



# NATRIUM

## Plant Overview

a TerraPower & GE-Hitachi technology

SUBJECT TO DOE COOPERATIVE AGREEMENT NO. DE-NE0009054  
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# Natrium™ Plant Overview

- Purpose : To provide an overview of the Natrium™ Plant design and operation including the Nuclear Island and the Energy Island. The overview will describe innovative features and related research and development activities.
- Agenda :
  - Natrium Reactor Licensing Overview
  - Advanced Reactor Demonstration Program
  - Natrium Safety Strategy
  - Natrium Plant Layout

# Natrium Reactor Licensing Overview

- Regulatory Engagement Plan submitted 6/8/2021
- 10 CFR 50 licensing process will be followed
  - Construction Permit Application 8/2023
  - Operating License Application 3/2026
- Numerous pre-application interactions are planned to reduce regulatory uncertainty and facilitate the NRC's understanding of Natrium technology and its safety case
- The Licensing Modernization Project (LMP) (NEI 18-04), as endorsed by RG 1.233, will support this application

# Natrium Reactor Licensing Overview

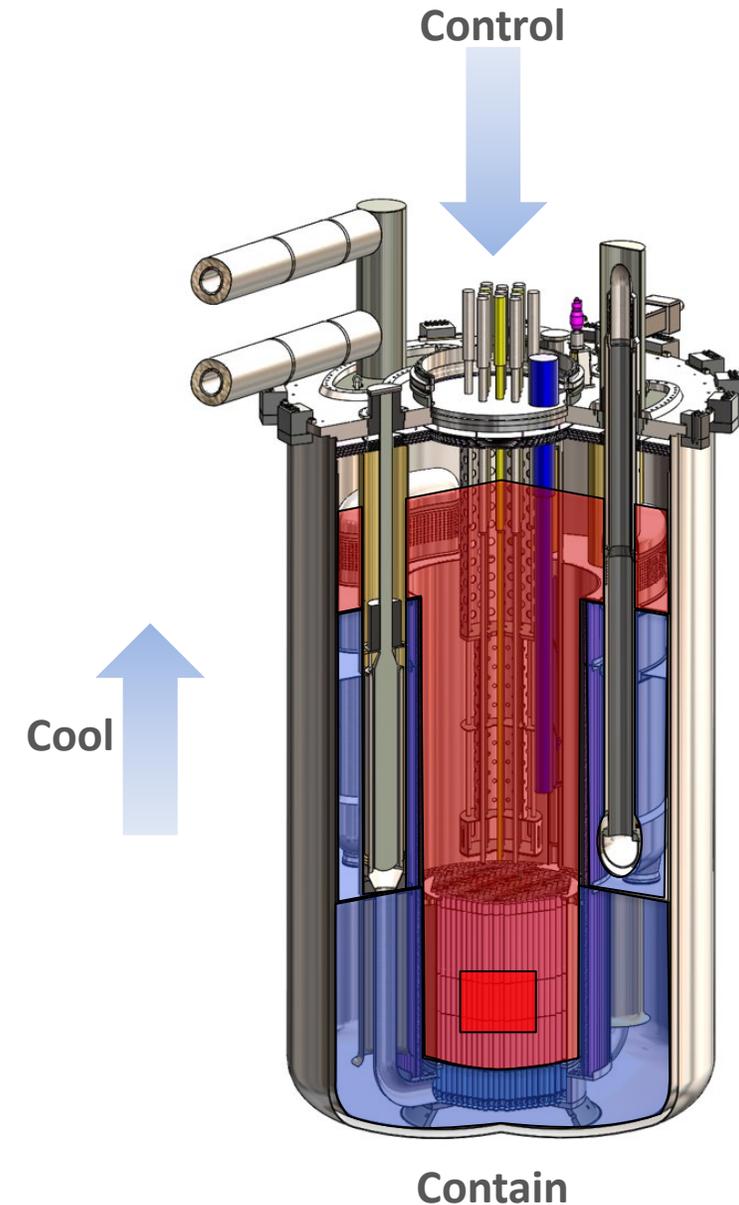
- Each pre-application interaction will build upon risk insights from prior interactions to demonstrate the Natrium reactor's safety case.
- Future Meetings and Presentations include:
  - Risk-Informed, Performance-Based Principal Design Criteria
  - SSC Classification Methodology
  - Energy Island Decoupling Strategy
  - Testing Plan and Methodology
  - Site Selection Process

# Advanced Reactor Demonstration Program (ARDP)

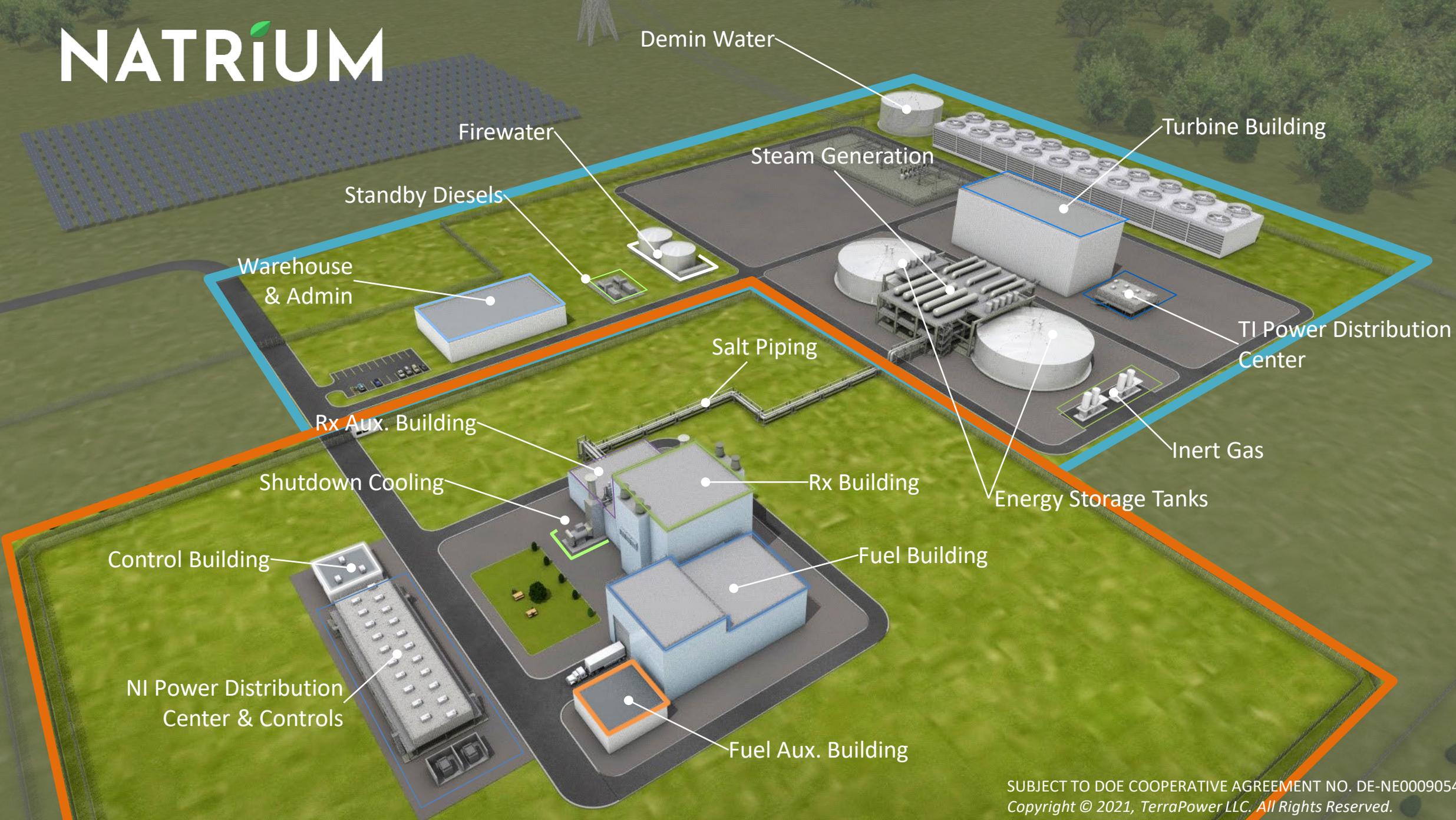
- Demonstrate the ability to design, license, construct, startup and operate the Sodium reactor within the Congressionally mandated seven-year timeframe
- Include improvements in safety, security, economics, and environmental impacts
- Utilize a simple, robust, reliable, and proven safety profile
- Lower emissions by initiating the deployment of a fleet of Sodium reactors – Demonstrate that the plants can be built economically and that they will be attractive for future owner/operators

# Natrium Safety Strategy

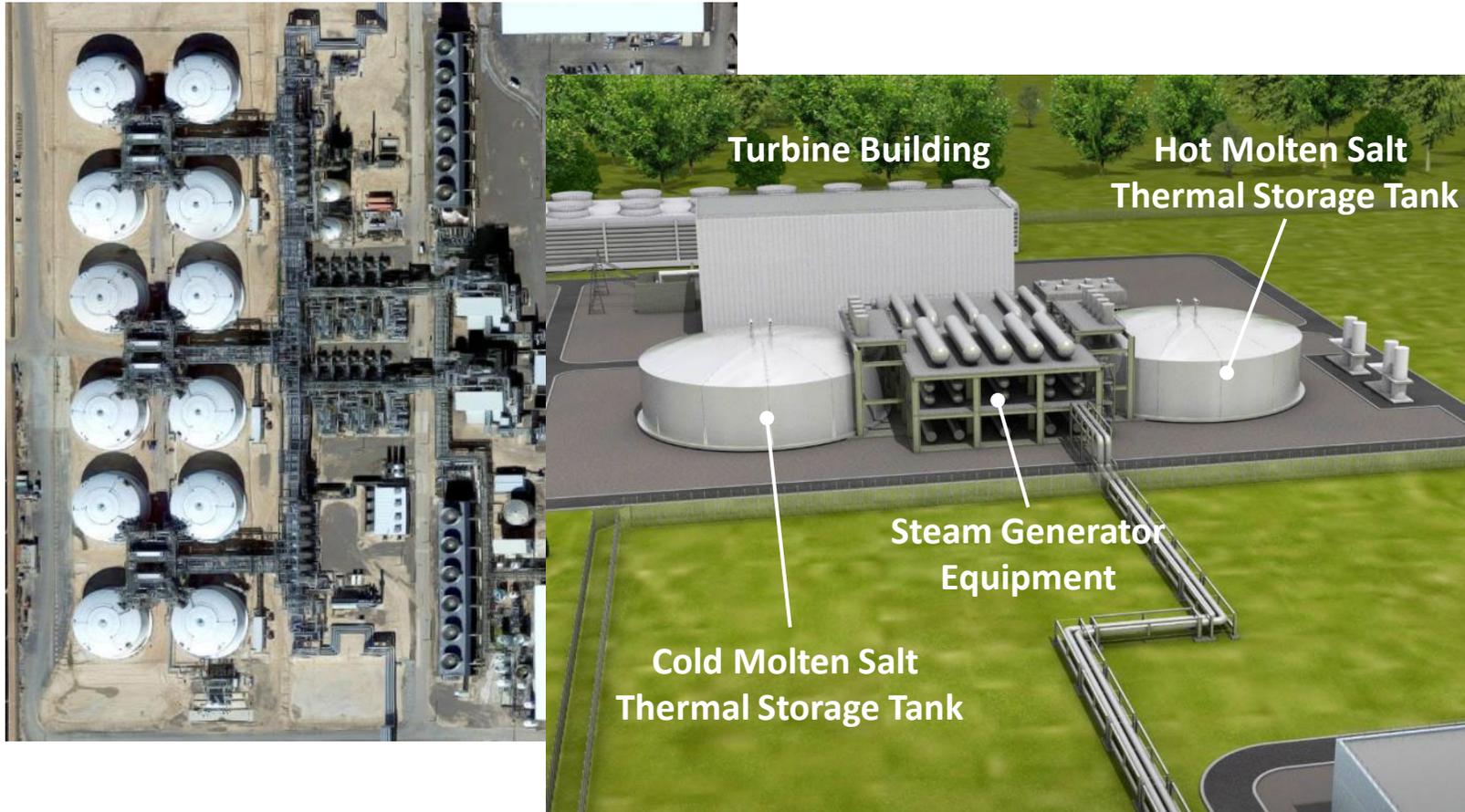
- Control
  - Motor-driven control rod runback
  - Gravity-driven control rod scram
  - Inherent reactivity feedback
- Cool
  - Robust sodium heat transport loops
  - Intermediate air-cooling natural draft flow
  - Reactor air cooling natural draft flow – always on
- Contain
  - Low pressure primary and secondary
  - Sodium affinity for radionuclides
  - Multiple boundaries, functional containment



# NATRIUM



# Natrium Plant Layout



## Energy Island & Thermal Storage

- Equipment procured from the Concentrated Solar Industry
- Storage tanks provide buffer to heat transport loops
  - No safety related functions
- **Utilities' Energy Need**
  - Number of tanks – storage
  - Turbine Size – peak power

# Natrium Plant Layout

