

Office of Nuclear Energy Support for U.S.-Based Small Modular Reactor Technologies

Office of Nuclear Technology
Demonstration and Deployment

October 13, 2017

DOE Support for SMR Technologies



- DOE recognizes the value of SMRs as a new power source for the U.S. electrical grid to enhance its reliability and resiliency
- Initiated *SMR Licensing Technical Support Program* in FY 2012
- Goal: Accelerate the availability of safe, affordable SMRs into the market by sharing financial and technical risk with the first movers in the industry
- Established cost-shared cooperative agreements with most mature designs
- B&W – First awardee selected in FY2013, agreement suspended in FY2015
 - Efforts on B&W design helped to establish regulatory blueprint for subsequent SMRs
- NuScale – Innovative option selected in FY2013, final funding year for program was FY2017
 - Program advanced NuScale development and certification
 - Success! Design Certification Application submitted to NRC in FY2017; review ongoing



Status of NuScale Power SMR Development

Design Certification Application (DCA) Review

- Submitted DCA to NRC in January 2017, docketed in March 2017
- NRC issued 46 Month review schedule (completion target – January 2021)
- Phase 1 of review, which results in completion of a preliminary safety evaluation report, ahead of schedule (Due April 2018)
- NuScale DCA dealing with significantly fewer requests for additional information that anticipated from benchmarks
- No significant safety concerns identified during NRC review



Progressing product realization in areas such as:

- Control room design and human factors engineering
- Instrumentation and control
- Emergency core cooling system valve design
- Steam generator fabrication and testing
- Alternative control rod drive mechanism design development
- Issued Major Manufacturer request for proposal in June 2017
- Supply chain development



Opportunity to Establish an Advanced Reactor Pipeline

- **Over next 30 years many units of the existing U.S. light water reactor (LWR) fleet will be retired**
- **Light Water SMRs are the most mature with ability to immediately contribute to U.S. energy portfolio**
- **Non-light water SMR designs also viable, but likely have a longer licensing horizon**
- **Significant work remains to finalize designs and site licensing projects, as well as development of supply chain infrastructure**
- **Need for Government Teaming with Industry**
 - Need new U.S. nuclear builds to regain leadership and global influence
 - SMRs expected to be a key element of the nation's future electricity generation portfolio
 - Historically, all commercial deployments of new reactor technologies preceded by significant private-public partnerships

Next Steps

- No SMR-specific program funding in FY 2018; however, the FY 2018 request “invests in early-stage research and development on next generation reactor technologies, including \$20 million supporting advanced small modular reactor.”
- FY 2018 Appropriation House mark recommends that the Department dedicate \$60 million to *“support technical, first-of-a-kind engineering and design and regulatory development of next generation light water and non-light water reactor technologies, including SMRs”*
- NE is developing an industry-focused funding opportunity announcement (FOA) that will support early stage R&D and first of a kind engineering for advanced reactors, including SMRs.

NE Support for U.S. Industry Initiatives:

Notional Framework for New Reactor Development, Including SMR Support FOA

Tier	Delineation of Tiers	Task Funding Range	Cost Share	Typical No. of Tasks	Length of Tasks
3	License Application with NRC and/or Contractual Arrangement w/ End User(s)	\$10M-\$100M	50/50	1-2	24-36 months
2	Reactor Technologies and/or Concepts at varying levels of technical and/or regulatory maturity	\$1M-\$10M	50/50 80/20	4-6	12-30 months
1	Technical and Regulatory Vouchers for work to be performed by DOE labs or licensing discussions w/ NRC	Less than \$1M	80/20	20+	6-18 months