Nuclear Energy's Comeback

Researched by Hey Lefty

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TL;DR

The nuclear resurgence is entering a highly operational phase as federal regulators dismantle grid backlogs and unlock strategic military fuel stockpiles to meet the urgent power demands of AI data centers. From Constellation Energy's fast-tracked Three Mile Island restart to Nano Nuclear's NRC milestone and Oklo's weapons-grade plutonium deal, the industry is securing both the regulatory runway and the fuel pipelines needed for next-generation deployment.

Regulatory Fast-Tracking for Hyperscaler Grid Demands

Federal regulators are actively dismantling grid and licensing barriers to accelerate nuclear projects linked directly to artificial intelligence infrastructure.

> *"The Federal Energy Regulatory Commission on Monday evening filed a waiver allowing power plant owner Constellation Energy to transfer certain grid rights from its Eddystone natural gas-fired power plant outside of Philadelphia to the Three Mile Island nuclear power plant."* — Constellation Energy Wins Critical FERC Waiver to Accelerate Three Mile Island Restart

This landmark FERC waiver, reported by Reuters, demonstrates that regulatory bodies are willing to employ creative, unprecedented workarounds to bypass severe interconnection backlogs. By allowing Constellation to transfer capacity rights from a fossil fuel plant, the regulator has effectively saved years of delays, putting the Microsoft-backed restart back on track for its 2027 target instead of the original 2031 grid delay Constellation Energy Wins Critical FERC Waiver to Accelerate Three Mile Island Restart.

What to watch: Watch whether other utility operators attempt to transfer capacity interconnection rights from fossil fuel assets to accelerate nuclear restarts.

Microreactors Aligning with High-Density Computing

Microreactor developers are transitioning from theoretical engineering concepts to active regulatory evaluations and direct hardware-integration partnerships.

> *"Acceptance of the Construction Permit Application for review confirms that the NRC has determined the submission contains the information necessary to begin detailed technical evaluation... Entering the NRC review process is an important progression for the KRONOS MMR™ program and further reinforces our transition from development toward deployment."* — Nano Nuclear Energy Microreactor Design Reaches Key Regulatory Milestone with NRC

Nano Nuclear Energy's formal acceptance by the NRC, as detailed on the company's announcement page, represents a critical regulatory milestone for its 15 MW high-temperature gas-cooled microreactor Nano Nuclear Energy Microreactor Design Reaches Key Regulatory Milestone with NRC. This regulatory progress is being paired with commercial ambitions, such as a non-binding agreement with Super Micro Computer

reported by Datacenter Dynamics to explore integrating these self-powering reactors directly into AI server racks.

What to watch: Watch for the formal safety and environmental feedback from the NRC as it conducts its technical evaluation of the KRONOS MMR construction permit application.

Government Backstops Advanced Reactor Fuel Pipelines

The federal government is leveraging strategic military inventories to bypass domestic fuel supply bottlenecks for advanced reactors.

> *"Fuel supply constraints are a key throttle to advanced reactor development. This program creates a pathway to use existing surplus material as bridge fuel for advanced reactors to bring more reactors online sooner."* — DOE Pivots to Fueling Advanced Reactors with Weapons-Grade Plutonium

The Department of Energy's selection of companies like Oklo Inc. to negotiate contracts under the Surplus Plutonium Utilization Program, highlighted by World Nuclear News, represents a major pivot toward recycling military waste into commercial fuel DOE Pivots to Fueling Advanced Reactors with Weapons-Grade Plutonium. By partnering with France's Newcleo, which plans to invest up to $2.0 billion in U.S. fuel infrastructure, Oklo is securing a vital source of bridge fuel that bypasses the severe enrichment constraints currently stalling advanced reactor development.

What to watch: Watch whether Oklo and Newcleo finalize their plutonium recycling and fabrication agreements with the DOE to secure their reactor fuel pipeline.

Long-Term Commitments Squeeze the Uranium Market

Utilities are prioritizing long-term contract security over spot purchases, driving term prices to multi-year highs as they prepare for massive capacity expansions.

> *"The long-term contract market significantly strengthened during the quarter. Reported term prices rose to a range of US$90.00/lb to US$93.00/lb, reflecting utilities' prioritization of long-term supply security over short-term spot purchases."* — Uranium Contract Prices Reach Multi-Year Highs Amid AI-Driven Demand and Supply Constraints

The premium of term prices over spot prices, as detailed in Yellow Cake PLC's quarterly operating update, indicates that utilities are increasingly desperate to secure multi-year supply chains to support reactor restarts and advanced reactor deployments Uranium Contract Prices Reach Multi-Year Highs Amid AI-Driven Demand and Supply Constraints. This structural supply deficit is prompting physical holding companies to aggressively exercise options, such as Yellow Cake purchasing over 1.1 million pounds of uranium from Kazatomprom, to lock in inventory before prices climb further.

What to watch: Watch whether uranium spot prices break past recent highs as physical holding companies and utilities compete for limited uncontracted supply.

What surprised us

- **The PJM grid bypass**: It is surprising that Constellation Energy successfully bypassed PJM Interconnection's initial 2031 grid delay by transferring Capacity Interconnection Rights directly from its Eddystone natural gas plant Constellation Energy Wins Critical FERC Waiver to Accelerate Three Mile Island Restart. This sets a precedent that fossil fuel assets can be cannibalized to fast-track clean energy nuclear restarts for hyperscalers.
- **Oklo's transatlantic fuel alliance**: It is surprising that Oklo is leveraging a partnership with France's Newcleo to secure its DOE plutonium utilization bid DOE Pivots to Fueling Advanced Reactors with Weapons-Grade Plutonium. Newcleo's commitment to invest up to $2.0 billion in U.S. fuel infrastructure shows that foreign capital is aggressively chasing U.S. military-grade plutonium recycling opportunities.
- **Microreactors targeting off-grid AI racks**: For a pre-revenue developer like Nano Nuclear Energy, signing an MoU with Supermicro to integrate microreactors directly into AI server racks is highly ambitious Nano Nuclear Energy Microreactor Design Reaches Key Regulatory Milestone with NRC. It positions microreactors not just as grid contributors, but as bespoke, localized hardware components for high-density data centers.

Open threads worth a vote

- `[NRC rules on Nano Nuclear's KRONOS Construction Permit Application](/topics/019e84f4-a5ca-7b52-849a-3dba92371a3c#threads)`

Appendix: Findings

Constellation Energy Wins Critical FERC Waiver to Accelerate Three Mile Island Restart

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On June 1, 2026, the Federal Energy Regulatory Commission (FERC) granted a vital regulatory waiver that removes a major obstacle to restarting Pennsylvania's Three Mile Island nuclear plant, now renamed the Crane Clean Energy Center. The plant is being resurrected by Constellation Energy (CEG) to power Microsoft's (MSFT) massive regional AI data centers under a landmark power purchase agreement.

Initially, regional grid operator PJM Interconnection had indicated that due to severe interconnection backlogs, the plant would not be permitted to feed power into the grid until 2031. This delay threatened to derail Constellation's commercial timeline. The FERC waiver resolves this by allowing Constellation to transfer Capacity Interconnection Rights (CIRs) from its Eddystone natural gas-fired power plant outside of Philadelphia directly to the Three Mile Island nuclear facility. This regulatory fast-track puts Constellation back on its original target to restart the reactor by 2027.

As reported by Reuters:

> "The Federal Energy Regulatory Commission on Monday evening filed a waiver allowing power plant owner Constellation Energy to transfer certain grid rights from its Eddystone natural gas-fired power plant outside of Philadelphia to the Three Mile Island nuclear power plant." "By granting the waiver, FERC puts Constellation back on track for its 2027 restart goal, the company said."

Strategic and Financial Context

The FERC ruling represents a massive win for Constellation Energy and the broader "nuclear-to-data-center" theme. Constellation's financial position is exceptionally robust, with revenue growing 63.8% year-over-year to a TTM total of $29.87 billion, and quarterly net income reaching $1.60 billion for the period ending March 31, 2026. The company's recent $16.4 billion acquisition of Calpine and the accelerated Crane restart timeline cement its status as the leading independent clean energy producer in the United States. Despite a recent 18.0% pullback in the stock over the past month, trading at $254.83 with a $91.00 billion market cap, the regulatory breakthrough provides significant long-term visibility for Constellation's contract with Microsoft.

Sources

- US regulator grants waiver for Three Mile Island restart

Nano Nuclear Energy Microreactor Design Reaches Key Regulatory Milestone with NRC

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In May 2026, Nano Nuclear Energy Inc. (NASDAQ: NNE) achieved two major milestones that advance its strategy of becoming a vertically integrated advanced nuclear company: the formal acceptance of its KRONOS Micro Modular Reactor (MMR™) Construction Permit Application (CPA) by the U.S. Nuclear Regulatory Commission (NRC), and a strategic partnership with Super Micro Computer (SMCI) to explore powering AI data centers.

NRC Accepts KRONOS Construction Permit Application

On May 20, 2026, Nano Nuclear announced that the U.S. NRC formally accepted the CPA for the deployment of its proprietary KRONOS MMR™ system at the University of Illinois Urbana-Champaign (U. of I.). Submitted on March 31, 2026, by the U. of I. (NNE's deployment partner), the formal acceptance signifies that the application contains sufficient information for the NRC to begin its comprehensive safety, environmental, and technical reviews.

The KRONOS MMR™ is a stationary, high-temperature gas-cooled microreactor designed to produce 15 MW of electricity and operate for up to 20 years without refueling. NNE believes KRONOS is the first commercially-ready microreactor to reach this CPA stage of the NRC's licensing process. Based on current estimates, NNE expects the NRC to complete its formal review in 2027, which would allow the company to begin nuclear construction activities at the U. of I. in the second half of 2027.

Florent Heidet, Chief Technical Officer of Nano Nuclear, stated:

> "Acceptance of the Construction Permit Application for review confirms that the NRC has determined the submission contains the information necessary to begin detailed technical evaluation... Entering the NRC review process is an important progression for the KRONOS MMR™ program and further reinforces our transition from development toward deployment."

Strategic MoU with Supermicro for AI Data Center Power

Complementing its regulatory progress, Nano Nuclear signed a non-binding Memorandum of Understanding (MoU) with Super Micro Computer (Supermicro) on May 6, 2026. The partnership aims to explore integrating NNE's KRONOS microreactors directly with Supermicro's high-density AI server racks, cooling systems, and infrastructure. This collaboration is designed to enable a new class of self-powered, grid-independent AI data centers.

Jay Yu, Founder and Chairman of Nano Nuclear, commented on the energy challenge of AI:

> "The AI revolution is fundamentally an energy challenge, and we believe nuclear power is the only scalable solution capable of meeting that demand. By working alongside one of the world's leading providers of AI server technology, we are positioning Nano Nuclear at the forefront of a new paradigm..."

Financial Position and Valuation

As of March 31, 2026, Nano Nuclear remains a pre-revenue developer but maintains a highly liquid balance sheet. The company holds $197.7 million in cash against just $2.6 million in total debt, although it recorded negative free cash flow of $14.0 million for the quarter ending March 31, 2026. Due to its speculative and high-beta nature (Beta of 5.04), the stock is highly volatile, trading at $23.56 with a market capitalization of $1.23 billion, representing a 58.4% decline from its 52-week high. While critics point to NNE's early-2030s commercial deployment timeline as highly ambitious, its rapid regulatory progression and high-profile tech partnerships continue to fuel investor interest.

Sources

- NANO Nuclear's KRONOS MMR™ and the University of Illinois Urbana-Champaign Advance to Next Regulatory Milestone as U.S. NRC Formally Accepts Construction Permit Application for Review
- Supermicro inks MoU with Nano Nuclear to explore the integration of its micro reactor with data centers

DOE Pivots to Fueling Advanced Reactors with Weapons-Grade Plutonium

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In late May 2026, the U.S. Department of Energy (DOE) selected five advanced nuclear companies to begin advanced negotiations under the Surplus Plutonium Utilization Program (SPUP). This federal initiative aims to repurpose 20 metric tonnes of surplus weapons-grade plutonium by converting it into fuel for advanced reactors, addressing both a long-term defense-waste liability and the severe fuel constraints currently throttling the advanced nuclear sector.

Selected Companies and Oklo-Newcleo Partnership

On May 26, 2026, the DOE announced the selection of five private firms to negotiate contracts for plutonium disposition: **Oklo Inc.** (NYSE: OKLO), **SHINE Technologies**, **Exodys Energy**, **Standard Nuclear**, and **Flibe Energy**. These companies are tasked with developing detailed recycling and fabrication plans to process the DOE's surplus military inventories into commercial reactor fuel.

Oklo is leading its bid in partnership with France-headquartered innovative reactor developer **Newcleo**. Under this transatlantic alliance, Oklo will direct the utilization of the surplus plutonium, while Newcleo brings extensive fuel fabrication experience and has committed to investing up to $2.0 billion via an affiliated investment vehicle into U.S. fuel infrastructure. In March 2026, Newcleo initiated pre-application engagement with the U.S. Nuclear Regulatory Commission (NRC) to license a lead-cooled fast reactor and its associated mixed-oxide (MOX) fuel fabrication facility in the United States.

Jacob DeWitte, co-founder and CEO of Oklo, explained the strategic significance of the program:

> "Fuel supply constraints are a key throttle to advanced reactor development. This program creates a pathway to use existing surplus material as bridge fuel for advanced reactors to bring more reactors online sooner. Material that has been set aside for disposal can instead be converted into fuel to produce electricity through fission."

SHINE Technologies CEO Greg Piefer also highlighted his firm's readiness:

> "Turning surplus material that's been sitting in storage into fuel for the next generation of reactors is exactly the kind of problem we built SHINE to solve."

Financial and Market Context

The selection under SPUP provides a significant boost to Oklo Inc. (OKLO), which is developing its Aurora powerhouse fast-neutron reactor. As of March 31, 2026, Oklo is a pre-revenue developer with a market capitalization of $10.11 billion. It holds a highly liquid balance sheet with $1.59 billion in cash against only $2.6 million in total debt, though it reported a net loss of $33.1 million and negative free cash flow of $50.7 million for the first quarter of 2026. Oklo's stock exhibits high volatility, trading at $58.09 (down 19.1% over the past month and 66.6% below its 52-week high), but its regulatory progress and the DOE's selection underwrite its long-term commercialization strategy.

Sources

- Oklo selected for US surplus plutonium programme

Uranium Contract Prices Reach Multi-Year Highs Amid AI-Driven Demand and Supply Constraints

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The global uranium market in 2026 is experiencing a structural paradigm shift. Driven by the immense, non-negotiable power demands of AI data centers and utility-level clean energy commitments, uranium prices remain highly elevated.

Q1 2026 Spot and Term Contract Pricing Trends

According to the quarterly operating update from London-listed physical uranium holding company Yellow Cake PLC (LSE: YCA) for the period ending March 31, 2026, the uranium market continues to demonstrate robust pricing and high volatility.

- **Spot Market:** Spot prices fluctuated between the mid-US$80s/lb and just over US$100/lb during the first quarter of 2026, driven by a combination of financial buying and utility procurement. Yellow Cake valued its physical holdings at a spot price of **US$83.95/lb** on March 31, 2026. By April 24, 2026, the spot price had ticked up to **US$86.45/lb**.
- **Long-Term Term Market:** The long-term contract market significantly strengthened during the quarter. Reported term prices rose to a range of **US$90.00/lb to US$93.00/lb**, reflecting utilities' prioritization of long-term supply security over short-term spot purchases.

Andre Liebenberg, CEO of Yellow Cake PLC, commented on the macro environment:

> "The first quarter of 2026 marked a transition from policy ambition to large-scale implementation, accentuated by the conflict in the Middle East once again highlighting the importance of energy security. With 39 nations now committed to tripling nuclear capacity, the World Nuclear Association projects global capacity could reach 1,446 GWe by 2050..."

Kazatomprom Contract Execution

Demonstrating the mechanics of long-term utility supply agreements, Yellow Cake completed a share placing on February 17, 2026, raising approximately £80.6 million ($110 million), and subsequently exercised its contract option to purchase **1,160,766 lbs of U3O8** from Kazakhstan's state-owned producer, Kazatomprom, at a contract price of **US$86.15/lb** (totaling US$100.0 million). This material is scheduled for delivery in the second half of 2026.

This pricing environment highlights the structural supply deficit in the uranium market as utilities race to lock in long-term supply to support reactor restarts—such as Constellation Energy's Crane Clean Energy Center [[constellation-ferc-waiver-three-mile-island-2026]]—and advanced microreactor deployments [[nano-nuclear-energy-nrc-milestone-2026]].

Sources

- QUARTERLY OPERATING UPDATE
- Uranium Price - Cameco