

Small Modular Reactors (SMRs)

Presentation to the Secretary of Energy Science Advisory Board

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DOE Market Survey

- Sponsored public workshops to solicit input from nuclear industry
- Conducted one-on-one meetings and site visits with SMR designers, manufacturers, and owner/operators to explore viable business case scenarios and R&D needs
- Conclusions from interface:
 - SMR LWR designs are most likely deployable within the next decade
 - Partnerships established between SMR designers, manufacturers, and owner/operators are feasible
 - Cost-share licensing program is needed for industry to successfully deploy SMRs in the next decade
 - Suitable regulatory framework is needed to support SMR licensing
- R&D needed to support innovative advanced reactor designs to address expanded missions beyond electricity





Office of Advanced Reactor Concepts

Small Modular Reactor RD&D Program

- DOE Small Modular Reactor Program:
 - Research, Development & Deployment (RD&D) to enable the deployment of a fleet of SMRs in the United States
 - SMR Program is a new program for FY 2011
 - Structured to address the need to enable the deployment of mature, near-term SMR designs based on known LWR technology
 - Conduct needed R&D activities to advance the understanding and demonstration of innovative reactor technologies and concepts



SMR RD&D Program

- SMR RD&D Program Elements:
 - –LWR SMR Licensing Technical Support (\$452M/5-year program)
 - Public-Private Partnerships for design certification and licensing activities
 - Reduce technical and regulatory risks of near-term SMRs
 - —SMR Advanced Concepts RD&D (~\$30M/per year); four technical pathways
 - R&D Program will be guided by input from vendors pursuing advanced
 SMR designs
 - Work organized into four technical pathways
 - Assessment Methods
 - Instrumentation, Controls and Human-Machine Interfaces
 - Materials, Fuels and Fabrication Technologies
 - Safety Assurance



LWR SMR Licensing Technical Support

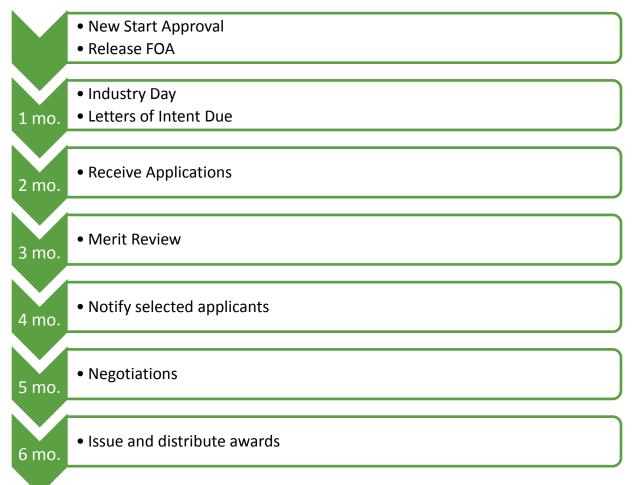
Industry Partnerships

- Cost-share first-of-a-kind (FOAK) development and licensing costs to advance LWR SMR designs toward Design Certifications (DCs), early site permits (ESPs), and Combined Operating Licenses (COLs)
- Maximum of 50% government cost share
- Pursue business model(s) that promise a return on investment or other value proposition to the U.S. Government
 - Cost-shared first-mover SMRs are a performing asset that will return value to the U.S. Government
 - Cost-shared projects advance U.S. strategic missions and goals
 - Revitalize domestic manufacturing industry
- Pursue business model(s) that advance U.S. commercial interests domestically and abroad





Proposed FOA Schedule





SMR RD&D Technical Focus Areas

- SMR Instrumentation and Control/Human Machine Interface
 - Develop techniques to improve measurements, diagnostics and controls for SMR-specific environments
 - Address needs for expanded functionality
- SMR Assessment Methods
 - Develop PRA capability to verify reduced risk of simpler, safer designs
 - Advanced economic models for near and long-term needs
- SMR Safety Assurance
 - Develop advanced technologies for intrinsic safety and security
 - Address issues identified in NRC SECY10-0034
- SMR Materials, Fuels and Fabrication Technologies
 - Evaluate materials and fuels for advanced SMR's
 - Examine material and fuel degradation phenomena to SMR-specific conditions
 - Support a project to advance integrated manufacturing of SMR module
 - Evaluate code cases for SMR materials and fuels

