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Recent NRC Rulemakings Can Help Unlock Advanced Nuclear Energy

How the NRC's reforms could cut delay, lower cost, and clear a path for competitive advanced nuclear deployment

by Nick Loris and Prasanna Pydipalli

May 2026

Executive Summary

Electricity demand in the United States is rising again after two decades of stagnation. Artificial intelligence, data centers, manufacturing growth, and broader electrification are putting sustained pressure on the grid. The question is not whether we need more power. It is whether we will build it in time and at a cost consumers can afford. Nuclear energy can help meet that need. It is reliable, emissions-free, and well-suited to meet around-the-clock demand from hyperscalers and industrial loads. Despite strong interest in nuclear and growing private investment, nuclear energy will succeed only if it is cost-competitive with other energy sources and technologies.

While many factors affect the cost of nuclear energy, one cannot ignore costly, outdated regulations as a cost inflator. Unlike most technologies that experience cost declines and economies of scale, building nuclear plants has become more expensive even as the technology has improved in performance and safety. The U.S. nuclear regulatory framework was built for a different era and a different technology set, centered on large light water reactors that dominated construction decades ago. The regulatory framework became rigid around those assumptions, even as interest and investment in small modular and advanced reactor technologies grew.

Encouragingly, the Nuclear Regulatory Commission is moving toward a more pragmatic framework, one that is performance-based and risk-informed. In the coming months, the NRC will finalize several critical rules to help reduce the time and cost of deploying nuclear power. Taken together, these regulatory fixes will improve the economic outlook for nuclear energy, benefiting consumers, the economy, energy security, and the environment.

None of these reforms requires compromising safety. In many cases, they would improve safety by allowing regulators to focus resources where they matter most. The opportunity is not just to build more reactors. It is to build a framework that enables nuclear energy to compete, scale, and deliver affordable, reliable power for decades to come.

Nuclear Energy's Moment

Nuclear energy has a tremendous opportunity to be a part of America's growing energy economy. Electricity consumption in the United States was relatively flat for roughly two decades, but that trend has now reversed, driven by surging demand from artificial intelligence and electrification.

The growth of artificial intelligence and the increased electrification of the economy are boosting demand. Lawrence Berkeley National Laboratory projects that data center electricity use alone will rise from roughly 4.4 percent of total electricity consumption in 2023 to between 6.7 and 12.0 percent in 2028, possibly tripling over five years.[1] With rising electricity prices and mounting pressure on the grid, the need for more energy supply is obvious. Nuclear energy is well placed to help meet that demand. Nuclear energy offers several qualities and advantages that make it desirable for meeting rising energy needs. These attributes include:

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Dependability. The Department of Energy reports that the U.S. nuclear fleet operated at a capacity factor of 92.3 percent in 2024. As a result, nuclear accounts for only 8 percent of total U.S. installed capacity but contributes about 18 percent of the total electricity generated. AI infrastructure runs continuously, and operators of hyperscale facilities have been open about the need for reliable, dispatchable power and are willing to commit to long-term contracts to secure it. Many of these companies have internal environmental goals that emissions-free nuclear power will help achieve. Microsoft, Google, Amazon, and Meta have collectively backed more than twenty gigawatts of small modular reactor development to date.

In some cases, companies are not only signing power purchase agreements (PPAs) but also directly investing in nuclear companies. For example, Amazon committed to a $500 million funding round for X-energy, an advanced reactor and nuclear fuel design company.[2] Working with utilities in Washington and Virginia, the partnership aims to scale power to meet energy needs for households, businesses, and data centers. Similarly, Meta committed to 20-year PPAs with conventional large light-water reactors and to investing in advanced reactor companies, Terra Power and Oklo.[3] Overall, the agreement will supply 6.6 gigawatts of new and existing nuclear energy by 2035.[4]

Innovative and scalable. A wide range of new nuclear technologies is available to meet increasing energy needs. Small modular light-water nuclear plants (SMRs) provide enhanced safety features and lower initial capital risks compared to larger light-water plants. Advanced reactors (Generation III+ and IV) are non-light-water technologies with passive safety systems and high fuel efficiency. Both SMRs and advanced reactors have distinct advantages: they can be manufactured in factories and deployed in smaller units, reducing construction costs and timelines while offering greater flexibility. Smaller footprints, reduced cooling water needs, and factory fabrication also allow these reactors to be in areas that may not support traditional plants. These features make nuclear assets ideal for hyperscalers and for communities across the country that need reliable power.

Safe and Clean. Nuclear power is a clean source, providing emission-free electricity nearly all the time, and is highly safe. Advances in next-generation reactors have further reduced both actual and perceived risks. When comparing death rates per terawatt-hour across energy sources, nuclear power ranks among the safest options.[5] Despite radiation concerns, eating a banana or taking a long flight exposes you to more radiation than working at or living near a nuclear plant.[6] Innovative companies are developing next-generation nuclear reactors that pose even fewer safety and proliferation risks than present ones. Technologies such as advanced water-cooled reactors, sodium-cooled reactors, molten-salt reactors, and fusion reactors could make an industry already known for safety even safer. Moreover, even as commercial nuclear power expands to nearly 450 plants worldwide[7], there is scant evidence that increased nuclear energy use promotes proliferation. In fact, international cooperation among nuclear operators can strengthen nonproliferation efforts. While every energy source has environmental tradeoffs, nuclear energy's advantages are significant. Nuclear power provides emissions-free electricity all the time and is highly safe. Its lifecycle emissions are comparable to or lower than wind and solar, and it requires much less land.[8]

Even though nuclear power is safe, clean, and reliable, policymakers and ratepayers alike have a legitimate concern: whether it makes economic sense. While that question should be one for free, competitive energy markets to answer, there are reasons to be hopeful about technological advances and economies of scale that could make nuclear energy more cost-effective relative to other resources. Critically, one cannot overlook the government-imposed regulatory burdens that raise costs and slow down the deployment of new plants, large and small.

An Outdated Regulatory Framework as a Driver of Cost

Elevated inflation has driven up prices for nearly everything in the U.S and global economy. This is especially true for capital-intensive energy infrastructure, where higher material and labor costs lead to budget overruns and project delays. Even so, evidence shows that regulatory costs are a significant factor in the increase in nuclear energy's costs. Unlike most technologies that experience cost declines and economies of scale, building nuclear plants has become more expensive even as the technology has improved.[9] While the need for specialized labor contributed to cost increases, several studies point to increased regulation as a factor.[10]

The U.S. nuclear regulatory framework was built for a different era and a different technology set, centered on large light water reactors that dominated construction decades ago. The framework became rigid around those assumptions, and the federal government failed to modernize that framework to accommodate fundamentally different technologies. The Nuclear Regulatory Commission (NRC) acknowledged this directly in its regulatory history for Part 53, noting that while "the safety philosophy inherent in the current regulations applies to all reactor technologies, the specific and prescriptive aspects of those regulations clearly focus on the current fleet of LWR facilities."[11] Consequently, the requirements written for a 1,000-megawatt LWR have been applied to a 10-megawatt reactor through a patchwork of exemptions, each requiring its own analysis and negotiation with NRC staff. The result has been higher costs and longer deployment timelines for dispatchable, clean power, with little to no benefit to public safety or the environment.

Executive Order 14300, signed by President Trump on May 23, 2025, cited this history directly, observing that the NRC had "failed to license new reactors even as technological advances promise to make nuclear power safer, cheaper, more adaptable, and more abundant than ever."[12]

Several structural barriers and antiquated regulatory frameworks have contributed to increased costs for the industry and, ultimately, ratepayers. They include:

Prescriptive regulation. The primary licensing pathways, Part 50 and Part 52 of the Code of Federal Regulations, were designed for LWRs. They specify requirements for coolant chemistry, containment design, minimum staffing levels, emergency planning zone distances, and many other parameters that do not logically connect to the actual risk profile of a small modular or advanced reactor. Developers of non-LWR technologies have had to seek exemptions from individual provisions, which is inconsistent, unpredictable, and costly. Part 53, finalized in March 2026 after more than five years of development, is the first new reactor licensing framework

since 1989 and the first major update to licensing standards since the Atomic Energy Commission issued Part 50 in 1956. After several attempts, the new pathway provides a technology-neutral, risk-informed alternative. Reviews of applicants should be specific to the technology, not broad, blanket requirements that have little to do with assessing risk and performance for that technology.

Burdensome environmental reviews. Compliance with the National Environmental Policy Act (NEPA) has historically required Environmental Impact Statements at the NRC, which take three to five years to complete.[13] That burden is harder to justify today than when NEPA was enacted. Since 1970, environmental law has expanded significantly, and NEPA now operates alongside a wide range of other federal and state permitting, consultation, and review requirements. In practice, that often makes NEPA duplicative of analyses already required elsewhere. At the NRC, the problem is compounded by a legacy regulatory approach shaped by the existing fleet: reactor applications are generally routed through the most burdensome environmental review pathway on the assumption that nuclear projects require full Environmental Impact Statements even when impacts are well understood, site conditions are familiar, or the project involves a smaller reactor or a repeat deployment. [14] As a result, reviews spend significant time on issues such as "need for power," "alternatives," and other procedural questions that rarely affect the final decision and add little substantive environmental value. [15]

A broken adjudicatory system and costly, uncontested mandatory hearings. The NRC's licensing process allows third parties to intervene through contentions. In practice, however, the admissibility process, discovery requirements, and layered appeals have contributed to lengthy, formalistic proceedings that often prolong decisions over issues with limited bearing on actual safety or environmental outcomes. As the Nuclear Innovation Alliance outlined in public comment, contested hearings "introduce lengthy delays, sometimes taking a year or more to resolve, take up significant NRC staff time, and impose significant costs on applicants."[16] Another costly, ineffective requirement is that NRC must conduct a public hearing with the agency's commissioners on every nuclear reactor license application before issuing a Combined License. Local engagement and public participation are essential parts of the process. From pre-application activities to after the NRC's full review, the agency does a thorough job engaging with the public and local communities throughout the entire process.[17] The uncontested mandatory hearings occur after exhaustive outreach and serve no meaningful purpose other than to lengthen timelines and increase costs.

Unnecessary security requirements and costly materials. The NRC's physical security regulations were created for large facilities with substantial enriched material inventories, requiring trained armed guards, detection systems, and armed response capabilities, which lead to high fixed operating costs. When uniformly applied to factory-built advanced reactors with passive safety systems and minimal fuel inventories, these regulations often far exceed the actual security threat and impose high costs on advanced reactor companies. Physical security standards should align with the technology's actual risk profile. Additionally, steel, rebar, and concrete used in nuclear power plants must meet strict quality assurance standards to be considered "nuclear grade." These materials can cost up to 50 times more than alternatives, even when they are

identical products. Nonetheless, their approval involves extensive analysis and documentation. The 2024 Advanced Nuclear for Clean Energy (ADVANCE) Act directed the NRC to produce a report on whether standard, commercially available materials would be adequate and safe. The NRC's report to Congress indicated that current regulations technically permit the use of such standard materials and components, but the approval pathways are complex, costly, and applied inconsistently.[18]

Fee structures. The NRC recovers nearly 100 percent of its budget through fees charged to applicants and licensees. For large utilities with regulated rate bases and substantial balance sheets, the fee structure is not problematic. However, for start-up companies that have not yet generated revenue, the fee structure presents a significant economic burden. Today, there are more early-stage nuclear companies than ever before, and the fees have only increased. Fees have risen from an average of $214 per hour between 1995 and 2004 to the NRC charging $336 for FY2026.[19] The ADVANCE Act capped the fee, reducing the rate for advanced nuclear reactor applicants and pre-applicants for certain activities.[20] Congress could go one step further by shifting all application licensing fees and safety costs to the federal government. The provisions of nuclear safety are a public good, and thus, the costs should be borne by the taxpayer. If some fee costs help prevent frivolous applications, which the NRC may be able to vet quickly anyway, other fee exemptions could help reduce the costs while establishing a barrier to entry for unserious applicants.

Opportunities for Reform

Despite the cumulative time, cost, and uncertainty created by decades of regulatory red tape and risk aversion, innovation in the nuclear industry has not stopped. Advanced reactor companies are attracting serious private capital, major tech firms are signing nuclear power agreements and directly investing in advanced nuclear, and policymakers on both sides of the aisle recognize the value nuclear can play in America's energy future. Public support is at or near record highs.[21]

Regrettably, for far too long, the pace of policy and regulation has not kept up to enable nuclear to scale at its full potential. To its credit, the Trump administration is changing that. As documented by the Breakthrough Institute, the NRC has 72 active rules before it. 25 rules stem from President Trump's EO 14300.[22]

In the next few months, the NRC will finalize several critical rules to help reduce the time and cost of deploying nuclear power. Cumulatively, these regulatory fixes will improve the economic outlook for nuclear energy, benefiting consumers, the economy, energy security, and the environment. While not exhaustive, below is a description of several notable impending rulemakings and why they matter to a competitive American nuclear energy industry.

MODERNIZING REACTOR LICENSING, SAFETY OVERSIGHT, AND SITING PRACTICES[23]

What it does: This package of reforms pursues system-wide modernization of licensing, safety oversight, and siting practices, including staged licensing, risk-informed oversight scaling, and expanded siting flexibility. It moves away from a one-size-fits-all regime toward a tiered governance model that can adapt to design maturity and deployment context. Standardized practices across projects aim to reduce bottlenecks and improve learning curves for new technologies.

Why it matters: First-of-a-kind uncertainty and prescriptive, customized review processes are major drivers of schedule risk and higher capital costs for novel reactors. A modernized framework reduces these regulatory chokepoints by providing clearer benchmarks, clear oversight, regulatory efficiency, and more replicable processes. Investors gain confidence in predictable pathways that lower hurdle rates and accelerate permits approvals and deployment. These reforms will address multiple friction points, strengthen the business case for multi-unit deployments, and facilitate faster market entry.

LICENSING REQUIREMENTS FOR MICROREACTORS AND OTHER REACTORS WITH COMPARABLE RISK PROFILES (PROPOSED 4/17/26)[24]

What it does: This proposed rule would establish a more flexible, risk-informed licensing framework for microreactors and other low-consequence reactors, particularly factory-fabricated designs. Rather than forcing these technologies into regulatory assumptions built around large light-water reactors, it is intended to better align licensing requirements with actual hazards, design characteristics, and deployment models.

Why it matters: A more tailored framework could reduce unnecessary licensing burden for lower-consequence designs, improve predictability for developers, and better support repeat deployments without compromising safety. The significance of this rule is not that it creates a carveout for reactors below a specific megawatt threshold, but that it moves the NRC toward a more graded, consequence-based approach.

REGULATORY ENHANCEMENTS FOR REACTOR LICENSING, DECOMMISSIONING, AND OPERATIONAL OVERSIGHT (PROPOSED 6/9/26) [25]

What it does: The rulemaking revises how regulators, developers, and operators interact throughout the entire lifecycle of nuclear projects. On licensing, it clarifies application content requirements, standardizes what information the NRC can request, and reduces duplicative or non-safety-related analyses that often slow reviews. It also expands the use of risk-informed, performance-based approaches, allowing applicants to demonstrate safety outcomes without having to comply with overly prescriptive design or process requirements tailored to large legacy reactors. On the back end of the fuel cycle, the rule updates decommissioning regulations to provide clearer timelines and more flexible options for licensees, including improved use of existing funds and streamlined approval processes for decommissioning activities. For operational oversight, it refines inspection and reporting requirements to focus more on actual safety performance, rather than routine compliance checks that add cost but little safety value.

Why it matters: By calibrating regulatory scrutiny to actual risk, these reforms will reduce project finance risk, lower the cost of capital, and improve the economics of both pilot units and multi-unit deployments. More predictable pathways could help unlock economies of scale and attract broader investment among a wide range of nuclear technologies. The rule will also provide more consistency by aligning processes for licensing pathways, including operating licenses, combined licenses, and advanced reactor applications. Importantly, the rule's emphasis on clarity around end-of-life activities also stabilizes depreciation, decommissioning budgeting, and long-horizon investment planning.

IMPLEMENTATION OF NEPA (PROPOSED 4/9/2026; FINAL 11/23/2026)[26]

What it does: This rule would modernize how the NRC implements NEPA by allowing greater use of categorical exclusions, generic environmental reviews, and narrower Environmental Impact Statement (EIS) scopes where appropriate, while preserving core protections and public participation where required. Just as importantly, it would help align NRC environmental reviews with the broader modern environmental law landscape by reducing duplication with other permitting and review requirements and by focusing reviews on reasonably foreseeable and material impacts. The rule would also move the agency away from a default assumption that reactor licensing actions must proceed through the more burdensome environmental review pathway, creating more room for right-sized review for smaller reactors, repeat designs, and projects at sites with well-understood impacts.

Why it matters: Environmental review is a major schedule driver for new nuclear projects, not only because NEPA can be slow, but because the current framework is often duplicative and disproportionately onerous. When the NRC defaults reactor applications to full EIS treatment, even where impacts are already well-characterized, it adds years of process, increases litigation exposure, and raises development risk without environmental benefits. A more tailored NEPA framework would reduce delay and shorten the path to deployment while preserving meaningful environmental review.

MODERNIZING SECURITY REQUIREMENTS (PROPOSED 5/18/2026; FINAL 11/23/2026)[27]

What it does: This rule replaces the current one-size-fits-all physical security regime with a genuinely risk-informed, performance-based, and graded framework that calibrates requirements to actual reactor risk profiles for different reactor sizes and technologies. It builds on the 2024 proposed rule for alternative physical security requirements for advanced reactors, codifying graded thresholds for armed response force requirements, force-on-force testing obligations, and cybersecurity program burdens based on reactor size, source term, and offsite consequence potential.

Why it matters: Security costs constitute a meaningful portion of operating budgets, especially for smaller, more dispersed sites. In fact, security compliance under Part 73 is one of the largest non-fuel operating cost drivers at nuclear facilities, and the current framework was written entirely around the risk profile of large light-water reactors. The rulemaking aligns NRC's security regulations with the passive safety and smaller footprint characteristics that define most advanced reactor designs entering the licensing pipeline right now. A risk-informed framework can maintain robust protection while reducing unnecessary spend, improving operating margins for microreactor deployments. Remote monitoring enhances resilience, lowers staffing needs, and reduces travel costs, contributing to faster, more cost-effective deployment.

EXCEPTIONS FROM FOREIGN OWNERSHIP, CONTROL, OR DOMINATION (PROPOSED 4/10/2026)[28]

What it does: Until the ADVANCE Act, the AEA restricted the NRC from giving licenses to foreign companies or foreign governments. This has reduced competition and foreign investment in America's nuclear power industry, leading to projects not moving forward. The NRC's direct final rule implements Section 301 of the Act. The change allows OECD countries and the Republic of India, subject to NRC approval, to own and operate nuclear power plants in the United States. Under the previous framework, there is no safe harbor, no minimum threshold, and no country-differentiated treatment, meaning a reactor developer that takes investment from a Japanese utility or a Canadian pension fund faces the same FOCD scrutiny as one tied to Russia or China. The rulemaking would establish categorical exceptions for entities with ownership or investment from designated allied and partner nations, like those with existing Section 123 Agreements and established nonproliferation track records. Further, the rule would introduce a threshold-based approach below which minority foreign ownership does not automatically trigger a full FOCD determination.

Why it matters: Scaling advanced reactors often requires global capital and collaboration, particularly from America's allies that have an interest in civilian nuclear deployment. Some of the global leaders in the nuclear power industry are America's strongest allies, such as France, Japan, and South Korea. International partnerships will expand supply chains, manufacturing capacity, and cross-border expertise, and attract more investment into America's large-scale nuclear projects and advanced reactors, helping to accelerate deployment while preserving the integrity of U.S. oversight and control. Easing restrictions on FOCD will also help bolster U.S. nuclear exports, as allied partners will be more inclined to partner with American companies if the U.S. stops treating allies as presumptive security threats.

RESCISSION OF ADVISORY COMMITTEE ON REACTOR SAFEGUARD FUNCTIONS (ACRS) (DIRECT FINAL 7/24/2026)[29]

What it does: This proposed rule would rescind certain functions of the ACRS and streamline the role of this independent advisory body within the U.S. Nuclear Regulatory Commission's licensing and oversight processes. Historically, the ACRS has provided technical reviews and recommendations on reactor safety issues, often duplicating analyses already conducted by NRC staff. The rule would eliminate or narrow mandatory ACRS review requirements for certain categories of licensing actions, particularly where the issues are well-understood, routine, or sufficiently addressed through existing staff expertise and established regulatory frameworks.

Why it matters: ACRS reviews currently add six to twelve months to reactor licensing timelines as a matter of routine, even for applications built entirely on already-approved standard designs where the committee has nothing new to evaluate. The problem is particularly frustrating for small modular and advanced reactor developers pursuing multi-site deployments of a standardized design: once the NRC staff and ACRS have reviewed the design certification, requiring the same full committee review for every subsequent site application is pure redundancy with real time and cost consequences Removing duplicative review steps reduces idle regulatory capacity, speeds licensing milestones, and focuses independent advisory input on genuinely novel or high-risk issues where independent expert review adds real value.

STREAMLINING CONTESTED ADJUDICATIONS IN LICENSING PROCEEDINGS (PROPOSED 3/3/2026; FINAL 7/10/2026)[30]

What it does: The proposed rule would narrow admissible contentions to material, well-supported claims, clarify standing requirements, and impose more disciplined procedures and timelines for evidentiary hearings. The rule also aims to reduce opportunities for duplicative filings and procedural delays that can prolong adjudicatory proceedings without contributing substantively to safety determinations. Specifically, the rule implements both the ADVANCE Act's statutory deadlines (staff review complete within 18 months of docketing, final licensing decision no later than 25 months) and EO 14300's more aggressive targets (18-month deadline for new reactor construction and operating decisions, 12 months for license renewals). The rule also bifurcates the standing and admissibility of the contentions process by separating those determinations and sequencing them on strict timelines. Doing so will front-load and weed out non-viable challenges rather than allowing them to drag through full adjudicatory proceedings. It also expands Subpart L simplified hearing procedures to cover virtually all licensing proceedings and requires attorney representation for any non-individual intervenor, meaning organizations and advocacy groups can no longer conduct pro se litigation as a low-cost delay tactic.

Why it matters: Contested adjudications are a key source of delay and cost. The contested-hearing process under the current Part 2 framework has functioned as an open-ended delay mechanism. There are no strict deadlines for completing adjudications. Consequently, anti-nuclear activists can stretch licensing proceedings for years through a series of filings, appeals, and procedural motions, with no meaningful backstop. Sharper standards and shorter processes improve financing and development certainty while reducing legal and administrative costs.

INCREASED FLEXIBILITY IN THE MANDATORY HEARING PROCESS[31]

What it does: This rule improves how the NRC conducts mandatory hearings required for certain licensing decisions. The uncontested hearings that Section 189a of the Atomic Energy Act requires the Commission to hold for certain licensing actions, regardless of whether anyone challenges the application. The rulemaking formally codifies a first-of-a-kind versus nth-of-a-kind framework in 10 CFR Part 2. For genuinely novel reactor designs, the Commission retains its presiding role. Still, it converts the process entirely to written

submissions, eliminating the oral hearing component that has historically added months to the licensing timeline. For nth-of-a-kind applications where the NRC has already fully reviewed and heard, the proposed rule delegates the mandatory hearing to a senior agency official rather than requiring the NRC's full involvement.

Why it matters: An uncontested mandatory hearing is, by definition, a hearing where nobody is arguing against the application. There are no disputed facts, no environmental risks or safety concerns, no intervenors, and no adjudicatory function being performed. Yet, under the current framework, it has added an average of 4 to 7 months to reactor licensing timelines, with no demonstrable impact on safety outcomes. NRC Commissioners have publicly supported going further and eliminating mandatory hearings for uncontested proceedings, a change that would require a statutory change.[32] Nevertheless, these changes will target a hearing process of roughly eight weeks rather than the months the current framework has historically consumed.

REFORMING AND MODERNIZING THE NRC'S RADIATION PROTECTION FRAMEWORK (PROPOSED 6/3/26; FINAL 11/23/2026)[33]

What it does: This proposed rule reconsiders reliance on the linear no-threshold (LNT) model and the "as low as reasonably achievable" standard that flows from it. With respect to LNT, the rulemaking challenges the core assumption that any radiation dose, no matter how small, carries a proportional cancer risk with no threshold below which exposure is safe. Epidemiological literature has increasingly failed to support at low dose rates.[34] On ALARA, it would eliminate or fundamentally restructure the requirement that licensees continuously lower doses, regardless of whether they're already well within regulatory limits, following DOE's lead in decoupling dose compliance from open-ended cost-justified reduction obligations. The proposed rule would also raise the public dose limit from 100 mrem/year to 500 mrem/year and maintain the occupational limit at 5,000 mrem/year, while removing the ALARA obligation below that threshold and adopting a longer-term pathway toward 10,000 mrem/year as the scientific basis is further established.

Why it matters: Overly conservative radiation standards inflate project costs and labor needs without delivering proportional safety gains.[35] The LNT model distorted public perceptions of nuclear energy risk, inflated operating costs, complicated siting decisions, and provided ammunition for anti-nuclear advocacy disconnected from actual health outcomes. ALARA has functioned as a one-way regulatory ratchet. Because further dose reductions are always theoretically "achievable" with enough money, it created an open-ended cost obligation with no defined endpoint and no proportional safety gains, adding billions in compliance costs across the nuclear fleet over decades.[36] A calibrated ALARA framework preserves protection while improving project economics for advanced and microreactors and enabling faster deployment and better technological integration.

NRC REVIEWS OF REACTOR DESIGNS PREVIOUSLY AUTHORIZED BY DOE OR DEPARTMENT OF WAR (PROPOSED 4/9/2026; FINAL 10/30/2026)[37]

What it does: This rule enables NRC reliance on prior federal safety evaluations, test data, and operational experience from DOE or defense authorities, rather than requiring the NRC to conduct a full, independent technical review of design elements already vetted by another federal agency. The rule covers all three licensing frameworks (Parts 50, 52, and 53), meaning it applies to all applicants regardless of which regulatory pathway the company chooses.

The ongoing challenge is the regulatory environment in which these technologies must operate; this environment increases costs, extends timelines, raises uncertainty, and discourages investment.

Why it matters: TerraPower's Natrium, X-energy's Xe-100, Kairos Power's Hermes, and other advanced reactor designs went through DOE's Advanced Reactor Demonstration Program and accumulated years of rigorous federal technical review, safety analysis, and in some cases actual construction and operation[38], only to face the prospect of essentially starting over at the NRC for commercial licensing. Leveraging previously authorized DOE/DoW reviews can shorten design reviews by months to a year and decrease non-recurring engineering costs. This eliminates duplication, lowers capital costs, and accelerates time-to-market for validated designs.

Conclusion: A Path to Competitive Nuclear Deployment

The United States has long been a leader in nuclear energy and continues to be so, with many promising innovations and investments in advanced reactors. The industry has a great chance to grow by meeting rising demand driven by AI and the need for reliable, plentiful power. The ongoing challenge is the regulatory environment in which these technologies must operate; this environment increases costs, extends timelines, raises uncertainty, and discourages investment. The NRC's set of rulemakings could significantly help address some of these systemic issues and enable the industry to deliver safe, clean power to the U.S. economy.

Nick Loris is the President at C3 Solutions and Prasanna Pydipalli is a Research Associate at C3 Solutions.

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