



Nuclear Energy University Program (NEUP) Fiscal Year (FY) 20 Annual Planning Webinar

RC-10 Small Modular Reactor Technology Development and Support for Deployment

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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***

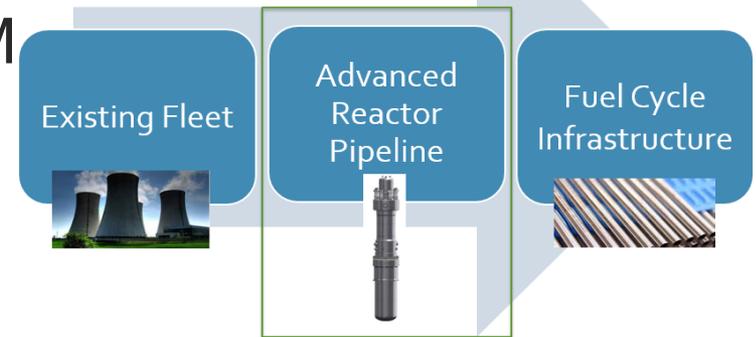
- *Retaining influence in the nuclear nonproliferation regime through innovative nuclear products that are attractive to other countries*

- ***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”
- Fiscal year 2019 budget is \$100 M
- FY2020 Request \$10 M
 - House Mark \$100 M

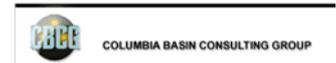


- **Program Goal**: To support cost-shared, design-related research and development for multiple advanced reactor designs to introduce these technologies into domestic and international markets

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



FY2020 represents the initial year that NE SMR programs will support NEUP proposals

RC-10.1 Technologies to Support SMR Development and Commercialization

Seeking proposals to develop technologies, capabilities and methodologies specific to SMR characteristics and environments that would help to improve the deployment potential of SMRs.

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

- Remote or autonomous operation capabilities;
- Control room improvements;
- Compact, high efficiency heat exchanger and steam generator designs;
- Improved penetration technologies for primary system components;
- On-line power monitoring capabilities for anticipated advanced SMR cores;
- Methodologies or use of robotics for remote or automated maintenance in confined environments and high radiation fields; and,
- Ability to conduct material accountability for advanced fuel designs in fleet-level deployment.

Note: Technology neutral, should reference existing designs or concepts

RC-10.2 SMR Market Analyses

Seeking proposals to analyze potential markets and applications that take advantage of SMR characteristics.

Proposals are sought to perform analyses on topics such as, but not limited to, the following:

- Feasibility of siting SMRs in both remote and populated areas;
- Examination of markets that are specifically trying to retire coal plants that are in the same output range as known SMR designs, and could be “sweet spots” for SMR deployment;
- Assessment of SMR capabilities to support remote industries such as mining operations, remote population centers, to provide resilient power to permanent, mission-critical facilities, and other potential applications;
- Evaluation of SMR capabilities to provide increased resilience of the existing electrical grid and for possible microgrid applications.

NOTE: Studies should incorporate information consistent with the capabilities of current domestic SMR designs and concepts of any technology type, should avoid duplication of existing SMR market studies, recommend SMR design requirements and potential improvements relevant to specific applications, and provide a data-driven market assessment for a range of SMR sizes and performance parameters.

RC-10.3 SMR Economic Analyses

Seeking proposals to conduct analyses or sensitivity studies that can address economic impacts of various SMR plant design, fabrication, construction, operation, and decommissioning activities, state and national-level energy policies and initiatives, and financing structures on the levelized cost of electricity (LCOE) of SMRs.

Proposals may address the impact on economics of a wide range of SMR-specific factors including, but not limited to, the following:

- Fabrication and construction improvements;
- Supply chain development and improvement activities;
- Unique transportation methodologies for major SMR components and modules that could improve construction schedules;
- Unique considerations for fleet-level fuel transportation and disposition;
- Decommissioning policies and methodologies;
- Financing structures that would support incremental deployment of multiple plant modules, or plant deployments at multiple locations; and,
- Potential federal and state policy changes, including actions such as changes in tax structures and valuation of resilience capabilities.

NOTE: Studies should incorporate information consistent with capabilities of current domestic SMR designs and concepts of any technology type, avoid duplication of existing SMR economic studies, and recommend potential improvements relevant to areas assessed.