COLUMBIA GLOBAL ENERGY DIALOGUE

How the NRC Can Be More Efficient and Effective: Roundtable Summary

By **Lavanika Bahuguna, Dr. Matt Bowen,** and **Rama T. Ponangi**

On Feb 24, 2025, Columbia's Center on Global Energy Policy (CGEP) hosted a private virtual roundtable to discuss improving the efficiency and effectiveness of Nuclear Regulatory Commission (NRC) regulation of commercial nuclear power. The backdrop to the discussion involves a variety of developments in the last five years related to the US Department of Energy and the private sector making large investments in nuclear reactor development. Congress created tax provisions in the Inflation Reduction Act of 2022 to incentivize the deployment of new reactors as well as to keep existing reactors in operation. In 2023 and 2024, the NRC issued the first construction permits for non-light water reactors in decades (and the Kairos Hermes test reactor is now under construction).[1]

Congress has also passed laws in recent years meant to shorten federal permitting times. For example, the Fiscal Responsibility Act of 2023 amended the National Environmental Policy Act to add timelines for federal agencies to complete their environmental reviews. Congress also passed the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2023 (ADVANCE Act), which included a number of provisions focused on increasing the efficiency of NRC regulation. The incoming Trump administration has also announced an emphasis on government efficiency writ large.

The roundtable brought together former NRC commissioners and former NRC staff to discuss challenges facing the agency, as well as opportunities for it to improve its performance.

Regulatory Challenges Facing the NRC

One participant stated that legitimate criticism of the NRC can be made due to the cost, delay, and intrusiveness of regulatory scrutiny. They said costs have often been significant and are a problem for thinly capitalized vendors early in their lifetime. One participant argued that the ADVANCE Act, which passed with overwhelming congressional support, was a new development requiring the NRC to carefully review its work processes and focus on what's essential—much of that review has reaffirmed actions that were already taking place, such as initiatives to streamline environmental reviews.[2]

That participant said that while commission members demonstrate an understanding and willingness to change, they face significant challenges to driving change. The participant also emphasized that while fast, efficient licensing is important, so is careful licensing and maintaining the public's trust. Some advanced reactors, they said, present new safety risks—for example, molten salt corroding piping or sodium-cooled reactors with new fire hazards—and these issues need to be directly addressed by both the regulator and the vendor.

Uncertain Value of New Part 53 Rule

On the topic of licensing frameworks, participants mentioned challenges related to the new Part 53 rule under development, which would be an optional technology-inclusive regulatory framework for use by applicants for new commercial reactors. Specifically, participants questioned whether developers will use it. Some individuals thought developers would not in fact use it. Some argued that given that Part 50, which is the original regulatory framework for licensing new reactors, is functioning well, it might have been better for the NRC to have used it to license new advanced reactors and draw lessons before moving on to develop Part 53.

One participant said that the commission had forced such an aggressive schedule for completing the Part 53 rulemaking that NRC staff had to start drafting the regulations almost immediately, and there wasn't enough time to properly engage the public and industry. Another person opined that most developers are likely to take the traditional two-stage licensing route rather than risk going to an all-new enterprise that they don't fully understand, even though the new licensing framework could include subsidies, etc. But one participant thought differently, saying Part 53 is a great opportunity to move forward, even if it's not the perfect vehicle. Part 53, in their opinion, is making progress toward a licensing process appropriate for newer technologies that will help developers (even those who end up licensing through other pathways) and can help the industry with respect to licensing of advanced reactors.

Cultural Inertia

One issue that participants brought up repeatedly during the discussion was the need for a cultural shift at the NRC. While acknowledging that changing a culture that has been prevalent for decades would be difficult, they felt doing so held more value than the production of any policy documents. The NRC, in these participants' view, needed to be empowered to de-risk innovation and raise questions. Staff should be comfortable with changes and new processes and be willing to fail and learn early in the process. Another participant mentioned the analogy of "using the same hammer" for every project—explaining that the NRC needs to get out of old mindsets and modify approaches to newer advanced technologies while staying risk-informed.

Participants highlighted Kairos Power's permitting effort as an example of what is possible going forward. They discussed how the NRC issued construction permits to Kairos faster than anticipated due in part to the NRC project manager involved —project managers at the agency can cut through months of process and drive efficiency by understanding and anticipating what the NRC concerns will be and what is needed to address them.

Underdeveloped International Relationships

Some participants brought up the challenge of succeeding in international markets for US nuclear reactor vendors. The advent of small modular reactors (SMRs) and the desire to build factories and establish new supply chains will need a sufficient number of reactor orders, likely requiring international sales and thus necessitating engagement with international agencies. The NRC, they explained, would need to expand international engagement to countries and regions where the agency has not traditionally worked, including Africa, Southeast Asia, and the Middle East. While the NRC has been striving to build new relationships in these regions, there is still room for improvement.

Other attendees said significant efforts are underway through the International Atomic Energy Agency and Nuclear Energy Agency to foster international collaboration. They thought the NRC's memoranda of understanding with Canada and the UK have been positive in terms of regulator information sharing, and that there is potential for further collaboration.

Opportunities for Improvement

Participants emphasized that the NRC has broad discretion in how it implements its mission and meets the objectives of protecting public health and the common defense and security of the country. They discussed several opportunities for the agency to improve, while observing that it is already making progress and seems open to change.

Hold Staff Accountable for Timing

Some participants said more accountability is needed at the lowest levels of the organization, not only in terms of safety but also schedules, for which participants thought staff is not currently held accountable. They sensed that management cares about schedules and budgets but staff does not.

One participant said that the agency should allocate the majority of its resources based on risk significance and ensure that this is communicated to both the applicant and the public, with both the NRC and the applicant actively monitoring resource expenditure. They suggested that staff should be held responsible for schedules, with managers overseeing those aspects, because delivering a product on budget should be a shared responsibility across the board at the NRC. Participants highlighted the need to be able to raise issues and escalate concerns to senior management when necessary, and for those issues to be resolved in a timely manner. Some said the NRC should be run more like a business: making sure reviews are of high quality but also focusing on the schedule and budget.

Finally, some participants thought that stakeholder engagement has improved, especially compared to the 1970s. They said the NRC is doing a better job than it had in the past of keeping stakeholders informed about what is occurring during the process and is holding open and collaborative meetings.

Centralize Decision-making

One participant raised a concern that while the office responsible for new reactors handles licensing, it currently has to go through multiple management chains—Nuclear Material Safety and Safeguards, Office of General Counsel, and Nuclear Security and Incident Response—which slows the decision-making process. They further explained that the new reactors office has to operate by way of consensus with these other offices. To streamline licensing, the participant suggested that the NRC chair or executive director of operations require the new reactors office to own the process and be empowered as the sole decision-maker.

Determine When Additional Safety Reviews Are Needed, and When They Are Not

Participants discussed the requirement in the Atomic Energy Act that the Advisory Committee on Reactor Safeguards (ACRS) review all construction permits and operating licenses, even if the same reactor types were to be deployed many times. They suggested Congress should reconsider the statute. Some felt that beyond first-of-a-kind reactor deployment, it should be up to the ACRS whether subsequent deployments require reviews. They felt it was important to maintain the independence of the ACRS both for having an additional check on NRC staff reviews and for public

confidence. Others felt that ACRS reviews for subsequent deployments should be at the discretion of the commission, thinking that if the ACRS was to decide, it would always choose to review them. To make the point of needing guardrails on reviews, one person mentioned an Idaho National Laboratory report[3] that said the ACRS had conducted 440 hours of review related to the NuScale design over 40 meetings.

Speed Up Legal and Commission Reviews

One attendee brought up the time consumed in NRC review schedules not only by ACRS but also for legal and commission reviews. NRC staff can't force ACRS, legal, or the commission to move faster or focus on what's important. And actions by the Office of General Counsel often go into a black box—there is no transparency into when a decision will happen. Others mentioned that papers often sit a long time with the commission without a vote—sometimes a year or more—which can be demoralizing to the NRC staff, some of whom put in long hours to try to achieve something on schedule. One participant suggested that commissioners could impose a timeline on themselves for making decisions—perhaps three or four months.

Lessen Encumbrances in Environmental Reviews and Hearings

One participant highlighted that the Atomic Energy Act gives the NRC huge flexibility with respect to conducting hearings, but that the agency generally isn't taking advantage of it. For example, the NRC could shorten mandatory hearings (nowhere in the Atomic Energy Act does it say these hearings must take six months), if it wanted. Within the context of environmental reviews, one participant said that even mere threats of litigation have led to increased costs or delays, and that the alternative siting and need for power analyses conducted as part of these reviews for new reactors are a waste of time, effort, and money.

Clarify Financial Qualifications

One individual mentioned the NRC potentially revisiting changes to financial qualification requirements for construction licenses. The participant recounted how the NRC had decided to change these requirements so that applicants did not have to have the funds lined up to pay for a new nuclear power plant before a license could be issued. There were merchant nuclear power plants that were planning to be project financed that could not line up the funding until after they received the license. The idea was to put a condition into the license that before a project put a shovel into the ground, it had to line up the funds necessary, and that the NRC would do a financial review of it at that later time. To this participant's memory, a combined license for the potential expansion of the South Texas nuclear power plant had proceeded this way, given the rulemaking that was underway. However, years went by and the rulemaking was never finalized, and then the

NRC later cancelled the rulemaking, losing, in this participant's view, years of work from the agency and industry over an issue of no safety significance. The participant observed that the same issue is now coming up for next generation nuclear deployment, and thus the NRC returning to the rulemaking and getting it over the finish line would hold real value.

Notes

1. NRC, "NRC to Issue Construction Permit for Kairos Hermes Test Reactor in Tennessee," December 12, 2023, https://www.nrc.gov/cdn/doc-collection-news/2023/23-078.pdf; NRC, "NRC To Issue Construction Permits for Kairos Hermes 2 Test Facility in Tennessee," November 20, 2024, https://www.nrc.gov/cdn/doc-collection-news/2024/24-081.pdf.
2. NRC, "Streamlining and Efficiencies," https://www.nrc.gov/about-nrc/regulatory/licensing/ecoe/modernizing/efficiencies.html.
3. Stephen J. Burdick, John C. Wagner, and Jess Gehin, "Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process," Idaho National Laboratory, April 2023, https://inldigitallibrary.inl.gov/sites/sti/sti/Sort_65730.pdf.

About the Authors

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Dr. Matt Bowen is a Senior Research Scholar at the Center on Global Energy Policy at Columbia University SIPA, focusing on nuclear energy, waste, and nonproliferation. He is also nonresident senior fellow with the Atlantic Council's Global Energy Center. He was formerly a Nuclear Policy Fellow at Clean Air Task Force and a Senior Policy Fellow at the Nuclear Innovation Alliance.

Dr. Bowen has written reports on federal and state policies to encourage advanced reactor development, and has also published papers on reforming U.S. nuclear export controls. During the Obama Administration, he was an Associate Deputy Assistant Secretary in the Office of Nuclear Energy and a Senior Advisor in the Office of Nonproliferation and Arms Control at the U.S. Department of Energy (DOE). Previous to working at DOE, he was an AAAS/APS Science Fellow for Senate Majority Leader Harry Reid.

Dr. Bowen received a Bachelor of Science degree in physics from Brown University and a Ph.D. in theoretical physics from the University of Washington, Seattle. He has held positions at the National Academies with the Board on Physics and Astronomy, the Board on Energy and Environmental Studies, and the Division on Engineering and Physical Sciences. Dr. Bowen has also done work outside of Columbia University as an independent consultant for EFI Foundation and Third Way.

Rama T. Ponangi is an India-trained lawyer specializing in nuclear law and policy. Prior to joining to CGEP, Rama worked as a Research Assistant under Professor Donna Attanasio, Director, Energy Laws, The George Washington University Law School, where he organized a 4-day conference titled "Investable Nuclear Energy" covering topics of Environment, Social and Governance aspects of nuclear energy, supply chain for the advanced nuclear reactors, future of the nuclear technology, garnering public support and role of academia in shaping next generation of nuclear law and policy experts. Rama is also a Policy Fellow at the Nuclear Innovation Alliance.

In the past, Rama interned at the Office of Legal Affairs, International Atomic Energy Agency (IAEA), Vienna, Austria, where he primarily assisted its Legislative Assistance activities such as reviewing the draft nuclear legislation of Member States and assisted in conducting bilateral and multilateral meetings such as Role of a Legal Advisor in a Regulatory Body and International Nuclear Liability Expert (INLEX). Rama also undertook research on the topic of safety, security and liability aspects of Transportable Nuclear Power Plants (TNPPs).

Rama has completed his Bachelors in Law – B.A.,LL.B. (Specializing in Energy Laws) from University of Petroleum & Energy Studies, Dehradun, India. He has completed a diploma in International Nuclear Law from the International School of Nuclear Law (ISNL), University of Montpelier, France organized by Nuclear Energy Agency, OECD. Rama has completed his Masters in Law – LL.M. in Energy and Environmental Laws from The George Washington University Law School as GW Merit Scholar and Randolph C. Shaw Environmental Graduate Environmental Fellow. Rama has completed several other niche certifications in nuclear energy and law.

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