National Reactor Innovation Center

Enabling the testing and demonstration of advanced reactor concepts

The National Reactor Innovation Center (NRIC) at Idaho National Laboratory provides resources for testing, demonstration, and performance assessment to accelerate deployment of new advanced nuclear technology concepts.

What is NRIC?

Authorized by the Nuclear Energy Innovation Capabilities Act (NEICA), NRIC provides private sector technology developers access to the strategic infrastructures and assets of the national laboratories. Companies can use these resources for commercial nuclear energy research, development, demonstration and deployment activities. These capabilities will ultimately support a timely and cost-effective path to the licensing and commercialization of new nuclear energy systems.

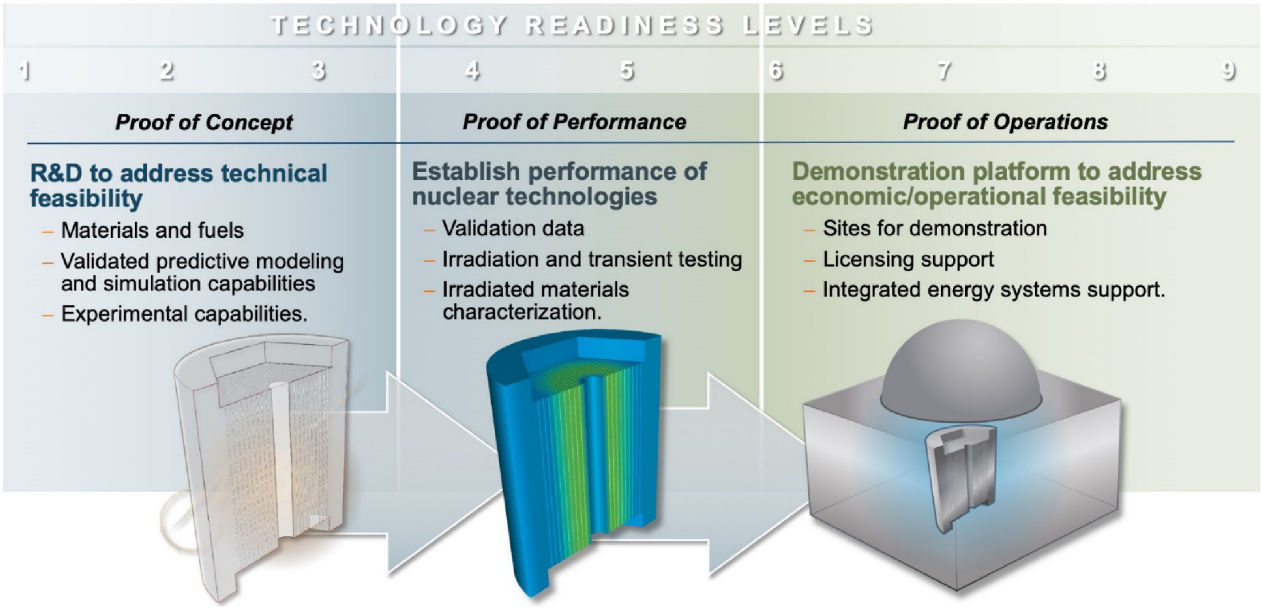
Why is NRIC needed?

NRIC is intended to:

- Enable testing and demonstration of reactor concepts by the private sector.
- Validate advanced nuclear reactor concepts.
- Resolve technical challenges of advanced nuclear reactor concepts.
- Provide general research and development to improve innovative technologies.

How will NRIC interface with the Gateway for Accelerated Innovation in Nuclear (GAIN)?

Both GAIN and NRIC are necessary components in a modern business model and approach, given today's technological and regulatory environment. The GAIN initiative was developed as a mechanism to provide the nuclear energy industry with access to the technical, regulatory and financial support necessary to move new or advanced nuclear technologies toward commercialization, as well as ensuring the continued reliable; clean and economic operation of the existing nuclear reactor fleet. It offers a single point of access to the broad range of capabilities in DOE's national laboratory complex and has developed and maintained



NRIC Provides Capabilities to Accelerate Technology Readiness from Proof of Concept through Proof of Operations.

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interfaces with the Nuclear Regulatory Commission, which will prove valuable in the advanced nuclear energy systems licensing and commercialization.

NRIC is a natural extension of GAIN as developers move to the later stages of commercialization—providing the on-the-ground capabilities to accelerate technology readiness from proof of concept through proof of operations. Demonstrating these advanced nuclear energy technologies will ultimately reduce costs and improve the performance of these prototypes as they move to full commercialization.

Why INL?

For more than 70 years, Idaho National Laboratory has played an important leadership role in the development and deployment of current and next generation nuclear reactors. On this 890 square-mile site in the Idaho desert, the U.S. government—including the Navy—and the private sector built, tested and demonstrated first-of-a-kind reactors that were later deployed around the world. Those activities at the National Reactor Testing Station (NRTS) helped establish U.S. nuclear technology leadership globally. Data generated at the NRTS and codes validated with these data have played an essential role in informing NRC approaches to regulatory policy and structure. Knowledge built at INL established international standards of regulation, safety and security that enabled global trade. The government's role in facilitating testing and demonstration at the NRTS to provide licensing and regulatory bases, and to mature technology and operations approaches, was key in developing the current commercial nuclear energy market.

Much of INL's integrated capability was established through decades of investment in the NRTS on the Idaho site.

INL Nuclear Energy Capabilities

- ***Advanced Test Reactor***, the world's premier nuclear test reactor, providing unmatched national priority nuclear fuels and materials testing.
- ***Cybercore Integration Center***, where multiple initiatives seek to enhance the security and resiliency of industrial controls systems by adopting an interdisciplinary approach to understanding the technical aspects of operational technology in an evolving threat environment.
- ***Collaborative Computing Center***, a pioneering computing environment that will become home to INL's newest supercomputer, Sawtooth, as well as space for collaboration with Idaho's universities and researchers from around the world.
- ***Materials and Fuels Complex***, a prime testing center for advanced technologies associated with nuclear power systems. This complex is the nexus of research on new nuclear fuels and materials, and includes the following facilities:
  - Analytical Laboratory
  - Fuels and Applied Science Building
  - Space & Security Power Systems Facility
  - Hot Fuel Examination Facility
  - Fuel Conditioning Facility
  - Experiment Fuels Facility
- ***Irradiated Materials Characterization Laboratory***, located at the Materials and Fuels Complex, focuses on microstructural, thermal, and mechanical characterization of irradiated nuclear fuels and materials.
- ***Transient Reactor Test Facility***, built to conduct transient reactor tests where the test material is subjected to neutron pulses that can simulate accident conditions.
- ***Moose Simulation Environment***, the Multi-physics Object Oriented Simulation Environment (MOOSE) has revolutionized predictive modeling work in an array of scientific fields and can help inform real-word experiments.
- ***High Temperature Test Laboratory***, which creates specialized sensors that can monitor various properties within a test reactor core during irradiation experiments.
- ***Human System Simulation Laboratory***, is a complete virtual nuclear control room created to test new technologies safely before they are implemented in.

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