NUCLEAR ENERGY: POWERING THE AI AND INDUSTRIAL ECONOMY

2026 retrospective edition

EXECUTIVE BRIEF
15-minute reading time

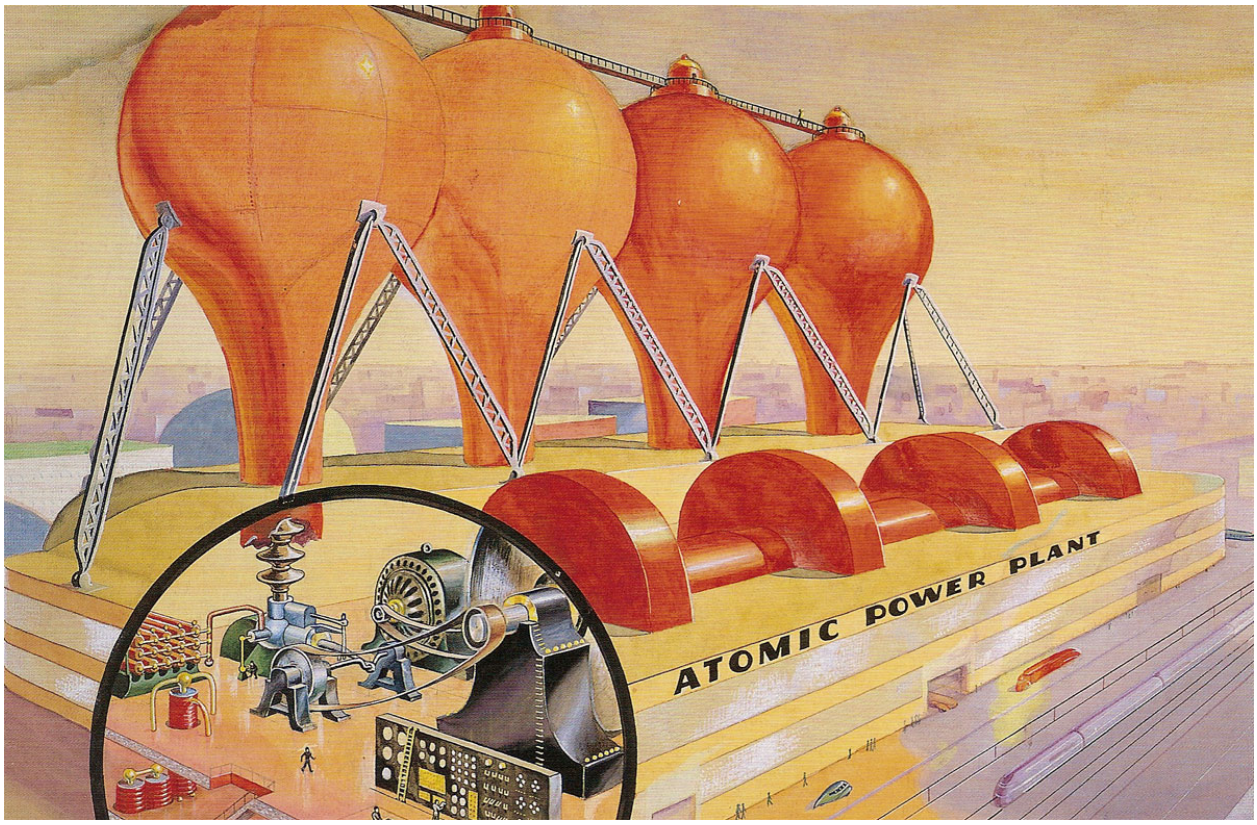

Image: Atomic Power Plant of the Future (1939) by Amazing Stories, an American science fiction magazine.

Several decades ago, people dreamt of a clean, affordable, and prosperous future with sophisticated infrastructure, industry, transport, and ultramodern everyday life powered by atomic energy. Today, nuclear is making a comeback, promising to power the next wave of the digital and industrial economy.

That future is still possible.

EXECUTIVE SUMMARY

In the last three years, nuclear energy has moved from policy aspiration to active capital deployment, marked by strong *government* support through enabling legislation and restarting stalled projects, *Big Tech* companies signing multi-billion-dollar nuclear power agreements, *the World Bank* resuming nuclear financing after six decades, and seventy-four reactors under construction across *15 countries*, with hundreds more planned.

The sector's rapid growth seems irreversible, as reliable electricity has become a strategic asset for the AI and industrial economy, making nuclear one of the defining infrastructure investment opportunities of the coming decades. Today, five key developments are shaping its path.

1. AI is changing the economics of electricity

Hyperscale data centers and advanced computing have transformed electricity from a localized utility into a strategic input for the digital economy. Demand for reliable, high-density power is growing rapidly, making electricity an increasingly scarce and valuable economic resource.

2. Big Tech became an energy buyer

Technology companies are no longer simply purchasing renewable energy—they are signing long-term agreements to secure nuclear power, fundamentally reshaping demand for clean, reliable baseload electricity.

3. Financing returned

The World Bank resumed support for nuclear energy, governments introduced enabling policies, and private capital increasingly recognized nuclear as a long-term infrastructure investment.

4. Advanced nuclear moved from promise to deployment

Small modular reactors and advanced reactor designs continued to progress through licensing, construction, and first-of-a-kind deployments, demonstrating tangible momentum beyond concept designs.

5. The investment narrative changed

What began as a climate-driven revival has evolved into a broader story of industrial competitiveness, energy security, and economic growth. Nuclear is increasingly viewed not simply as a clean energy technology, but as foundational infrastructure for the AI and industrial economy.

WHY NOW

The significant feature of this nuclear cycle is that it was launched by decarbonization but is now being accelerated by economic competitiveness. **Reliable electricity has become a strategic input for AI, advanced manufacturing, and industrial growth**, strengthening the economic case for nuclear investment well beyond climate objectives.

The convergence of AI-driven electricity demand, bipartisan policy reform, multilateral financing, and direct corporate procurement has created conditions for nuclear investment that did not exist just two years ago. These are not cyclical tailwinds – they are structural shifts that are reshaping the global energy landscape. Investors who understand the sector's risks and position themselves ahead of the next wave of deployment – from advanced reactor technologies and emerging market expansion to supply chain development – will be well positioned to participate in what is shaping up to be the next industrial revolution.

NUCLEAR POWERING THE AI ECONOMY

Artificial Intelligence is a major driver for the rapidly growing demand of electricity. Generative AI and the next-generation digital intelligence technology, such as quantum, world models and physical world models, require unprecedented computing capacity supported by reliable, continuous power. Training models, operating hyperscale cloud infrastructure, and serving billions of AI-powered queries requires vast amounts of electricity – this demand will continue to grow as the use of technology scales and more solutions becomes available.

For technology companies, electricity is becoming a strategic production component, which determines where new computing infrastructure can be built and how quickly AI services can scale. Access to abundant electricity is becoming a competitive advantage in the race for the AI leadership not only for companies but also in the geopolitical race between countries.

Nuclear energy has several advantages particularly suited for the digital economy. First, it offers 24-hour baseload electricity with high-capacity factors, supporting continuous operation of energy-intensive computing infrastructure. Second, it requires relatively small land areas, even for full-scale reactors. Third, despite large upfront costs, a nuclear power plant’s long operating life can provide price stability over time. Fourth, small modular reactors (SMRs), when they become commercially available, can provide greater flexibility in deployment co-locating near data centers, industrial corridors, mining operations, and remote communities. Furthermore, nuclear delivers clean, emissions-free electricity – a critical decarbonization objective for many businesses.

As compute and energy become increasingly interconnected, leading AI companies become new energy generation investors and buyers. Companies like Alphabet, Meta, Microsoft, and Amazon – tech leaders deploying billions into AI infrastructure – are directly investing corporate capital into nuclear. Oracle and OpenAI announced in 2025 the “Stargate” initiative to build out data center capacity for over 7GW across six sites in the United States.

Energy is part of the critical infrastructure, not only for data centers, but also for advanced manufacturing, semiconductor production, hydrogen production, research facilities, and other energy-intensive industries. ***Nuclear has the potential to become an anchor for these emerging ecosystems – the enabling infrastructure for the next industrial economy.***

MARKET OPPORTUNITIES

After decades of stagnation and decline, the nuclear power industry is seeing a significant comeback. Established players and new companies are working on innovative solutions to improve traditional large-size light-water reactors and introducing next-generation advanced nuclear solutions of smaller, modular designs. Globally, **74 reactors are under construction in 15 countries** as of early 2026 — up from 60 in early 2024 — with an additional 120 reactors planned and over 300 more proposed. Many countries in the emerging markets, including those in Eastern Europe, Asia Pacific, the Middle East, and Africa, have received approval (or are awaiting it) to start new nuclear power projects in the coming 10-15 years. This represents one of the largest infrastructure opportunities of the coming decades.

Nuclear Power Market Summary

- *Expected growth to 2050*: ~570 GWe in additional capacity, reaching approximately 992 GWe globally (IAEA, 2025).
- *Expected market size*: **$2.2 trillion** in new nuclear investment through 2050 (Morgan Stanley, 2025).
- *SMR investment* alone projected to grow from $5 billion today to $25 billion annually by 2030, with cumulative investment of $670 billion through 2050.
- *Fastest growing country*: **China** (36 reactors under construction; 110 GW total capacity targeted by 2030, as of mid-2026).
- *New markets*: Middle East, Africa, and Southeast Asia.
- *Projects in developing countries*: Poland, Romania, Armenia, Czech Republic, Egypt, Turkey, Bangladesh, and Uzbekistan.

Source: IEA (2026), IAEA (2025), Morgan Stanley (2025), World Nuclear Association (2026)

Figure 4.2 Global nuclear capacity projections 2025-2050

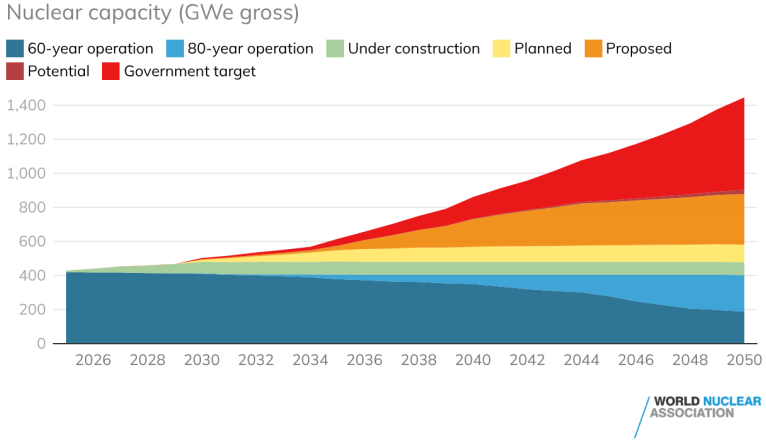

Figure 4: Global nuclear capacity projections, 2026-2050. WNA (2026).

Global Nuclear Market Projections

Global nuclear investment currently runs at approximately $65 billion per year. Under current policy trajectories, the IEA projects this rising to $70 billion by 2030; under announced national pledges, it reaches $120 billion; under a full net-zero scenario, it exceeds $150 billion annually by 2030. The IAEA has raised its nuclear capacity projections for five consecutive years, now projecting global operational capacity of 992 GWe by 2050 — more than double today's 420 GWe. These projections reflect a substantial increase in construction activity: ten new reactor construction starts were recorded in 2025 alone (nine in China, one in Russia), totaling 12.2 GW of new capacity initiated in a single year.

Opportunities for US Nuclear Industry

The US nuclear industry remains a global leader, combining established reactor vendors, world-class engineering capabilities, and one of the strongest pipelines of advanced reactor innovation. The policy environment has materially improved: the Inflation Reduction Act provides production tax credits of up to $15/MWh for existing nuclear plants and technology-neutral investment credits for new advanced reactors, while the ADVANCE Act (2024), passed 88-2 in the Senate, streamlined NRC licensing and reduced regulatory costs for advanced reactor applicants.

The following are the most promising prospects driven by the IAEA target of 992 GWe in global nuclear capacity by 2050:

- **US nuclear exports** could be worth $1.9 trillion over the next 30 years (UxC, 2022).
- **Technology transfer and new build.** Most planned global builds remain based on large light water reactor technologies. As advanced designs mature, the SMR market will expand rapidly alongside. US vendors hold leading positions in the most commercially advanced SMR designs. In March 2026, TerraPower received the NRC's first-ever construction permit for a commercial non-light-water reactor; Kairos Power began Hermes test reactor construction in May 2025. US innovation proven this decade will access a sizeable share of the global advanced reactor market.
- **Corporate power procurement.** A new category of offtaker has emerged. Microsoft, Amazon, and Google have signed direct nuclear PPAs with US operators and developers — including the 2027 restart of Three Mile Island under a Microsoft agreement with Constellation Energy — creating contracted revenue streams that underpin project financing for new builds.
- **Operations.** The service market — engineering services, component supply, fuel cycle services — will expand rapidly as new units are added worldwide. US suppliers are well positioned to access this growing market.
- **Decommissioning and waste management.** US vendors hold significant advantages given the country's extensive experience with reactor life extensions. Much of the existing global reactor fleet originates from US technology, giving US vendors a natural advantage in selling services and components internationally. Growing demand for decommissioning services, driven by aging reactor shutdowns in numerous countries, adds further opportunity.
- **Project financing, especially in emerging markets.** A growing number of developing economies have approved nuclear programs and will require foreign capital and

technology partners. These are mainly government-level programs to provide risk guarantees, but private sector can still play a part as technology vendors, equity partners, or offtakers. See *Emerging Markets* for region and country-level detail.

Source: Mordor Intelligence (2026), World Nuclear (2026)

EMERGING MARKETS: THE NEXT GROWTH FRONTIER

The next phase of the nuclear renaissance will increasingly be driven by emerging markets. As electricity demand accelerates across developing economies, governments are turning to nuclear energy to strengthen energy security, support industrialization, and meet rising demand for reliable, low-carbon power.

More than 70% of global electricity demand growth through 2050 is expected to occur outside high-income countries, with the vast majority coming from countries already considered ready—or potentially ready—for nuclear energy. According to Third Way's *2026 Global Nuclear Market Map*, the global nuclear market could triple by mid-century, reaching approximately **$380 billion annually by 2050**.

A major catalyst for this expansion has been the return of multilateral financing. In 2025, the World Bank ended its long-standing prohibition on financing nuclear energy, followed shortly by the Asian Development Bank. Together, these institutions can now support reactor life extensions, technical assistance, and new nuclear deployment, providing sovereign financing and risk-sharing mechanisms that have historically been unavailable to first-time nuclear countries.

While every region is progressing at a different pace, several markets stand out:

- **Eastern Europe** is leading near-term deployment, driven by energy security, replacement of aging infrastructure, and European decarbonization goals.
- **The Middle East** is transitioning from early ambitions to commercial deployment following the successful commissioning of the UAE's Barakah nuclear power plant.
- **Asia-Pacific** remains the industry's largest growth market, led by China while countries across South and Southeast Asia evaluate both conventional reactors and small modular reactors to meet rapidly growing electricity demand.
- **Africa** represents the longest-term opportunity. Although South Africa remains the continent's only operating nuclear nation, several countries are developing regulatory frameworks with support from the IAEA and international development institutions.

Investment Implications

The expansion of nuclear into emerging markets represents more than geographic diversification—it reflects a structural shift in global energy investment. As financing mechanisms mature and governments strengthen regulatory frameworks, opportunities are emerging across reactor technologies, engineering and construction, fuel supply, grid infrastructure, and long-term operations.

Not every market will advance at the same pace. Successful deployment will depend on political commitment, credible regulation, financing capacity, and experienced technology partners. For investors and industry participants, selectivity will remain essential. However, the combination of accelerating electricity demand and improving access to capital suggests that emerging markets are likely to become one of the primary engines of growth for the global nuclear industry over the coming decades.

Source: Third Way (2026), Energy for Growth Hub (2026)

FINANCING THE NUCLEAR RENAISSANCE

The financing environment for nuclear energy has changed fundamentally.

Institutional Capital
Institutional enthusiasm has moved well beyond white papers and into active capital deployment. Goldman Sachs, Bank of America, JP Morgan, Citibank, and Guggenheim have all signaled strategic interest in the sector. Brookfield Asset Management — which acquired Westinghouse Electric for $7.9 billion in 2023 — secured a conditional **$17.5 billion DOE loan** commitment in June 2026 to finance long-lead equipment for up to 10 Westinghouse AP1000 reactors, the largest single nuclear financing commitment in US history. DOE loan guarantees, IRA tax credits, export credit agency financing, and long-term corporate power purchase agreements (PPAs) are creating the risk-sharing framework needed to support large-scale nuclear investment.

Corporate Procurement: a new financing category
Perhaps the most consequential financing development of 2024–2026 has been the emergence of Big Tech as a direct purchaser of nuclear electricity. Long-term PPAs with highly creditworthy corporate buyers provide the revenue certainty that has historically constrained nuclear project finance. Key examples include:

- **Microsoft** signed a 20-year, 835 MW PPA with Constellation Energy to restart Three Mile Island (Crane Clean Energy Center).
- **Amazon** signed a 17-year, 1.92 GW agreement with Talen Energy and invested $700 million in X-energy.
- **Google** committed to purchase up to 500 MW from Kairos Power's planned SMR fleet.
- **Meta** signed a 20-year, 1.1 GW agreement with the Clinton Clean Energy Center.

As of mid-2026, every major hyperscale technology company has secured at least one long-term nuclear power agreement.

Private investment. Private capital continues to flow into advanced nuclear technologies. TerraPower, X-energy, and Kairos Power have all secured substantial public and private financing to advance commercial deployment. Oklo, which became publicly listed in 2024, ended 2025 with approximately **$1.4 billion** in cash and a reported 14 GW customer pipeline, supported by partnerships with Meta and Nvidia.

Government-backed financing. Emerging market nuclear programs increasingly rely on bilateral agreements, export credit agencies, and multilateral development banks. The World Bank and Asian Development Bank both resumed support for nuclear energy in 2025, significantly expanding financing options for countries pursuing first nuclear programs. Projects across Poland, Romania, the Czech Republic, Egypt, Bangladesh, and Southeast Asia illustrate the growing international pipeline.

Life extensions. Extending the operating life of existing reactors remains the fastest and lowest-cost path to expanding clean nuclear capacity. Electricity from life-extended U.S. reactors is estimated to cost approximately **$31/MWh**, compared with **$141–221/MWh** for new nuclear construction (Lazard, 2025). More than 90% of the U.S. reactor fleet has already received license extensions to operate for up to 60 years, with many expected to pursue further extensions.

Innovation and consolidation. More than 80 advanced reactor designs are under development across 19 countries. As technologies mature, the sector is expected to consolidate around standardized designs capable of benefiting from serial manufacturing, deeper supply chains, and lower construction costs.

Regulation. Governments are also modernizing nuclear regulation to reduce development timelines and improve investment certainty. In the United States, the ADVANCE Act, subsequent executive actions, and the NRC's new Part 53 framework have accelerated licensing for advanced reactors. Similar reforms are underway in the United Kingdom, Canada, Japan, and across Europe, reflecting a broader shift toward enabling commercial deployment rather than simply regulating the industry.

Source: NRC (2026), MorganLewis (2026), nuclearnewswire (2026), nippon (2025)

LOOKING FORWARD

Nuclear energy has crossed an important threshold—from viability to execution. Reactors are being built, long-term power contracts are being signed, financing structures are maturing, and advanced reactor technologies are moving from design toward deployment. The investment question has shifted from whether nuclear will play a role in the future energy system to where capital should be positioned as the sector scales.

What to Watch

Several developments will determine which technologies, companies, and markets emerge as long-term winners over the coming decade:

- **Commercial deployment of SMRs.** The BWRX-300 project at Darlington will be the first large-scale test of whether small modular reactors can be delivered on schedule and at competitive cost. Its success will influence financing and deployment of future designs.
- **Expansion of fuel supply.** Commercial-scale production of HALEU and additional Western enrichment capacity remain critical to supporting advanced reactor deployment and reducing dependence on Russian fuel supplies.

- **Corporate demand for nuclear power.** Long-term agreements signed by Microsoft, Amazon, Google, and Meta represent a new financing model. Successful execution will encourage broader corporate procurement of nuclear electricity.
- **Restart and life extension of existing reactors.** Projects such as Three Mile Island, Palisades, and Duane Arnold demonstrate the growing value of existing nuclear assets as electricity demand rises.
- **Emerging market deployment.** Financial close on the first wave of projects in Poland, the Czech Republic, the Middle East, and Asia will be an important signal that new financing models can support nuclear expansion beyond traditional markets.
- **Industry consolidation.** As more than 80 advanced reactor designs compete for commercial deployment, regulatory progress, strategic partnerships, and acquisitions will increasingly distinguish long-term winners from technologies that fail to reach market.

Key Considerations

The outlook for nuclear is increasingly favorable, but several challenges remain. Not every advanced reactor developer will reach commercialization, and regulatory approval will continue to separate viable technologies from the rest. Fuel supply—particularly uranium enrichment and HALEU production—remains a strategic bottleneck, while project success will continue to depend on stable policy frameworks and access to long-term capital.

Execution risks are still elevated. The gap between announced projects and projects that reach financial close — let alone construction completion — has historically been wide in nuclear. Plant Vogtle, the most recent US reference point, came in years late and billions over budget. The pipeline of planned reactors globally is large; the pipeline of projects with committed financing, regulatory approval, and experienced contractors is much smaller. Cost overruns, supply chain bottlenecks for nuclear-grade components, and workforce shortages in specialized trades remain structural constraints that policy reform alone cannot resolve. For investors, the distinction between a country with a nuclear aspiration and a country with a credible execution pathway is the most important underwriting judgment of this cycle.

Despite these challenges, the convergence of AI-driven electricity demand, industrial policy, corporate procurement, and renewed public and private investment has fundamentally changed the sector's trajectory, putting it on the defining path of the **long-term economic growth globally**.

Nuclear Energy Outlook full version:
The full-length version of the Nuclear Energy Outlook containing over 24 pages of information across 10 sections along with references is available on Substack:
https://juliagraf.substack.com/p/nuclear-energy-powering-the-ai-and

ABOUT

Scale Economy Outlook is a research series exploring the technologies, industries, and ideas shaping the next industrial economy. Each report examines where innovation creates business and economic value – and what it takes to scale it.

There are several initiatives in the pipeline, including:

Outlook | AI & Jobs
Outlook | Digital Trends
Outlook | Transition Economy

About the author

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About the company

Scale Economy Group is a strategy, research, and advisory firm helping businesses, investors, and public sector organizations identify where emerging technologies create value—and how to scale that value into long-term business and economic growth.

Our work is guided by five questions:

- Is this technology real?
- Is this market investable?
- Where is value being created?
- What are the barriers to adoption and scale?
- What will matter in five years?