

Nuclear Energy Enabling Technologies

New Proposal for FY 2011

Briefing to the
Nuclear Energy Advisory Committee

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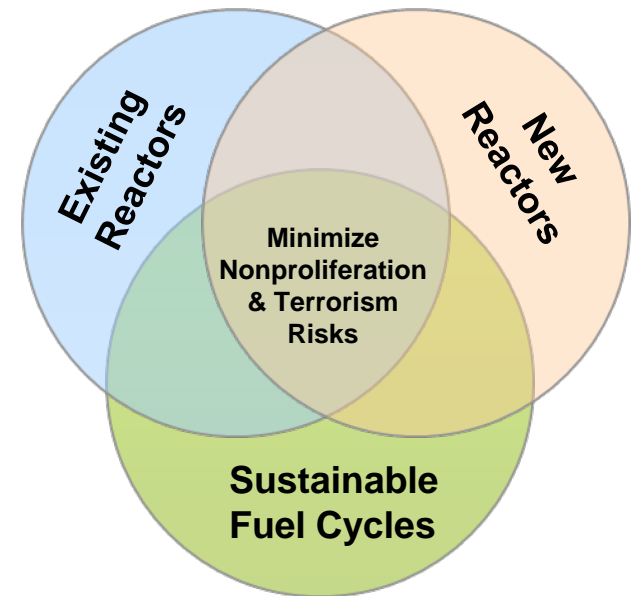
Office of Nuclear Energy's Mission



The primary mission of the Office of Nuclear Energy is to advance nuclear power as a resource capable of making major contributions in meeting the Nation's energy supply, environmental and energy security needs by resolving technical, cost, safety, security and regulatory issues through research, development and demonstration.

Nuclear Energy's R&D Objectives

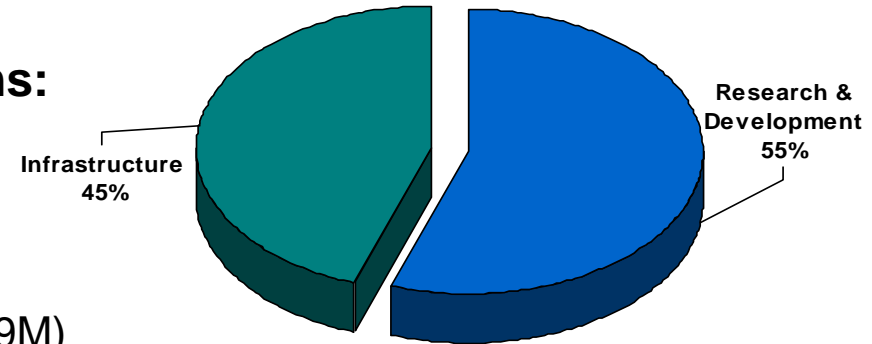
- 1) **Develop technologies and other solutions that can improve the reliability, sustain the safety, and extend the life of current reactors**
- 2) **Develop improvements in the affordability of new reactors to enable nuclear energy to help meet the Administration's energy security and climate change goals**
- 3) **Develop sustainable nuclear fuel cycles**
- 4) **Understand and minimize the risks of nuclear proliferation and terrorism**



Nuclear Energy RD&D: Reorganized and Refocused

◆ New RD&D Agenda consists of three complementary and integrated programs:

- Reactor Concepts RD&D (\$195M)
- Fuel Cycle R&D (\$201M)
- Nuclear Energy Enabling Technologies (\$99M)



NE Overall Budget: \$912M

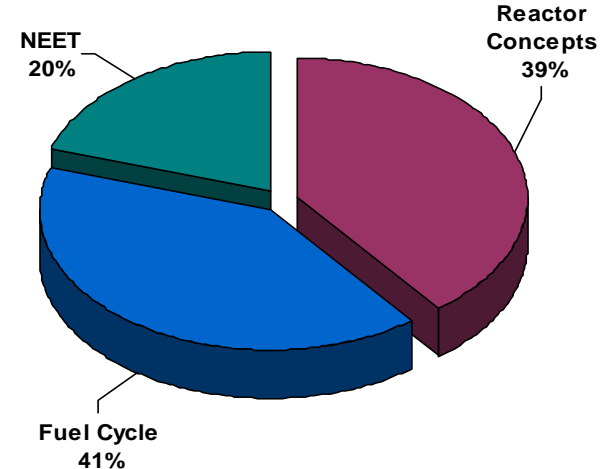
NE R&D Budget: \$495M



Nuclear Energy Enabling Technologies: R&D in Support of Reactors and Fuel Cycles

◆ **The proposed NEET program will consist of three complementary and integrated programs:**

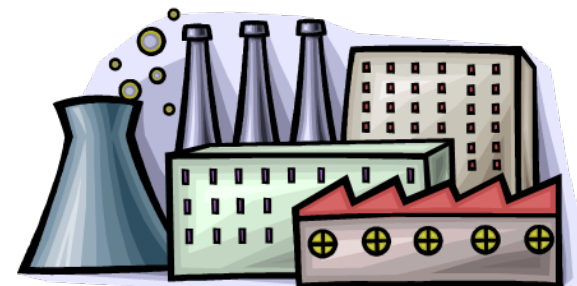
- Crosscutting Technology Development (\$43M)
- Transformative Nuclear Concepts R&D (\$28M)
- Energy Innovation Hub for Modeling and Simulation (\$24M)



Nuclear Energy Enabling Technologies: Crosscutting Technology Development

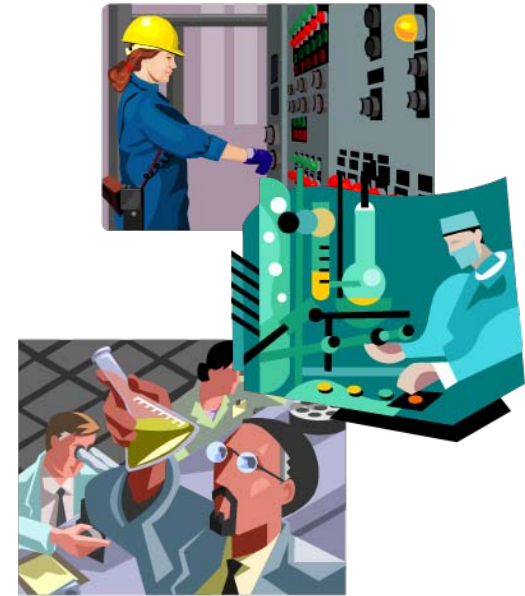
◆ Supports R&D in either crosscutting or enabling technologies to support multiple reactor concepts in following areas:

- **Reactor Materials** – New classes of alloys and materials not yet considered for reactor performance may enable transformational reactor performance.
- **Proliferation Risk Assessment** – Develop new tools and approaches for understanding, limiting, and managing risks of proliferation and physical security for fuel cycle and reactor system options.
- **Advanced Methods for Manufacturing** – Research on advanced manufacturing technologies that draw upon successful practices in oil, aircraft, and shipbuilding industries, as appropriate, and employ modeling and simulation capabilities.
- **Advanced Sensors and Instrumentation** – Research on unique sensor and instrumentation infrastructure technology to monitor and control new advanced reactors and small modular reactor systems.



Nuclear Energy Enabling Technologies: Transformative Nuclear Concepts R&D

- ◆ **Support investigator-initiated projects that relate to any aspect of nuclear energy generation via an open, competitive solicitation process**
 - Reactor and power conversion technologies
 - Enrichment
 - Fuels and fuel management
 - Waste disposal
 - Nonproliferation
 - Other
- ◆ **Encourage “outside the box” options for nuclear energy**



Nuclear Energy Enabling Technologies: Energy Innovation Hub for Modeling & Simulation

- ◆ Focus on dramatically changing user environment for advanced modeling and simulation and high performance computing with mission focus to create a “virtual” model of an operating reactor.
- ◆ Improve our scientific understanding of reactor systems to increase the pace of innovation and reduce costs.
- ◆ Exact scope of work to be performed will be defined by successful applicant.
- ◆ Evaluation of responses received from January 20, 2010, Funding Opportunity Announcement is underway.



Nuclear Energy Enabling Technologies: R&D Planning Workshop

- ◆ Purpose is to obtain stakeholder input on NE's R&D agenda.
- ◆ Input will be sought in the areas of:
 - Reactor Materials
 - Non-Proliferation Risk Assessment
 - Advanced Sensors & Instrumentation
 - Advanced Methods for Manufacturing and Construction
 - Transformative Nuclear Concepts
- ◆ Format envisioned to be one-day workshop with plenary and breakout sessions.
- ◆ Tentatively scheduled for the week of July 26th in the DC metro area to coincide with NE University Program Workshop.

