



Nuclear Energy University Program (NEUP) Fiscal Year (FY) 21 Annual Planning Webinar

RC-11: Advanced Small Modular Reactor Technology Development and Demonstration

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SMR Benefits

DOE believes SMRs have the potential to provide a clean, reliable, and resilient energy option for domestic and international utilities

- ***New Standard for Nuclear Safety***

- *Plants that can safely shutdown without operator interaction, off-site power or off-site water and remain so indefinitely*

- ***Greater Affordability***

- *Easier financing for public power entities in the U.S. and smaller countries*
- *Simplified designs, fewer components*
- *Factory fabrication, shorter construction times*

- ***Energy and Grid Benefits***

- *Good candidate to replace retiring fossil plants*
- *Support grid stability, security, resilience*
- *Energy output more appropriate for countries with smaller electrical grids*

- ***Importance to National Security***

- *Retaining influence in the nuclear nonproliferation regime through innovative nuclear products that are attractive to other countries*

- ***Manufacturing jobs and supply chain opportunities in the United States***



Advanced SMR Research and Development Program

- In 2019, DOE initiated a new program for advanced SMR research and development
- Supports Office of Nuclear Energy goal “Establish an Advanced Reactor Pipeline”
- Received \$100 M in fiscal years 2019 and 2020
- FY 2021 Request is \$10 M
 - House Mark \$297 M



- **Program Goal**: To support cost-shared, design-related research and development for multiple advanced reactor designs to introduce these technologies into domestic and international markets

Major Program R&D Areas

Program working with industry to support:

- Development of new designs
- Licensing activities
- Operations and maintenance
- Advanced manufacturing capabilities
- Supply chain development



FY2021 will be the 2nd year that NE SMR programs will support NEUP proposals

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FY 2020 CINR Awardees

The following projects were awarded during the FY 2020 award cycle:

- Massachusetts Institute of Technology
 - “Highly Compact Steam Generators for Improved Economics of Small Modular Reactors”
 - Lead PI: Bren Phillips
- University of Michigan
 - “Innovative Enhanced Automation Control Strategies for Multi-unit SMRs”
 - Lead PI: Brendan Kochunas
- University of Michigan
 - “Deployment Pathways of Small Modular Reactors in Electric Power, Industrial, and Other Niche Markets to Achieve Cost Reductions and Widespread Use”
 - Lead PI: Michael Craig

RC-11 Advanced Small Modular Reactor Technology Development and Demonstration

Seeking applications to develop technologies, capabilities, and methodologies specific to SMR characteristics and environments that would help to improve their deployment, operations, and overall utility in meeting domestic and international market needs.

Examples of technology development areas where proposals are sought include, but are not limited to, the following:

- *Design advancements:* Technologies that enable innovative design solutions that can function in specific SMR environments;
- *Operational advancements:* Technologies that improve the efficiency (reduce cost, schedules, and/or staffing requirements) for SMR operations;
- *Diverse applications:* Technologies that facilitate utilization of SMRs for multiproduct (electricity and heat) applications