

# **IRP-1: Grand Challenge IRP – Accelerating Reactor Deployment**

Up to 3 years and up to \$3,000,000

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# Grand Challenge IRP - Accelerating Reactor Deployment

- NE's goal of demonstrating several advanced reactor types within this decade resulting in advanced reactor deployment in the 2030s, is a core aspect of addressing U.S. clean energy climate change goals.
- One of the primary challenges is reducing overall capital and operating and maintenance (O&M) costs while also de-risking the technologies for industry to adopt more quickly.
- NE solicits applications for this scope that take a holistic, multi-disciplinary approach to reactor deployment consideration for specific reactor technologies.
- Proposals that suggest innovative ideas for cost reduction or shortening the deployment timeline by developing a holistic, multi-faceted approach, including a focus on key technical needs areas, like nuclear economics, accelerated testing, and reactor/plant design expertise, are desired

# Grand Challenge IRP - Accelerating Reactor Deployment

- Applications can cover a wide variety of topics including:
  - **Innovative component, instrumentation, and fuel handling systems**
    - For example: Compact fuel handling machine for advanced reactors, advanced sensors and instrumentation, self-actuated control mechanisms, in-service inspection and health monitoring systems, test articles for existing testing facilities.
  - **Design optimization**
    - For example: Design of advanced reactors targeting better performance, lower fuel/HALEU requirements, multi-purpose/flexible operation, etc.
  - **Technologies to reduce cost and schedule**
    - For example: Material and size reduction design strategies for advanced reactors, accelerated testing and qualification of fuels and materials, design innovations and technologies to reduce capital costs, O&M costs, and construction cost and timeline.
  - **Siting infrastructure considerations**
    - For example: Enhancing or developing tools/methodologies to inform on advanced reactor siting implications including social, political, economic, infrastructure, etc.
  - **Other topics**
    - Relevant work topics not explicitly mentioned here will be considered if they support the grand challenge of accelerating advanced reactor deployment.

# Ongoing NE Work Relevant to IRP-1

- **Advanced Reactor Technologies (ART) Program**
  - Mechanisms Engineering Test Loop (METL) - Supports development of next-generation components and workforce for sodium fast reactors. <https://www.anl.gov/nse/mechanisms-engineering-test-loop-facility>
  - Liquid Salt Test Loop (LSTL) - Support the development of next-generation systems such as FHRs and MSR. <https://www.ornl.gov/directorate/thermal-hydraulics-experiments>
- **National Reactor Innovation Center (NRIC) - Advanced Construction Technology (ACT) Initiative**
  - Aims to reduce cost overruns and schedule slippages that have plagued the construction of nuclear power plant projects. <https://nric.inl.gov/advanced-construction-technologies-initiative/>
- **Simulating Neutrons with Accelerated Particles (SNAP)**
  - Predicts the evolution of microstructure and mechanical properties of structural materials in-reactor and at high doses, using ion irradiation. <https://mibl.engin.umich.edu/>

The above list of R&D examples is not exhaustive, and it is provided to assist applicants in identifying research that is not duplicative of previous or on-going research.

# Areas Not Of Interest

Applications should focus on research that support the **DOE-NE mission**

Applications with the following areas would be considered not relevant to this topic:

- Nuclear non-proliferation purposes
- Technologies solely for nuclear fusion applications
- Nuclear weapons R&D
- Nuclear medical isotope production

Applications on technologies that crosscut any of these areas could be considered responsive if proposal clearly demonstrates the application to nuclear energy.

# IRP-1 Helpful Links

- Molten Salt Reactor (MSR) Program - <https://gain.inl.gov/SitePages/Molten%20Salt%20Reactor.aspx>
- Fast Reactor Program - <https://gain.inl.gov/SitePages/Fast%20Reactor.aspx>
- HTGR Program - <https://gain.inl.gov/SitePages/HighTemperatureReactor.aspx>
- NEUPs - [https://neup.inl.gov/SitePages/FY15\\_Funded\\_Projects.aspx](https://neup.inl.gov/SitePages/FY15_Funded_Projects.aspx)
- SBIRs - <https://science.osti.gov/sbir/Awards>
- NEAMS – <https://neams.inl.gov>
- GAIN - <https://gain.inl.gov/SitePages/DE-FOA-0001817.aspx>
- iFOA – <https://www.energy.gov/ne/industry-foa-awardees-8>
- Federal POC email – [Brian.Robinson@nuclear.energy.gov](mailto:Brian.Robinson@nuclear.energy.gov)

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# Questions?