Westinghouse eVinci™ Micro- Reactor Program

GAIN-EPRI-NEI-US NIC Micro-Reactor Workshop
Idaho National Laboratory
June 2019

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Global Technology Office
Westinghouse Electric Company LLC
www.westinghousenuclear.com/New-Plants/eVinci-Micro-Reactor
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Westinghouse eVinci™ Micro Reactor

Redefine Nuclear Industry and Reinstate U.S. Leadership

- **Size:** 1.9 MWe Heat pipe reactor, 3 MWth district heat
- **Construction:** Factory built, assembled, fueled and tested
- **Transportable by:** Road, rail, sea and air
- **Location Independent:** Ambient air heat rejection
- **Zero EPZ:** Small exclusion zone
- **Lowest Proliferation FOM**
- **Semi-autonomous Operation:**
  - Self regulating core and heat pipes
  - Advanced I&C system
  - Passive and Automatic shutdown

Other DOE Programs

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Design Effort

- Conceptual Design
- Basic Design
- NRC Pre-Licensing
- Detailed Design
- NDU Licensing
- EDU Test

DOE FOA-1817

- DOE FOA Award Announced
- T&Cs
- Start Work

DOE – FOA 1817 Budget Period 1 ($12.8M Award - $8.4M to WEC/$15M WEC In-Kind)

Nuclear Demonstration-2023
eVinci™ Micro Reactor - Specific Needs

**Nuclear Criticality Data via testing**
- Reduce design uncertainties
- Nuclear data from criticality tests in Epithermal/Cadmium energy neutron flux range
- Neutron scattering data
- **Advanced high temperature metal hydride moderator:** Dynamic simulation of hydriding and dehydriding during reactor transients

**High Temperature Materials and Sensors Data**
- Sensors: Have 650°C data; Need 850°C data
- Irradiated TZM creep characterization data
- ASTM code development

**HALEU/TRISO Fuel Supply**
- eVinci core only needs <600 Kg HALEU TRISO
- Demonstration reactor may require less
- 19.75% enriched with U-235

**Pilot Assembly line**
- Modeling and Simulation
- Assembly Line pilot
- Inspect-ability and repeatability
- Cost and Quality Control
- Regulatory Assessments
Micro Reactor Needs (Technology Agnostic)

**Micro Grid Integration Test Platform**
- Operate with other generation technologies
- Remote monitoring
- Operator training

**Impact Limiter Qualification**
- Impact limiter qualification needed for every transportable micro-reactor

**NRC/DOT/DHS Standard for Micro Reactor Transportation**
- Does 10CFR71 and 10CFR73 apply?

**External Hazards Identification Standard**
- Earthquakes, tsunamis, EMP attack, GMD, fire, flood, weapons attack?

**NDU Site + DOE Regulatory Assistance**
- Site Identification and Evaluation
- DOE regulatory support in review of CSDR and SDS

**Supercomputing Platform to run Coupled Design M&S and Safety Analysis Tools**
- Coupled modeling and simulation requires large clusters
- 1,000’s of cores per simulation

**Refueling, Handling and disposal of used Micro Reactor**
- Refueling operation in factory
- Used fuel and activated materials disposition

**NRC Regulatory Engagement Assistance**
- Pre-licensing and licensing funding assistance for FOAK micro reactors
- Standardized reg guides for micro reactors