, the manufacturer is going to be driven toward simply building bigger plants, which is exactly what has happened over the past seventy years.

One of the strangest aspects of the SMR discussion is that more than fifty SMR designs are currently in various stages of development. But the only rationale for SMRs is the possibility that they will overcome the inherent diseconomies of shrinkage by achieving some sort of "economies of standardization"—the gains you might achieve if everyone could settle on one or at most two designs. After all, one of the big failures of the U.S. nuclear industry was the inability to agree on a single design that could make licensing, siting, and construction simpler and potentially less expensive. But if the United States were to have, say, four or five competing SMR designs, then it seems improbable that any of those would achieve economies of standardization because the market in this country (and Europe) for new nuclear plants of any size is not huge. So, the overwhelming majority of startups built around SMR designs seem destined to fail.

Remember, there is no reason to believe that the economies of standardization—if they actually do manifest—would be large enough to overcome both the diseconomies of shrinkage and the inherently high cost of nuclear plants. But that is precisely what would be needed to create a successful commercial SMR to compete in the market of the 2030s and beyond. That's especially true with all the advances we see in emerging competitors to nuclear power, such as enhanced geothermal systems.

Indeed, the DOE's own September 2024 "Pathways to Commercial Liftoff: Advanced Nuclear" report modeled a median cost per MW over 50% higher for SMRs than for large reactors. **It is exceedingly rare for the DOE to issue a report so negative on a technology that it promotes, like SMRs**. If they ever become commercial, SMRs might lead to the highest electricity price rises ever seen. The report makes clear we wouldn't pursue countless SMR designs if we were serious about nuclear. Savings from modularity require mass-producing one or, at most, two designs. The current U.S. strategy means virtually all SMR companies will fail, and costs will remain very high for a long time.

A 2014 journal article concluded, **"We argue that scientists and technologists associated with the nuclear industry are building support for small modular reactors" by putting forward "rhetorical visions imbued with elements of fantasy that cater to various social expectations."**[90] These include the possibility of "risk-free" energy by using terms such as "passive safety" and "inherently safe." They warn that these visions involve "downplaying," or "erasing" and "selectively presenting," data about "the cost and economic competitiveness of SMRs."

We've already seen that the entire discussion about nuclear power and SMRs involves downplaying, erasing, or selectively presenting data about the cost and economic competitiveness. The same fantasy applies on the safety side.

Indeed, the scant attention to safety in the public debate about hydrogen from nuclear power is particularly worrisome because it appears to reflect a complete lack of awareness of just how hazardous a fuel hydrogen is.

Hydrogen Is a Dangerous Gas—Especially for Nuclear Reactors

As we've seen, producing hydrogen by using electricity from a nuclear plant does not make much sense economically or environmentally. Nuclear power is simply too expensive, and it can reduce far more CO_2 far more affordably by simply providing power directly to the grid. It also already achieves a benefit often touted for future hydrogen projects of providing electricity that isn't intermittent.

But nuclear power plants, like most fossil fuel power plants, generate a considerable amount of heat, which they throw away. This appears to create an opportunity because high-temperature electrolysis, over 900°F (500°C), using solid oxide electrolyzer cells, can, in theory, achieve very high efficiency. The DOE's Idaho National Laboratory has for years been aggressively promoting such high-temperature electrolysis as "a path to hydrogen economy."[91]

But as a 2023 Clean Air Task Force report explained, the technology is not yet commercial and will require major technical advances to get there.[92] And there's another major limitation of high-temperature electrolysis. Safety is perhaps the single highest priority for any nuclear power plant. The NRC devotes significant time and money to vetting proposed designs for nuclear power plants or any major change in such designs. Regulators understand the risks posed by the uniquely hazardous physical characteristics of hydrogen because nuclear accidents often generate massive amounts of hydrogen.

Indeed, the 1979 President's Commission on the Three Mile Island (TMI) accident concluded, "Those managing the accident were unprepared for the significant amount of hydrogen generated during the accident."[93] During the licensing process, "the utility represented and the NRC agreed" that in a major "loss of coolant accident," hydrogen would not be a concern for weeks. But in reality, "in the first 10 hours of the TMI accident," which was not even considered a major accident, "enough hydrogen was produced in the core by a reaction between steam and the zirconium cladding and then released to containment to produce a burn or an explosion that caused pressure to increase by 28 pounds per square inch in the containment building."

In 2011, the International Atomic Energy Agency (IAEA) in Vienna explained in a 160-page report on the dangers of hydrogen in severe accidents that **"ignition of dry hydrogen-air mixture can occur with a very small input of energy."[94] How small? "Possible sources of accidental ignition are numerous, such as sparks from electrical equipment and from the discharge of small static electric charges."** That's why, in the few industrial settings where hydrogen is plentiful, safety rules are strict and can be onerous. For instance, people are often required to wear static-free clothing.

Hydrogen burns invisibly and is unusually flammable compared with other gases like natural gas. Also, the normal flame speed of hydrogen is 5–10 feet per second, some ten times faster than that of natural gas. All of this makes hydrogen fires harder to control. Worse, as the IAEA warns, it has many combustion regimes "in a severe accident scenario" where speeds above sound velocity—1,000 feet per second—are routine. And concentrations of hydrogen above 30% can create a detonation, "a combustion wave that travels at supersonic speeds relative to the unburnt gas in front of it." That speed can be over 6,000 feet per second.

Therefore, we should expect the NRC to apply significant oversight of any design or design change that places a large hydrogen generation and storage system near a nuclear reactor. Such systems add entirely new risks to a nuclear plant since they can have severe explosive accidents of their own, which is why industrial settings typically require large separations between them and other buildings.

Thus, Trump's move to give the White House control of the previously independent NRC is especially troublesome in the case of collocating hydrogen and nuclear reactors. Indeed the 2023 Clean Air Task Force study explained, "Actually harnessing nuclear process heat from an existing reactor for electrolysis is a lot more complicated than conducting a simulation" and "*could quickly become a permitting nightmare*."[95]

France's state-owned electric company, EDF, has pursued such a project and described serious limitations facing similar retrofits. For instance, the potential to harness steam is limited to lower pressures, "significantly limiting the size of the electrolyzer to double-digit MWs." Also, the electrolyzer needed to be "sited at least several hundred meters from the reactor for safety reasons, limiting the quality of heat that can be transferred to the [electrolyzer] to about 200C."

Thus, large-scale hydrogen generation using nuclear plants located with high-temperature thermal electrolysis seems fraught with risk, and efforts to eliminate that risk probably undercut nuclear-generated hydrogen's modest value. Ultimately, using nuclear power plants of any size to make hydrogen for use as an energy carrier is unlikely to be a practical, affordable, or scalable strategy, and it raises serious issues of safety and opportunity cost.

CONCLUSION

Building new nuclear power plants means higher energy bills for consumers—even before they are finished being built and even if they are never finished. Building new SMRs means even higher energy bills than that. Indeed, **if they ever become commercial, SMRs might lead to the highest electricity price rises ever seen.**

SMRS are a dead end for powering data centers**,** with high risks of cost overruns, delays, and reliability/safety problems. These problems have thwarted efforts to commercialize SMRs for decades. Trump's tariffs increase those risks since SMRs require foreign sales, uranium, and components from countries like Canada to succeed.

SMRs make no sense for generating hydrogen from an economic, climate, or safety perspective for decades, if ever, as I discuss here and at even greater length in my new book, *The Hype About Hydrogen: False Promises and Real Solutions in the Race to Save the Climate*. At the same time, Trump's policies "severely increase the risk of expensive, unexpected nuclear accidents,**"** *Scientific American* warned in March.

The current strategy of pursuing multiple new SMR designs simultaneously is exceedingly unlikely to lead to a "nuclear Renaissance," as even the DOE's own September 2024 "Pathways to Commercial Liftoff: Advanced Nuclear" makes clear. This all but guarantees that the primary competition—new renewables plus storage—continues to dominate.

It would be unprecedented in the history of energy for smaller nuclear reactors to overcome not only the high cost per MW of large nuclear plants but also the diseconomies of shrinking them down—and then to somehow keep dropping in price so sharply that SMRs become such clear marketplace winners as to make a major contribution to cutting greenhouse gas emissions by 2050. This is especially true since SMRs show every sign of the kind of cost escalation that has plagued larger nuclear reactors for decades. Even China, the only country in the world still building a significant number of nuclear plants, cannot build SMRs quickly or affordably.

Any company or country that wants to power data centers or their economy with low-cost, low-risk, very low-carbon, reliable, and safe power that can be built in a timely fashion should be 1) building solar, wind, and battery storage now (with a minimum amount of natural gas), and 2) commercializing enhanced geothermal power over the next few years so it can be scaled up as the core affordable carbon-free baseload and dispatchable power post-2030.

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Romm spent 5 years in the 1990s working on climate and clean energy solutions at the U.S. Department of Energy. From 1993 to 1995, he helped the Deputy Secretary oversee the Office of Energy Efficiency and Renewable Energy (EERE) as well as the Office of Nuclear Energy. From 1995 to 1998, he helped to run EERE and oversee technology and policy analysis for the office—ultimately serving as Acting Assistant Secretary, where he oversaw a $1 billion budget for R&D, demonstration, and deployment of climate solutions, including solar, wind, geothermal, and advanced batteries.

In 2008, Romm testified on the economics of nuclear power in front of the Senate Committee on Environment and Public Works Subcommittee on Clean Air and Nuclear Safety. That year, he was also elected a Fellow of the American Association for the Advancement of Science for "distinguished service toward a sustainable energy future." In 2009, Time magazine named him "Hero of the Environment" and "The Web's most influential climate-change blogger" for his work at Climate Progress. Rolling Stone named him one of "100 people who are changing America." In 2004, Romm was given the Ban Ki-Moon Award for Environmental Leadership from the former UN Secretary-General.

Romm has 11 books on climate change, clean energy, and communications, including an Oxford University Press book that NY Magazine called "the best single-source primer on the state of climate change." Romm's 2004 book, "The Hype about Hydrogen: Fact and Fiction in the Race to Save the Climate," was named one of the best science and technology books of 2004 by Library Journal. On April 22, Island Press is publishing a completely revised and updated edition, "The Hype About Hydrogen: False Promises and Real Solutions in the Race to Save the Climate," which discusses hydrogen, e-fuels, fusion, direct air capture, and small modular reactors.

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