

Enabling Nuclear Innovation

Strategies for Advanced Reactor Licensing

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NRC COMMISSION MEETING



CATF Introduction

- Non-profit environmental organization founded in 1996
- Offices in the US and China
- Dedicated to accelerating commercialization of zero emissions energy technology through policy and business actions
- Major focus on CCS and advanced nuclear (helped to establish Nuclear Innovation Alliance)
- Funded by philanthropic foundations

The logo consists of the letters 'NA' in a bold, yellow, sans-serif font. The 'N' and 'A' are connected at the top, with the 'A' having a vertical bar on its right side.

NUCLEAR
INNOVATION
ALLIANCE

Enabling Nuclear Innovation: Strategies for Advanced Reactor Licensing

NIA Mission & Modes of Operation

The NIA leads advanced nuclear energy innovation.

- *We assemble companies, investors, experts, and stakeholders to advance nuclear energy innovation and enable innovative reactor commercialization through favorable energy policy and funding.*
- *We research, develop, and advocate policies that enable the efficient licensing and timely early-stage demonstration of advanced reactor technologies.*

www.nuclearinnovationalliance.org



NIA Strategic Priorities

- A staged and more technology-inclusive licensing process
- A test bed & demonstration platform where nuclear innovators in the private sector can demonstrate advanced technologies
- Cooperation to provide for international commercial testing, demonstration, and deployment of advanced technologies.
- Financial support for early stage technology development and early commercial deployment.



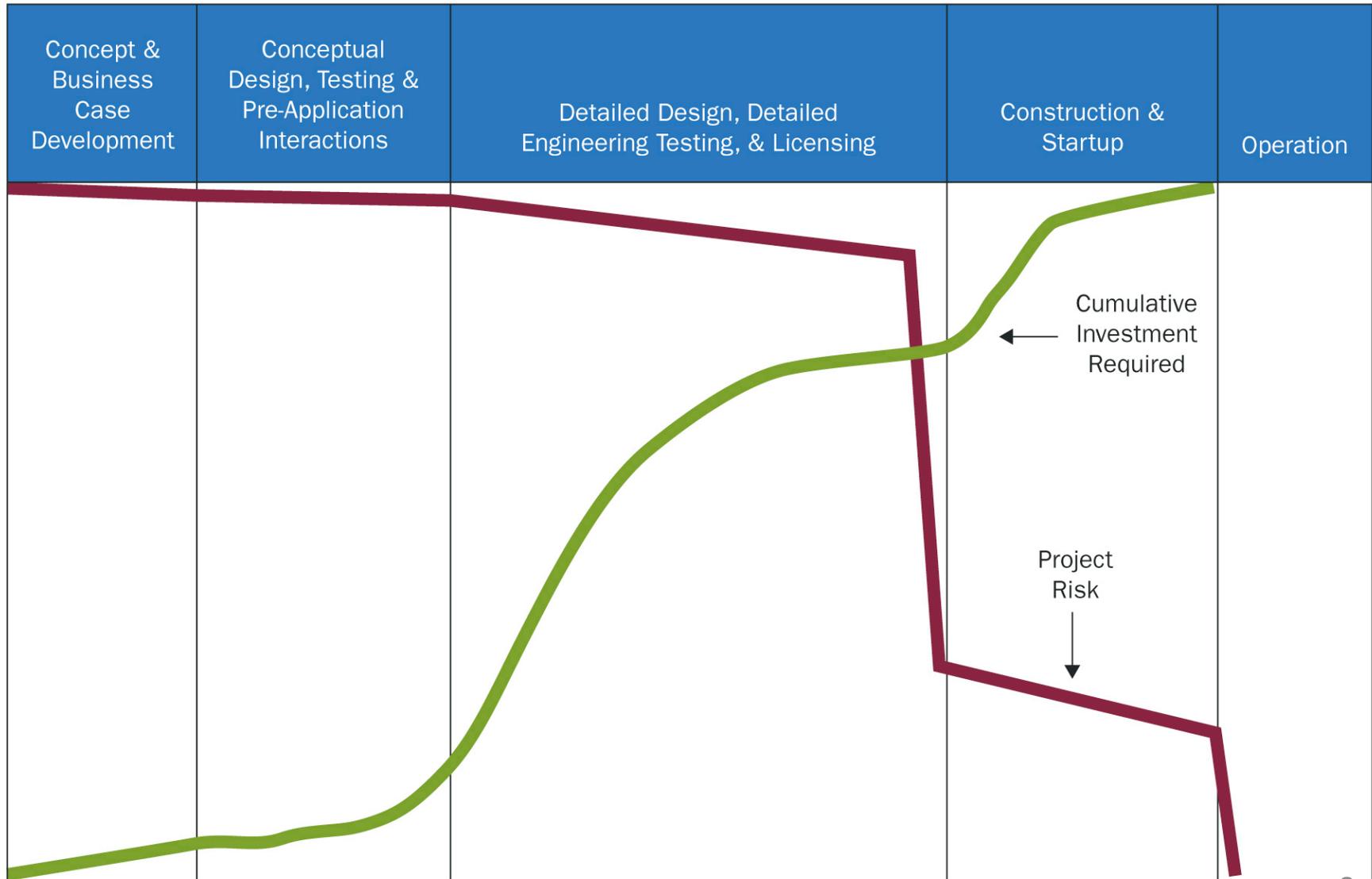
Introducing the Advanced Nuclear Industry



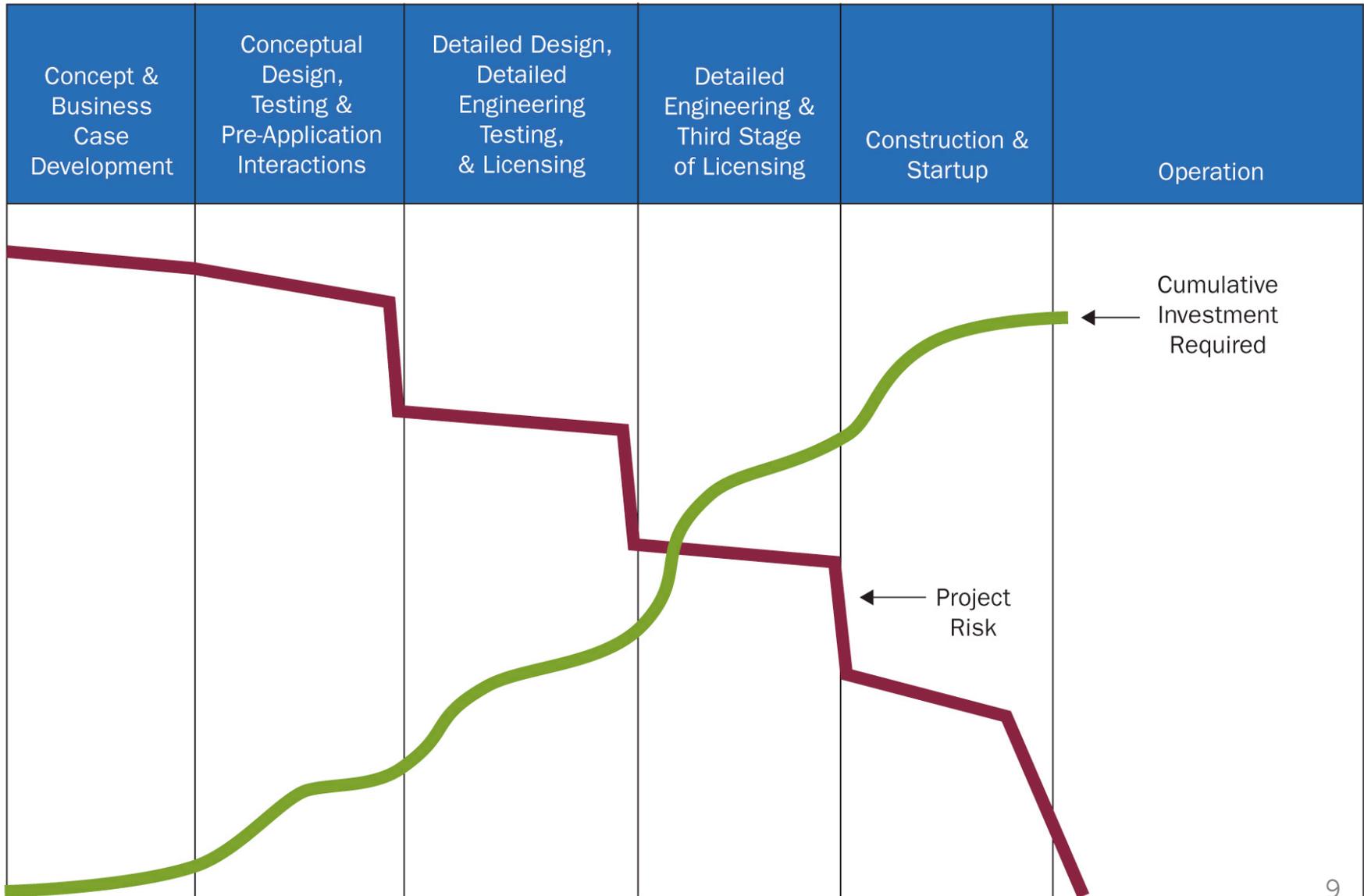
Key Challenges to Commercialization

- Regulations designed for light water technologies do not easily fit advanced reactors, requiring major revisions to requirements, exemptions, and high costs and long time periods interacting with the regulator.
- The current licensing process (Part 50 and Part 52) requires a major investment of time and money, **without** interim steps that provide concrete feedback.
- Some innovators need to build a prototype or demonstration reactor.

Current Project Risk/Investment Profile Relative to Licensing



Desirable Project Risk/Investment Profile Relative to Licensing



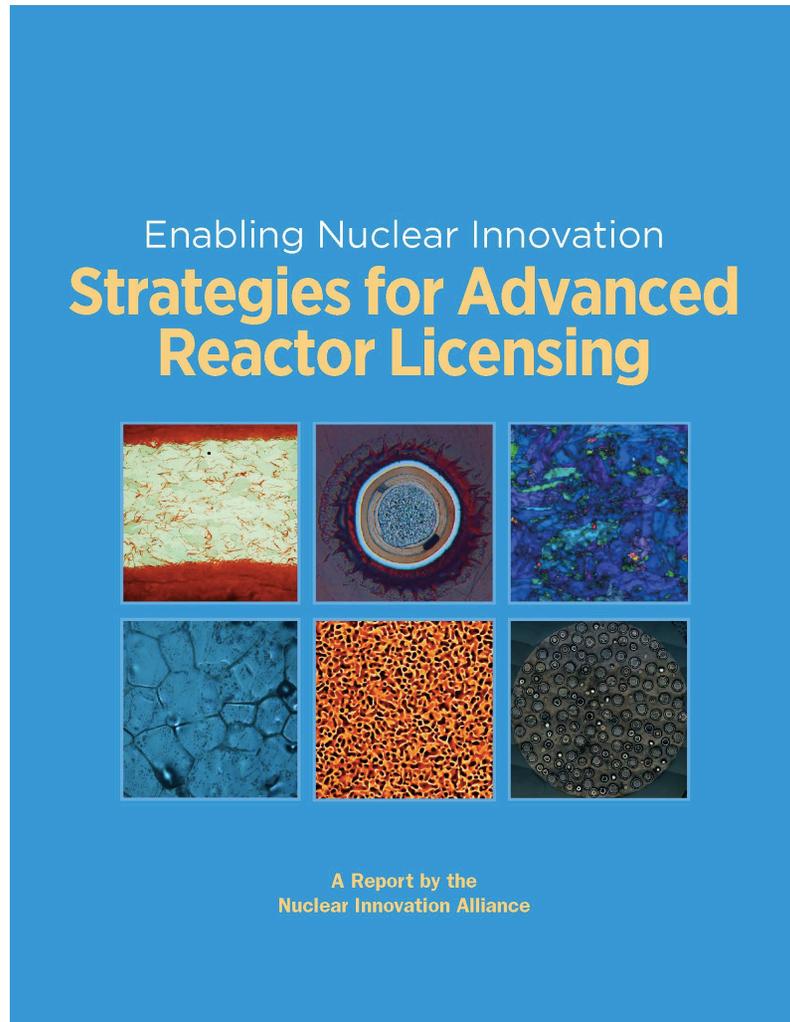
Goal

- A process that
 - Incorporates discrete stages;
 - Is more predictable, efficient, and cost-effective for advanced reactors;
 - Is more technology-inclusive; and
 - Maximizes the use of current regulations while recognizing limitations of LWR-centric features.

Key Team Members

- Ed Wallace
 - Former head of licensing for NuScale and PBMR, regulatory affairs for Exelon and TVA, 30+ years experience in nuclear regulation from the vendor/utility side.
- David Matthews
 - 38 years at NRC in various roles including Director of the Division of New Reactor Licensing; Director of Division of Regulatory Improvement Programs. Prior experience with decommissioning, emergency preparedness, and operating reactor oversight.
- Chip Cameron
 - 30+ years experience in the legal, technical, and policy aspects of nuclear licensing and regulation. Former Assistant General Counsel for Rulemaking and Fuel Cycle in NRC Office of the General Counsel; Dispute resolution specialist for NRC; various related projects in private practice.
- Joe Gray
 - 20 years at NRC in various legal roles including legal assistant to several commissioners and a chairman, Associate General Counsel for Licensing and Regulation, and other positions in the Office of General Counsel.
 - In Private practice, experience with nuclear licensing (including the Seabrook plant), and regulatory matters.

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Download the Report at:
www.nuclearinnovationalliance.org

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Staged Licensing

- A licensing project plan, along with topical reports and the standard design approval can be used to define stages.
- Staff guidance and policy decisions will be needed to implement this (a rulemaking is not required).

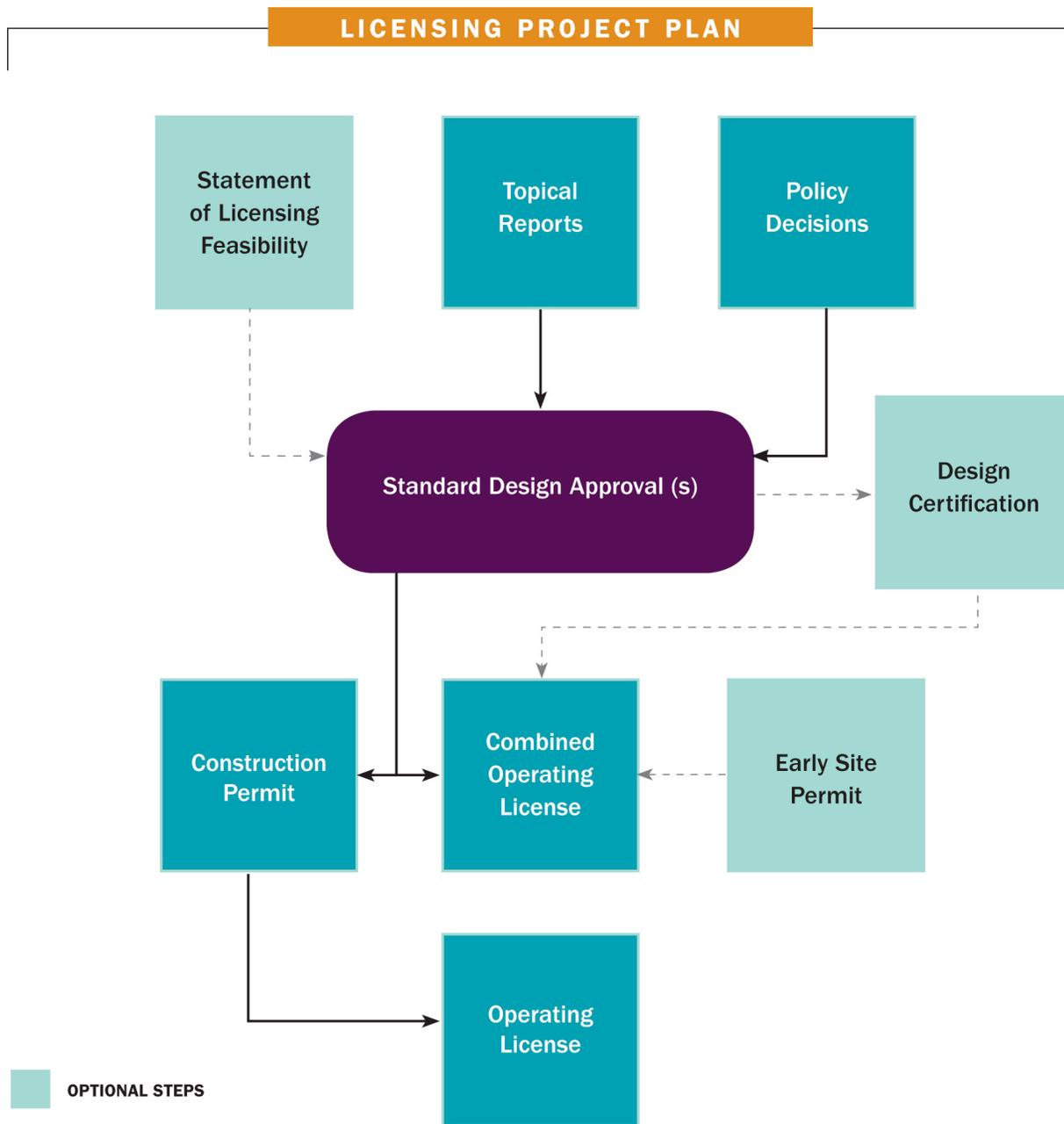
Licensing Project Plan

- Industry and NRC Practices have led to inefficiencies
 - Late identification of the need for guidance
 - Limited front-end planning of regulatory engagement
 - Delayed licensing submittals
 - Lack of management engagement
- A Licensing Project Plan will help to mitigate those issues
 - Defines working relationship between NRC and applicant, including communication protocol
 - Defines review components for each stage of licensing (project schedules, testing requirements, deliverables, and NRC review budgets)
 - Forms the basis for an agreed application schedule between NRC and developer and provides a mechanism for accountability

Statement of Licensing Feasibility

- Provides early-stage feedback on whether a preliminary reactor design is consistent with current NRC regulations. (Pre-licensing)
- Does not represent a commitment by NRC to issue a license
- It would offer important benefits:
 - it would standardize a review phase that, because of its limited cost and duration, could be used by stakeholders to compare available design options;
 - it would provide early feedback to the applicant, allowing timely alterations in approach to better meet regulatory expectations
- Based on CNSC Vendor Design Review Phase 1
- Staff guidance and policy decisions will be needed to implement this

Elements of Staged Licensing



Risk-Informed Performance Based Licensing

- Immediate Term:
 - Address Advanced Reactor Policy Issues
 - Revise LWR-centric requirements, while increasing the use of risk-informed and performance based techniques and guidance for advanced reactors
 - Continue to move forward with the DOE/NRC Advanced Reactor Licensing Initiative
- Medium Term
 - Develop and implement a technology-inclusive licensing and regulatory framework for advanced reactors

Policy Recommendations

- Revise the NRC's budget structure so that licensees and applicants reimburse it for activities related to their regulation, with Congress funding other agency-related activities
- Appropriate funds for the NRC to prepare for advanced reactor licensing
- Continue funding to DOE for competitively awarded grants for early efforts to license advanced reactors

We intend these recommendations to serve as a foundation for appropriate deliberation and, soon after, decisive action to improve the regulatory pathway for advanced nuclear energy technologies. This is critically important work that will enable society to capture the immense future benefits of advanced nuclear power.

Thank you

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