U.S. DEPARTMENT OF ENERGY | Office of NUCLEAR ENERGY

Clean. Reliable. Nuclear.

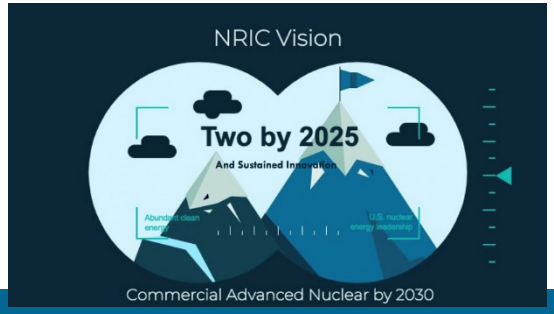
FY 2022 CINR FOA
RC 1: National Reactor Innovation Center (NRIC)

Federal POC: Janelle Eddins
Technical POC: Ashley Finan (INL)

August 10, 2021

NRIC Mission, Vision, Goals

- **Mission:** enable and accelerate the development and demonstration of advanced reactors by harnessing the unique DOE national laboratory facilities and capabilities
- **Objectives:**
  - Enable demonstration of at least 2 advanced reactors
    - Enable access to infrastructure, sites, materials and expertise
      - e.g. test beds for reactor demonstrations, sites for NRC licensed activities
    - Provide regulatory support (DOE authorization, activities to facilitate NRC licensing)
    - Utilize best practices in public and stakeholder engagement
  - Prepare DOE national laboratories for continuing innovation and support to advanced reactor demonstration
    - Develop best practices for planning, construction, and demonstration of nuclear projects
    - Develop enduring infrastructure and expertise to support future demonstrations
    - Establish methods for efficient coordination among laboratories
- NRIC is led by the Idaho National Laboratory (INL) with significant activities at the INL site, but resources at other national laboratories and potential reactor demonstration sites play an important role in achieving NRIC's objectives



Advanced Construction Technologies(ACT) Initiative

- **The ACT initiative aims to make nuclear construction faster and more affordable**. In the initiative's first project, NRIC will partner with a team led by General Electric Hitachi (GEH) to further develop and demonstrate three construction technologies that will reduce the cost of new nuclear builds by more than 10% and increase the pace of advanced nuclear deployment.
  - Vertical shaft construction, a best practice from the tunneling industry could reduce the amount of excavation and backfill required for a typical nuclear plant by one million cubic yards resulting in a savings of $50 million and reduction in construction schedules by more than a year.
  - Steel Bricks™ a steel- concrete composite could significantly reduce the amount of labor required on-site. The steel casings can be rapidly produced in factories concurrent with excavation then shipped to the site for faster installation.
  - Advanced sensors combined with digital twin technology will create a digital replica of the nuclear power plant and allow real time monitoring the integrity of the structure.
- These technologies can be applied to a variety of advanced reactor designs and will be available to reactor developers by 2025 and can ultimately help improve the economics of deploying advanced reactors into the market

  https://nric.inl.gov/advanced-construction-technologies-initiative/

RC 1.1: Improving Construction Cost and Schedule Outcomes ($800k, up to 3 years)

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- Construction costs and schedules risks drive up the costs of nuclear power plants
- NRIC's ACT Initiative seeks to develop and demonstrate technologies, processes and approaches that would reduce the cost and time for advanced nuclear construction
- Proposals are sought that identify, evaluate and/or develop methods, processes or technologies that can significantly improve advanced nuclear construction cost and schedule outcomes
- Examples include: project management, digital engineering, open architecture design, construction technologies, manufacturing approaches
- Proposed activities should be complementary to current ACT project and not duplicative

RC 1.2: Environmental Justice and Equity Considerations in Siting Energy or Industrial Facilities ($800k, up to 3 years)

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- The success of demonstration projects will in part depend on positive benefits to communities hosting those projects
- A socio-technical approach to deployment is needed that includes consideration of technology, geography, economics, politics, social issues, and historical context.
- Areas of interest for proposals include:
  - Quantitative and analytical approaches to evaluating equity and justice impacts
  - Case studies of similar projects and analyses of success and failure
  - Social-science led studies of related topics important to advanced nuclear deployment
- Applicants are encouraged to think expansively and seek out multidisciplinary partners

RC 1.3: Implementation Consideration for Advanced Nuclear Reactors as Dedicated Power Supplies ($400k, up to 3 years)

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- New large electrical loads pose challenges to U.S. electric power grid that could be addressed by use of microreactors or small advanced reactors to serve as dedicated power sources.
- Proposals are sought that identify high value opportunities for advanced nuclear reactors to provide a dedicated supply of heat and/or electricity.
- Example opportunities include: electric vehicle charging stations, electrolyzers for hydrogen stations, data centers, maritime shipping, district heating, synthetic fuel production, or other industrial processes.
- Areas of interest for proposals include: techno-economic analysis; technical interface considerations and regulatory analysis; details on reactor type, size, variability of loads, thermal and electrical output capacity; startup and shutdown requirements under planned and unplanned conditions; site requirements such as containment function, methods and capacity to transfer heat to the environment in various operating conditions, access, physical security boundaries, operator and security staff.

Contact Information

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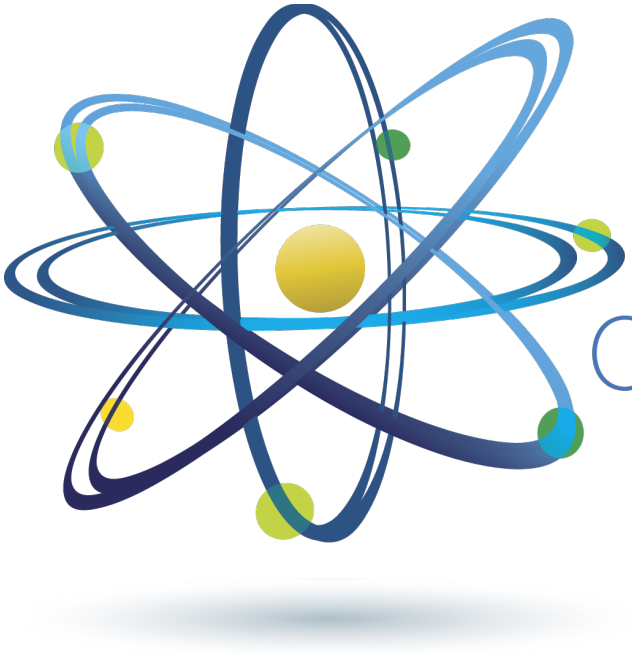
Please visit: https://nric.inl.gov/

Questions?



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