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Capital requirements of nuclear startups

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Setting the stage

The next wave of energy innovation is putting a new focus on nuclear power—and on the capital it takes to make it real.

Recent growth in artificial intelligence (AI) has led to a surge in data-center power demand. Power utilities are struggling to keep up. Chatbots and hyperscale data centers are consuming power faster than new plants can be built. As the grid shows signs of strain, the search for abundant, reliable, carbon-free energy has become urgent.

Nuclear energy presents a potential solution for meeting some of the growing electricity demands of data centers. The nuclear industry is responding with numerous next-generation reactors in the development and testing phases. At the same time, startups are navigating questions about the feasibility and public support for a nuclear renaissance.

Against this backdrop, one constant stands out: the extensive capital requirements nuclear startups must marshal to bridge the gap between innovation and commercial deployment.

> “Today’s nuclear startups are positioned at the intersection of urgent energy demand and innovative technology. As data centers, AI, and new industries drive a surge in power requirements, nuclear energy stands out as a solution with reliability, scalability, and carbon-free credentials. The confluence of public policy, growing investor interest, and advances in small modular reactors is creating an unprecedented window of opportunity. For those startups able to amass the necessary capital, the path is open to become leaders in the global energy transition—and to help redefine the future of clean, abundant power.”

Tom Keefe
Audit & Assurance Partner,
Power, Utilities & Renewables Sector Leader,
Deloitte & Touche LLP

The economic challenge

Capital cost claims 60% or more of a new nuclear plant's levelized cost of electricity (LCOE).[1] Add other costs like interest, fuel supply, and the development of new designs, and the scale of investor commitment comes into focus.

Another notable variable in the overall cost of capital is timeline. Bringing an innovative reactor to market doesn't stop at research, development, and testing. It can take as long as five years to get approval from the Nuclear Regulatory Commission (NRC), the regulator that licenses commercially owned nuclear power plants in the United States, to build a new reactor.[2] Then there is building the reactor itself, which can tack on at least another five years.[3]

Other countries have shown the potential to build up nuclear power at scale (or at least in much greater volume) with relatively good cost and speed metrics. For example, China has made large investments in this space. On August 19, 2024, the Chinese government authorized the construction of 11 new 1,000-plus-megawatt reactors for a total cost of $31 billion.[4]

Changing the equation

> “The emergence of small modular reactors (SMRs) has the potential to set a new course for energy in the US. With rising demand for clean, reliable power, SMRs offer flexible solutions that support energy transition and unleash new opportunities for growth. By mobilizing capital and harnessing innovation, we can redefine what’s possible for the future of America’s energy mix.“

Jay Cochran
Audit & Assurance Partner,
Energy, Resources & Industrials Industry Leader,
Deloitte & Touche LLP

Of course, what works for one country doesn’t necessarily apply to all economies. For example, some countries must rely on private capital markets with higher required returns; while others, like China, rely more heavily on subsidized public borrowing. And even in China, first-of-a-kind (FOAK) reactors can cost more than subsequent nth-of-a-kind (NOAK) reactors, mainly due to new supply chains for novel components and materials, unique infrastructure, and greater scrutiny in the licensing process.

Still, recent advancements may help to change the equation. A new generation of SMRs are designed to address the efficiency limitations of conventional nuclear reactors. SMRs typically have a power output of less than 300 megawatts, compared to the roughly 1 gigawatt of power that the average conventional reactor produces.[5] Modern SMRs are also factory-built and have safety features that can make them more resilient to accidents.

By one estimate, some 80-plus SMRs are in development globally.[6] The main difference between these designs is the cooling medium. For example, one reactor may use ordinary (or light) water while another uses liquid sodium or helium.

In the US, nuclear power has been a focus area for recent federal policy activity. Since taking office, President Donald Trump has signed a series of executive orders aiming to accelerate the development and deployment of nuclear energy, including by fast-tracking licenses and reforming the NRC.[7] Additionally, the Department of Energy kicked off a pilot program to accelerate the development of nuclear fuel production lines.[8] Meanwhile in Congress, there is bipartisan interest in boosting nuclear energy.

Public and private pathways to capital formation

The financial climate is, for the moment, unusually receptive to capital formation. Volatility remains subdued, with the Volatility Index (VIX) near historically low levels.[9] On September 17, 2025, the Federal Reserve cut interest rates for the first time in nine months and indicated more cuts were likely.[10]

For nuclear startups, this creates an opportunity to secure the long-duration funding their projects require. Unlike more speculative sectors, nuclear carries specific policy backing and a defined demand signal, boosting investor confidence that projects can translate into durable, revenue-generating assets.

Companies that move now have three main pathways to raising capital.

1

Hyperscaler investment

Natural partners for nuclear startups may be the very companies driving surging energy demand. Many hyperscalers have already placed bets on advanced energy solutions to secure long-term, carbon-free power for their data centers.[11] Their balance sheets and energy appetites could make them preferred anchor investors in nuclear projects. A hyperscaler-backed plant may provide both a customer and an anchor investor de-risking development while conveying credibility to the broader capital markets.

2

Venture capital

Venture capital (VC) has played a vital role in seeding the current generation of nuclear startups. Yet the scale of capital required—billions, not millions—means venture funding alone may not be enough to carry projects to commercialization. VC can catalyze innovation at the front end, but nuclear startups must plan for a funding strategy that extends well beyond the traditional venture model.

3

Initial public offering (IPO)

Ultimately, many nuclear companies may need to turn to the public markets. An IPO offers access to broad pools of capital, the liquidity to attract and retain top engineering and operational talent, and the visibility to compete on a global stage. While public investors may demand a higher degree of proof and regulatory clarity than private markets, the size of nuclear's opportunity—and the policy and market tailwinds behind it—make the sector a compelling candidate for future listings.

Hitting the inflection point

> “In the capital-intensive world of nuclear innovation, defining your strategy with clarity isn’t just a leading practice—it’s a business imperative. Investors want more than a bold idea; they want to see an overall roadmap that details technology, market opportunities, regulatory hurdles, and concrete financial projections. The right strategy can help de-risk investment, inspire confidence, and position a startup to turn breakthrough ideas into sustainable market leaders.”

Martin Stansbury
Principal, Strategy for Energy, Resources & Industrials, Deloitte & Touche LLP

So where to go from here? For nuclear startups pursuing venture capital, private equity, and hyperscaler investment, several steps can be considered.

Prepare investor materials. Create a compelling pitch deck detailing the technology, market opportunity, regulatory landscape, and financial projections. Be sure to highlight risk mitigation strategies and scalability plans.

Engage with providers. Involve advisers early to structure transactions, appoint an auditor to advise on establishing and maintaining financial integrity, and enlist a consulting team to provide integration and strategic support.

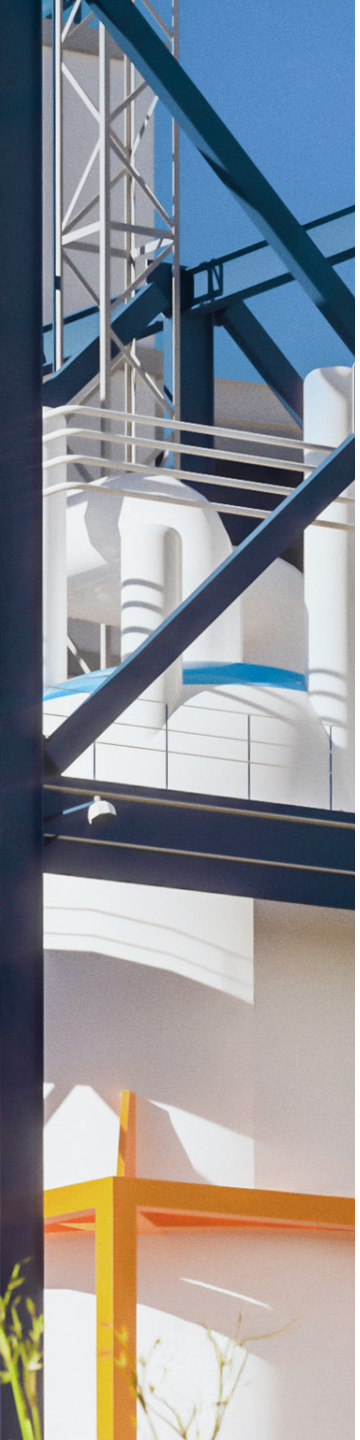
To prepare for an IPO, consider the following:

Gauge your readiness to go public. Tools like IPO SelfAssess™ paired with Deloitte’s tailored IPO Readiness Assessment provide a structured way to evaluate gaps across finance, accounting, IT systems, controls, and executive compensation.

Assemble your team. An IPO requires a coalition of legal, capital markets, audit, and advisory professionals who understand both the US markets and the energy sector. Engage this team early to advise the company on how to develop as a mature public entity before the opening bell rings.

Educate stakeholders. Between SEC filings, exchange rules, US securities law, and complex tax implications, executing an IPO is a demanding process. Enlist your advisory team to educate your board and executive team on the path forward.

Nuclear power is having a moment. But the road to value creation isn’t just about technology and timing. Startups that meet the capital challenge can position themselves to bring their ideas to life and become leaders in the next phase of the global energy transition.



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Endnotes

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