

# DOE Support for Advanced Reactor Licensing and Demonstration

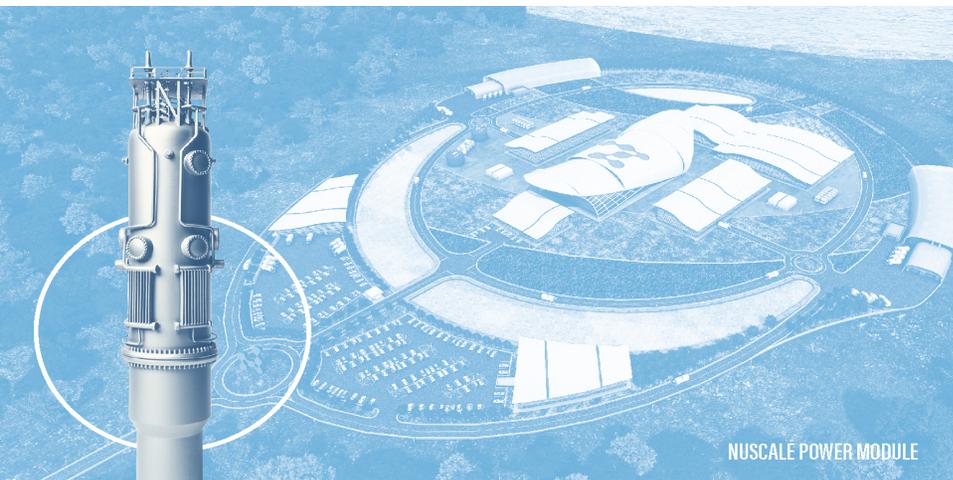
Alice Caponiti

Deputy Assistant Secretary for Reactor Fleet and  
Advanced Reactor Deployment

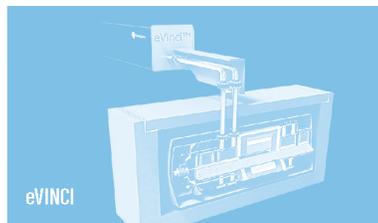
Office of Nuclear Energy



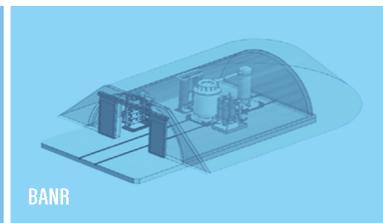
December 9, 2021



NUSCALE POWER MODULE



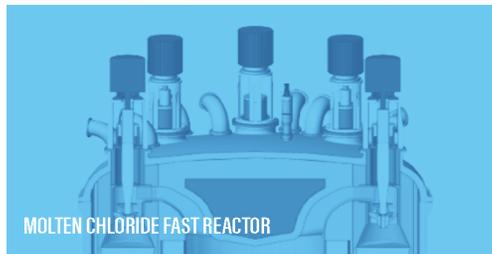
eVINCI



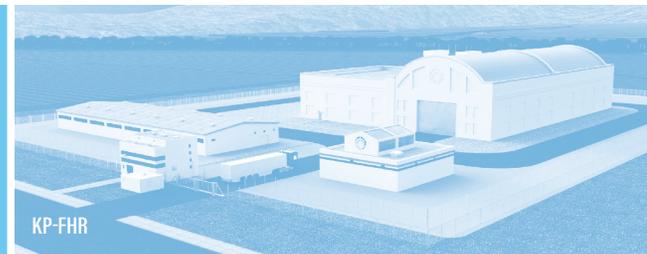
BANR



SMR-160



MOLTEN CHLORIDE FAST REACTOR



KP-FHR

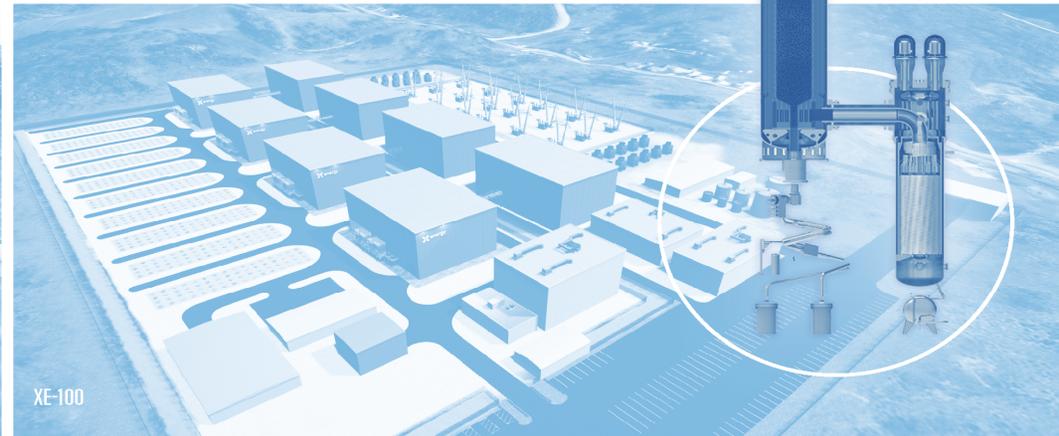
# ADVANCED NUCLEAR TECHNOLOGY

U.S. DEPARTMENT OF  
**ENERGY**

Office of  
**NUCLEAR ENERGY**

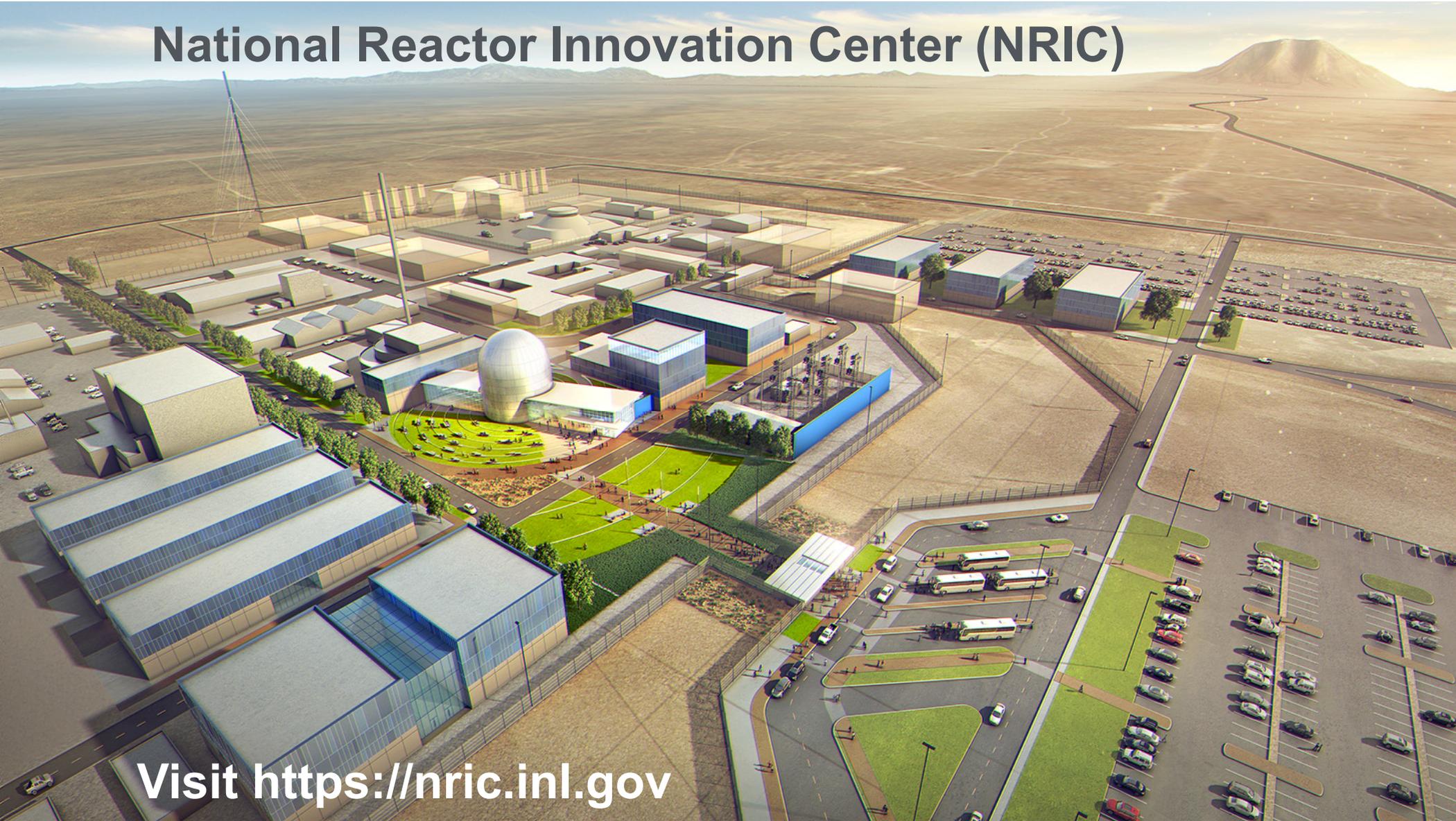


NATRIUM REACTOR



XE-100

# National Reactor Innovation Center (NRIC)



Visit <https://nric.inl.gov>

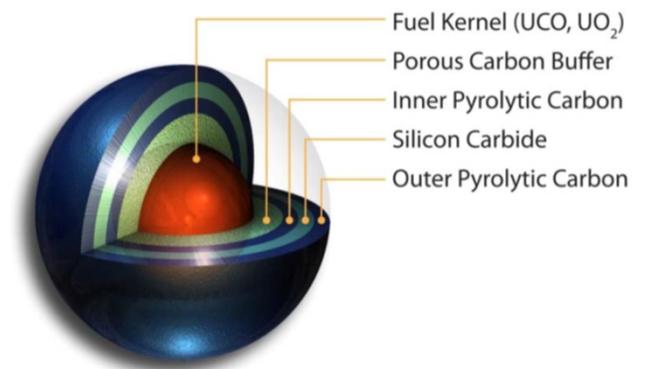
# Advanced Reactor Regulatory Development

- DOE NE cost-share support of industry-led initiatives to adapt and establish a regulatory framework for advanced reactors
  - Technology-Inclusive Content of Applications Project (TICAP) is a risk-informed, performance-based (RIPB) approach to right-size information in a license application to increase efficiency of generating and reviewing an application
  - Builds on NRC-endorsed Licensing Modernization Project systematic risk-informed process
  - Opportunity for early movers to demonstrate implementation of risk-informed, performance-based approach



# Advanced Reactor Regulatory R&D

- NE R&D activities directly reduce technical and regulatory risks by providing the bases for the establishment of advanced reactor technology licensing technical requirements
  - Establish technical insights and tools regarding radionuclide transport and release from advanced reactors, including fast reactors, gas-cooled reactors, and molten salt reactors
  - Supporting NRC endorsement of codes and standards important for the manufacture of advanced reactor components
  - Validation and access to priority material property data to be used in safety codes and models
- Examples include:
  - Advanced fuel irradiation and performance testing
  - Passive safety system testing and model validation
  - Advanced materials testing and ASME Code qualification
  - Modeling and Simulation Tool Development



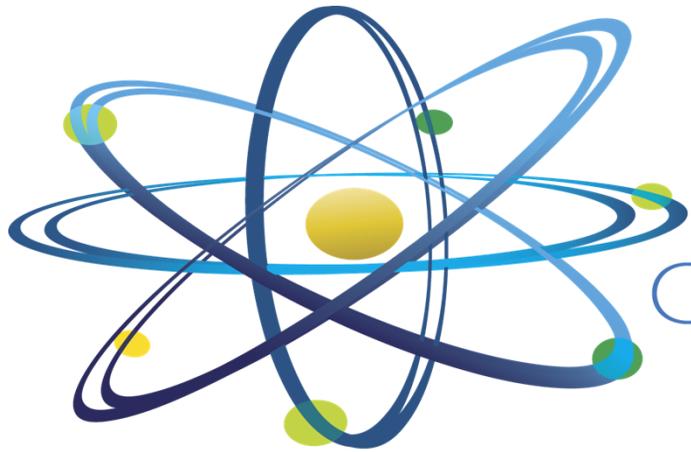
# Expanded Cooperation with the Regulator

- DOE/NRC MOU on Nuclear Energy Innovation (October 2019)
  - Accelerate technical and regulatory readiness to enable demonstration of innovative technologies and advanced reactor concepts
  - Support sharing of technical experience and knowledge
- MOU addendum for Advanced Reactor Demonstration Program (April 2020)
- MOU addendum on the National Reactor Innovation Center (NRIC) (Feb 2021)
  - Provide NRC access to infrastructure and capabilities to observe and learn about the technologies developed through NRIC
- MOU addendum to facilitate the use of advanced modeling and simulation in a regulatory environment (April 2021)
  - Help overcome barriers for adoption of advanced modeling and simulation tools
  - Support NRC's development of capabilities for confirmatory analysis
  - Provide 'deep knowledge' of adopted codes, training and long-term support
- DOE/NRC MOU on Versatile Test Reactor (VTR) (September 2019)

# Summary

- DOE programs have expanded to support a broad diversity of U.S. advanced reactor designs for near, mid, and long-term commercial demonstration
- DOE targets research and development to reduce the technical and regulatory risks associated with advanced reactor designs
- DOE will continue to support industry-led initiatives to inform regulatory frameworks for advanced reactors, including the Part 53 rulemaking process

Thank you!



Clean. **Reliable. Nuclear.**