

DOE Support for Advanced Reactor Licensing and Demonstration

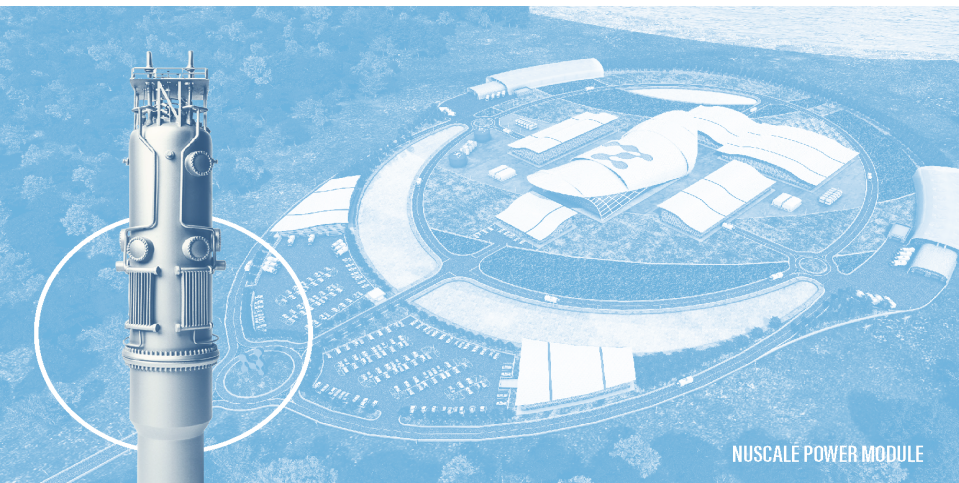
Alice Caponiti

Deputy Assistant Secretary for Reactor Fleet and
Advanced Reactor Deployment

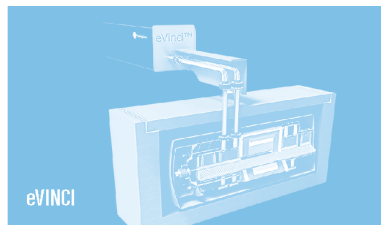
Office of Nuclear Energy



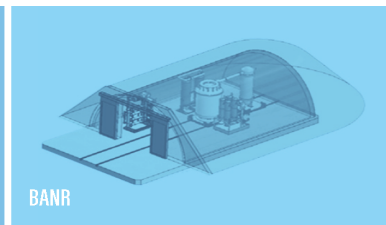
December 9, 2021



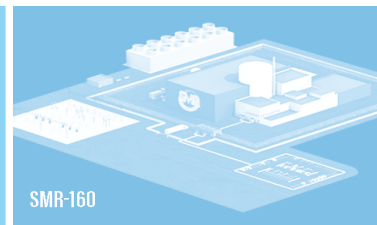
NUSCALE POWER MODULE



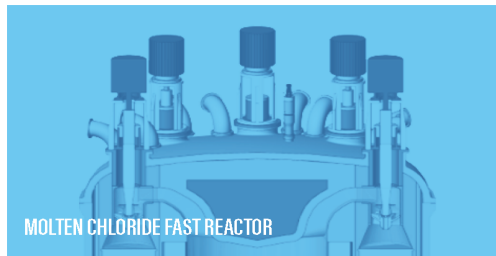
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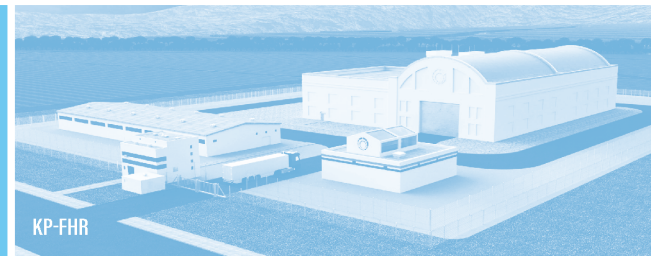
BANR



SMR-160



MOLTEN CHLORIDE FAST REACTOR



KP-FHR

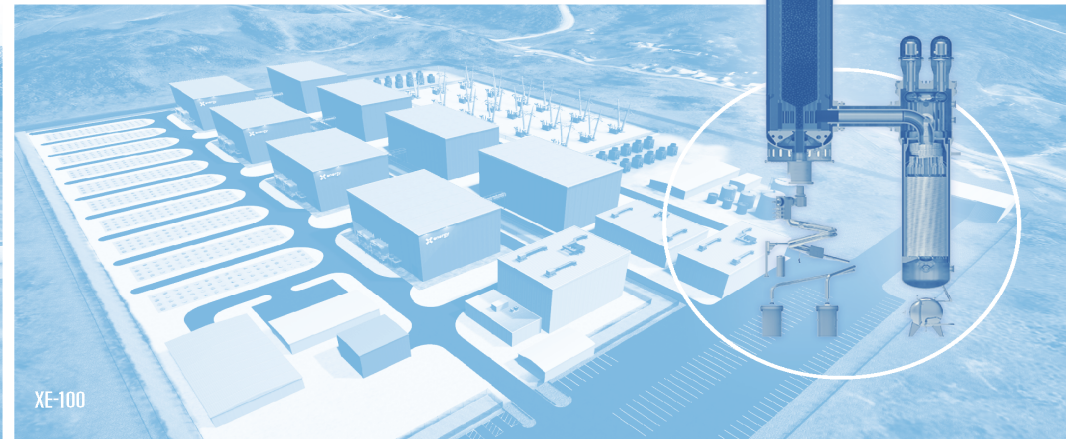
ADVANCED NUCLEAR TECHNOLOGY

U.S. DEPARTMENT OF
ENERGY

Office of
NUCLEAR ENERGY

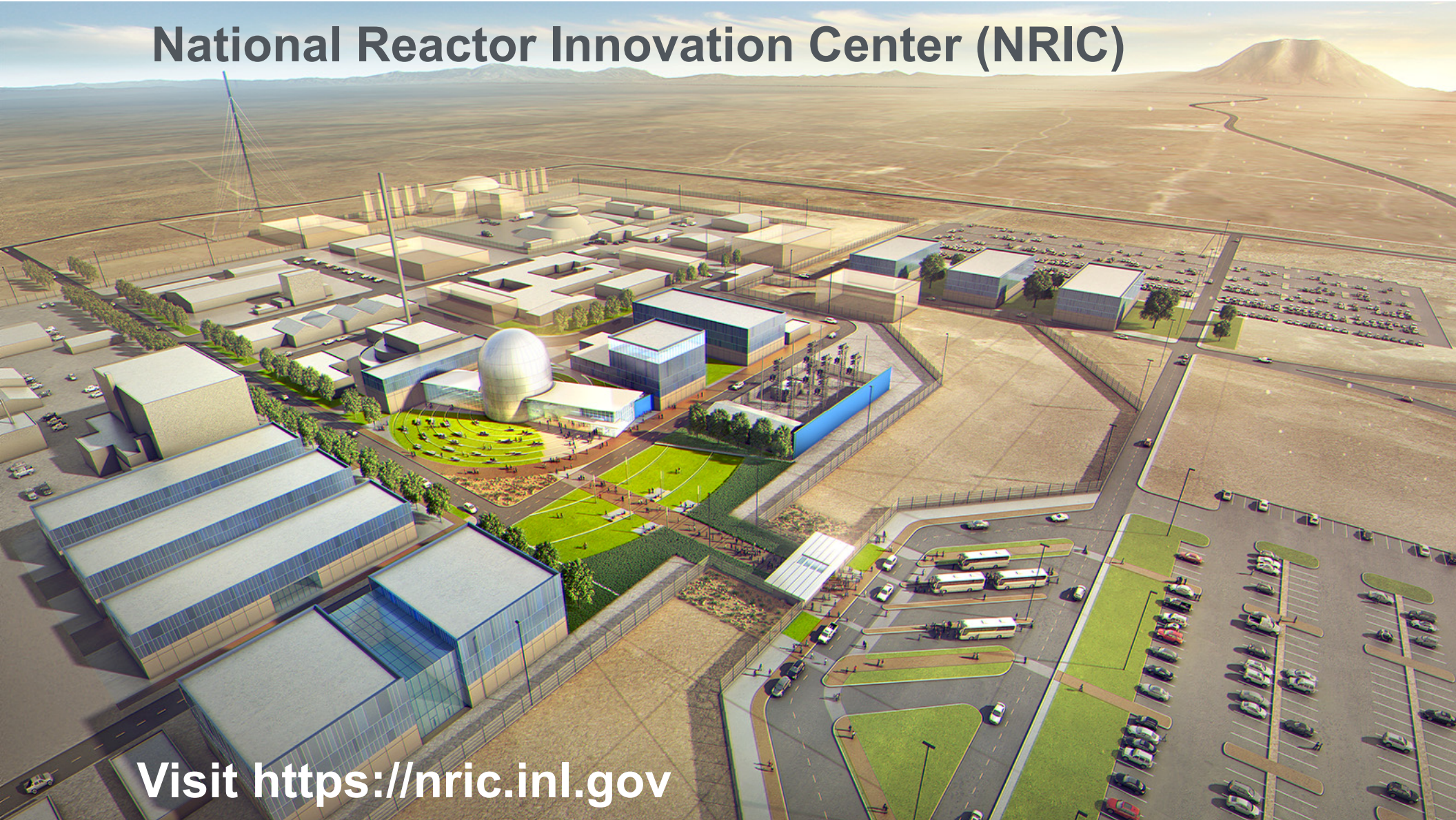


NATRIUM REACTOR



XE-100

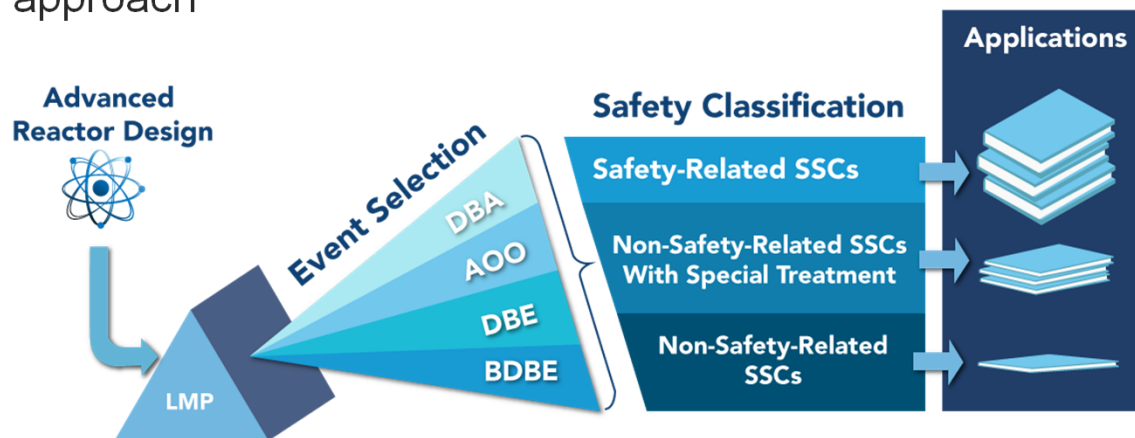
National Reactor Innovation Center (NRIC)



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

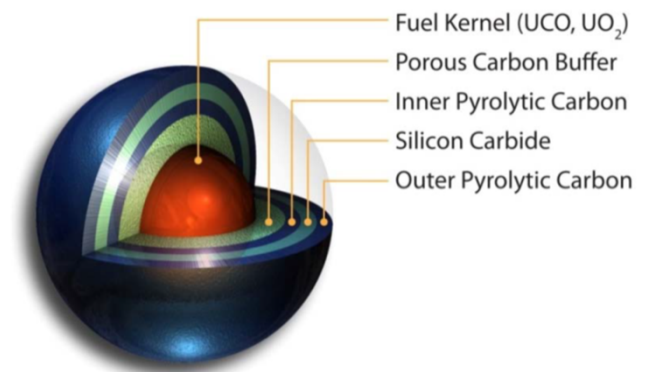
Advanced Reactor Regulatory Development

- 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



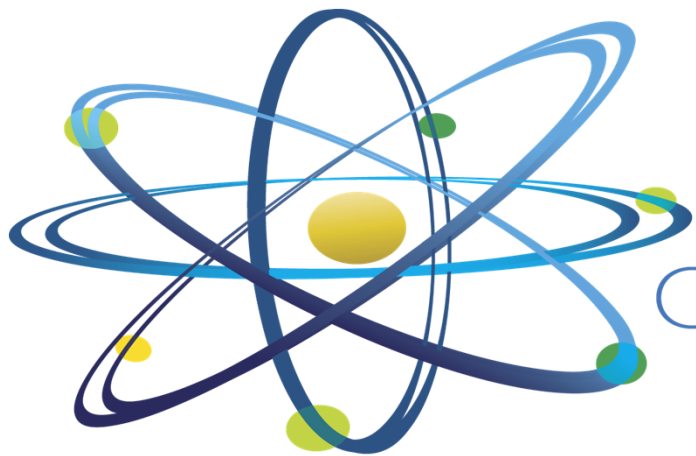
Expanded Cooperation with the Regulator

- 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.**