TIC Asset Management

Small Modular Reactors: Why This Time Might Be Different

By Francisco Heitor

The Historical Roadblock of Nuclear Investment

Nuclear power has always been seen as a promising source of clean, reliable energy. But in practice, the industry has struggled to scale. High upfront capital requirements, frequent construction delays, and political volatility have kept nuclear energy from becoming a mainstream solution. While nuclear has some of the lowest operating costs among energy sources, traditional large-scale reactors can cost more than $10 billion and take 8 to 12 years to complete.

Even after they're built, these plants often operate in markets that don't fully reward their reliability. In energy-only markets with volatile pricing, nuclear's high fixed costs can become a liability. On top of this, the sector doesn't benefit from economies of scale in the way that other industries might — building larger plants hasn't translated into lower per-unit costs. Instead, project complexity and regulatory hurdles tend to increase.

Public skepticism, especially following major accidents, has led to heightened scrutiny and stricter safety regulations. These added layers of oversight, while important, have contributed to long delays and increased costs. As a result, nuclear power has earned a reputation as a bureaucratically complex and politically sensitive investment — one with high capital expenditures and long timelines to recoup them.

SMRs: A Structural Shift

Small Modular Reactors (SMRs) offer a fundamentally different proposition. Ranging from 50 to 300 megawatts per unit (compared to traditional reactors which typically exceed 1,000 MW) SMRs are designed to be factory-built and modular. This model relies on what's often called economies of series, or economies of learning, where building many identical units leads to efficiency gains and cost reductions over time.

SMRs can be deployed in stages, which is attractive for utilities uncertain about future demand. Their smaller size opens new applications too, such as replacing aging coal plants, supporting remote areas, or supplying industrial heat. Many designs incorporate passive safety systems, which can streamline regulatory approvals and reduce insurance costs.

Most importantly, SMRs reduce the financial exposure that has long plagued nuclear projects. Instead of risking $10 billion on a single asset, a 300 MW SMR can be built for around $1.5 billion, with room to expand modularly. Shorter construction windows — targeting three to five years — further help reduce financing costs and political risk. These factors could make SMRs a more practical, bankable option.

Globally, more than 80 SMR designs are currently in development across 18 countries. The U.S. leads with 22 projects, followed by Russia and China. Several of these initiatives are receiving government backing, and interest from private-sector players, such as Amazon, which signals a growing commercial appetite.

A France-Like Model for the 21st Century?

France provides a useful historical reference. During the 1970s and 1980s, the country rolled out dozens of standardized pressurized water reactors (PWRs) in quick succession. This centralized, fleet-based approach leveraged learning curves, simplified procurement, and reduced regulatory friction. Today, more than 70% of France's electricity still comes from nuclear power.

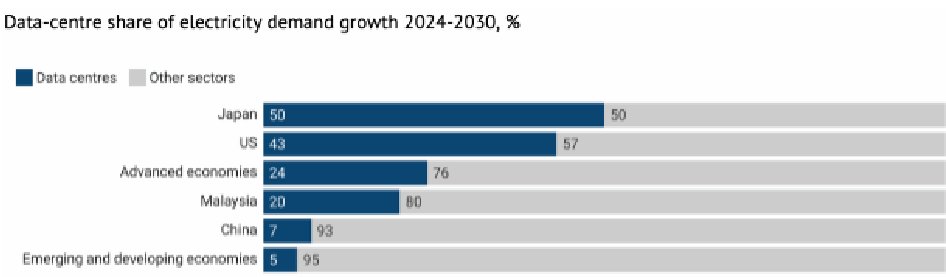
While today's energy systems are more market-driven and decentralized, SMRs could bring back some of those advantages. Deploying standardized models at scale can cut costs and shorten construction timelines by streamlining approvals, simplifying maintenance, and reducing logistical complexity. Repetition makes these projects more predictable, which investors value.

Early SMR projects will still be expensive. But once a design is deployed 20 times or more, unit costs are likely to drop significantly. France's experience offers strong validation of this potential.

Demand Catalysts: AI and Data Centers.

The explosion of AI-related computing power is reshaping global energy needs. Training AI models, running cloud services, and powering massive data centers all require high volumes of continuous electricity. According to the IEA, it could account for up to half of electricity demand growth in some countries, (Graph 1).

These training operations can't afford outages and demand 24/7, high-density, and increasing carbon free energy. That demand profile aligns perfectly with nuclear's strengths. SMRs are well-suited to deliver steady output, can be placed near industrial or digital infrastructure, and meet growing ESG (Environmental, Social and Governance) expectations. Tech giants such as Amazon, Microsoft, Meta, and Google have long-term horizons and



Graph 1. Source: IEA

robust balance sheets, making them ideal candidates for long-term power purchase agreements (PPAs).

These agreements provide revenue stability. One of the biggest obstacles to nuclear project financing. For instance, in 2025, Amazon entered a PPA linked to an upcoming SMR project in the U.S., while Microsoft committed to sourcing nuclear power for its AI platforms. Google and others are exploring similar paths. What's emerging is a partial shift in leadership, from governments to private firms, driving nuclear development.

While AI-related demand may accelerate early commercial momentum, the long-term economics of SMRs will ultimately depend on political commitment and state-level strategic decisions. First-of-a-kind deployments require regulatory stability, long-term policy clarity, and, in many cases, direct public financial support to absorb construction and technology risk. Even with strong private offtakers, large-scale SMR expansion will hinge on whether governments actively incorporate these reactors into national energy planning frameworks and treat them as strategic infrastructure rather than purely commercial assets.

Why Would Governments Bet on SMRs?

The case for SMRs may be compelling on paper, but the real question is political: why would a government disrupt an existing energy mix to adopt a technology that remains commercially unproven, carries historical baggage, and is almost certain to face public opposition? The answer lies in a set of converging pressures that are quietly making the status quo untenable for a growing number of countries.

The most immediate driver is coal retirement. Many advanced economies are decommissioning coal-fired plants to meet net-zero targets, but renewables alone cannot fill that gap reliably. Solar and wind are intermittent by nature — they cannot guarantee the round-the-clock baseload supply that industrial economies require. An SMR can be installed on the same grid infrastructure as a retiring coal plant, at the same site, without requiring new transmission lines. For countries like Poland, which has committed to phasing out coal while facing real energy security concerns, this is not an abstract benefit but a structural necessity.

The second driver is geopolitical. Countries across Eastern Europe, including Bulgaria, Lithuania, Estonia, and Serbia, have recently signed agreements or reversed long-standing nuclear bans, driven largely by a desire to reduce energy dependence on Russian fossil fuels. In this context, an SMR is not just an energy asset as it is also a sovereignty decision. The same logic applies to countries seeking to reduce exposure to volatile LNG markets or unreliable cross-border electricity imports.

Third, the financial architecture around nuclear is fundamentally changing. In June 2025, the World Bank lifted its long-standing prohibition on nuclear project financing, with its updated policy now explicitly supporting SMR deployment, a shift that significantly eases hesitation among institutional investors. Combined with the EU's classification of nuclear as a green energy under its taxonomy, governments can now access cheaper capital for these projects, which materially changes the political cost-benefit calculation.

The political risk, however, is real and should not be underestimated. Public acceptance remains deeply shaped by Chernobyl and Fukushima, and the cancellation of NuScale's Idaho project in 2023, after costs nearly doubled, handed critics a concrete example to cite. Governments that move forward will need to frame SMRs not as a revival of Cold War-era nuclear, but as a modern, modular infrastructure investment, closer in concept to a data center than a power station.

Investment Outlook

The commercial case is gaining real-world validation beyond the private sector. Romania is on track to become the first EU country to deploy an SMR, with NuScale's plant at Doicești targeting 2030. In the United States, federal support has been unambiguous across two administrations: the Department of Energy committed $900 million to help first deployments, explicitly framing the program around AI demand and energy dominance. At the political level, EU Commission President Ursula von der Leyen and France's President Emmanuel Macron have publicly backed nuclear as central to the clean energy transition. For investors, this geographic and governmental breadth matters as it signals that SMR demand is not contingent on any single market or administration, reducing one of the sector's most persistent systemic risks.

Several firms are emerging as early leaders in the SMR space. NuScale Power, one of the most advanced players, has received U.S. Nuclear Regulatory Commission (NRC) approval. Oklo is working on fast spectrum microreactors tailored for remote and defense applications, with support from the U.S. Department of Energy. Ultra Safe Nuclear Corporation (USNC) is focusing on high-temperature gas cooled designs with planned deployments in North America and Europe.

TerraPower, backed by Bill Gates, is developing a sodium-cooled reactor with energy storage features and aims to begin construction in Wyoming. GE Hitachi's BWRX-300 design is attracting interest from utilities across the U.S., Canada, and Europe. Each of these companies brings a distinct strategy and technology, offering a range of opportunities for investors.

SMRs are still in the early stages of commercialization, with most first-of-a-kind builds expected between 2026 and 2030. Key risks include cost overruns, regulatory delays, and supply chain constraints. Yet the presence of financially strong offtakers, especially major cloud providers, combined with government incentives and improving regulatory pathways, significantly improves the investment case.

For investors, the focus should be on:

- Developers with regulatory traction and manufacturing partnerships;
- Jurisdictions offering strong policy support and grid challenges;
- Projects backed by long-term PPAs or guaranteed return models;
- Companies addressing energy needs for AI and hyperscale computing.

If early projects succeed, SMRs could become a repeatable infrastructure model, offering reasonable capital costs, steady cash flows, and strong ESG alignment. The nuclear industry has faced setbacks before, but with this convergence of technological innovation, private demand, and geopolitical momentum, **this time might be different.**

References

[1], [2], [3], [4], [5], [6], [7], [8]

Article written in May