

ILLINOIS MICROREACTOR DEMONSTRATION PROJECT



ILLINOIS & U. OF I. LEGACY

Illinois Leadership

- **1942: Chicago, IL** | First sustained fission
- **1946: Lemont, IL** | Argonne National Laboratory
- **1959: Morris, IL** | First fully commercial nuclear power
- **Today:** Majority of Illinois electricity is nuclear

U. of I. TRIGA®

- In heart of U. of I. campus
- 38 years of safe operation
- Thousands of public visitors
- 6,000 MW transients, 1MW steady state power
- Shutdown in 1998 and returned site to Greenfield
- ANS National Historic Landmark



UIUC TRIGA® Image provided by University of Illinois

'Micro' reactor technology

Small scale

- Power output <1 - 50* MWth
- Long core life
- Similar in size to research & test reactors.

Transportable

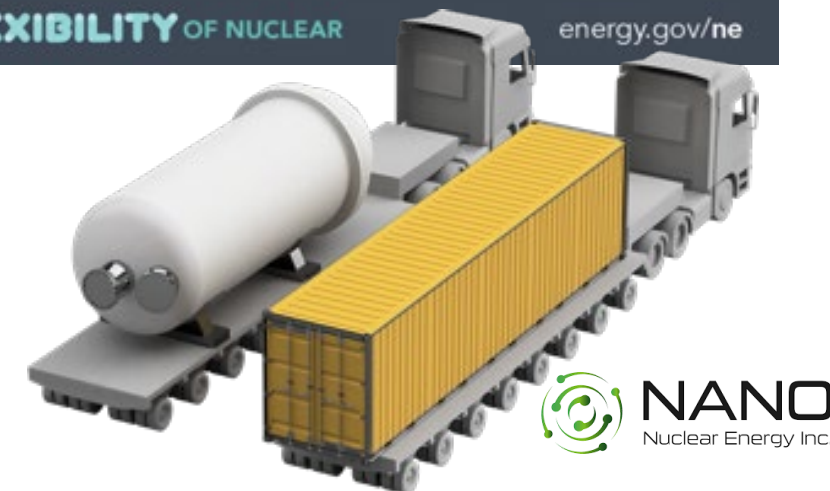
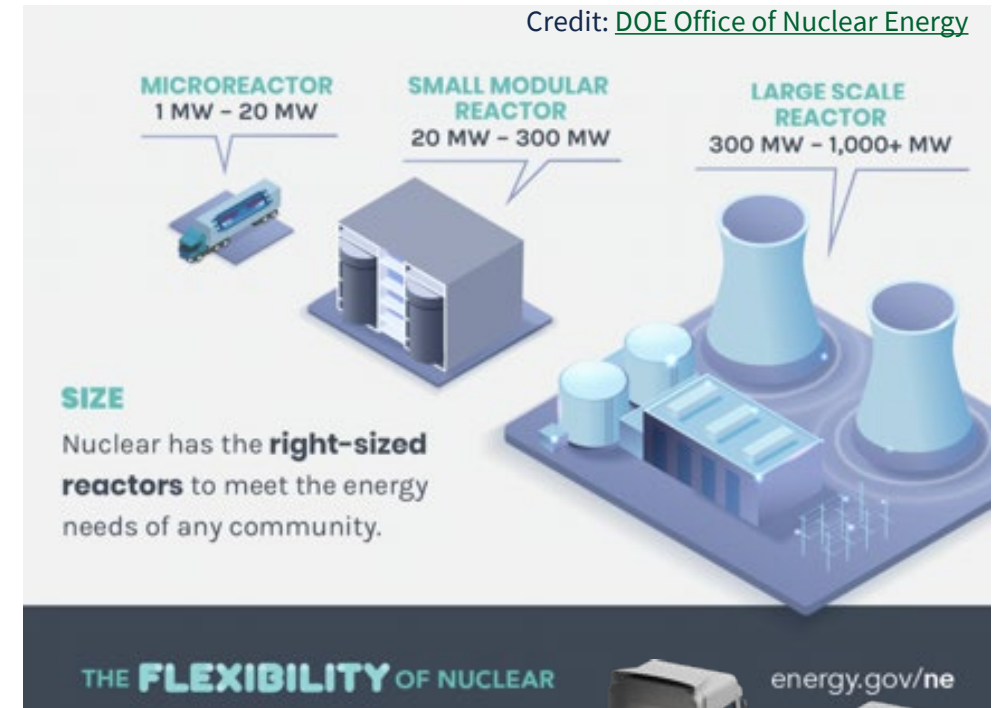
- Reactor vessel small enough for truck, railcar, or airplane.
- reduced onsite construction: plug-and-play

Self-adjusting

- Simple and responsive design concepts.
- Inherently safe

Promising:

- Dozens of start-up companies have competing designs.
- Right-sized for data centers, disaster response, resilient energy, remote locations, developing grids, energy intensive industry, and more...



ILLINOIS MICROREACTOR DEMONSTRATION PROJECT

The mission is to de-risk advanced reactor deployment and enable a new paradigm of nuclear power through education, research and at-scale demonstration.

CORE MISSION

Education, Training & Engagement

- Engineers & Scientists
 - General Public
- Operator Training
- Installation & Maintenance

Producing the future workforce & redeeming public perception of nuclear power

CROSS-CUTTING MISSION

At-Scale Demonstration

- Electricity, District Heat, Direct Air Capture, Hydrogen Production, Integrated Thermal Storage, Energy-Intensive Processes

Demonstrating the future of nuclear power

CORE MISSION

Research & Development

- Reactor & Component Optimization
- Critical Enabling Technologies
- Synergistic Applications

Enabling a new paradigm of nuclear

NEED: NEXT GENERATION RESEARCH & DEVELOPMENT



- Instrumentation & control, human-machine interface
- Cyber & physical security
- Construction modernization
- Grid security/resiliency
- Micro-grid technology
- Hybrid energy systems
- Advanced power conversion cycles
- Data centers power and cooling

- Advanced reactor multi-physics validation
- Hydrogen economy
- Advanced materials
- Radiation monitoring & detection
- Agricultural sustainability & food security
- High temperature water purification processes

CAMPUS ENERGY PORTFOLIO

Electrical

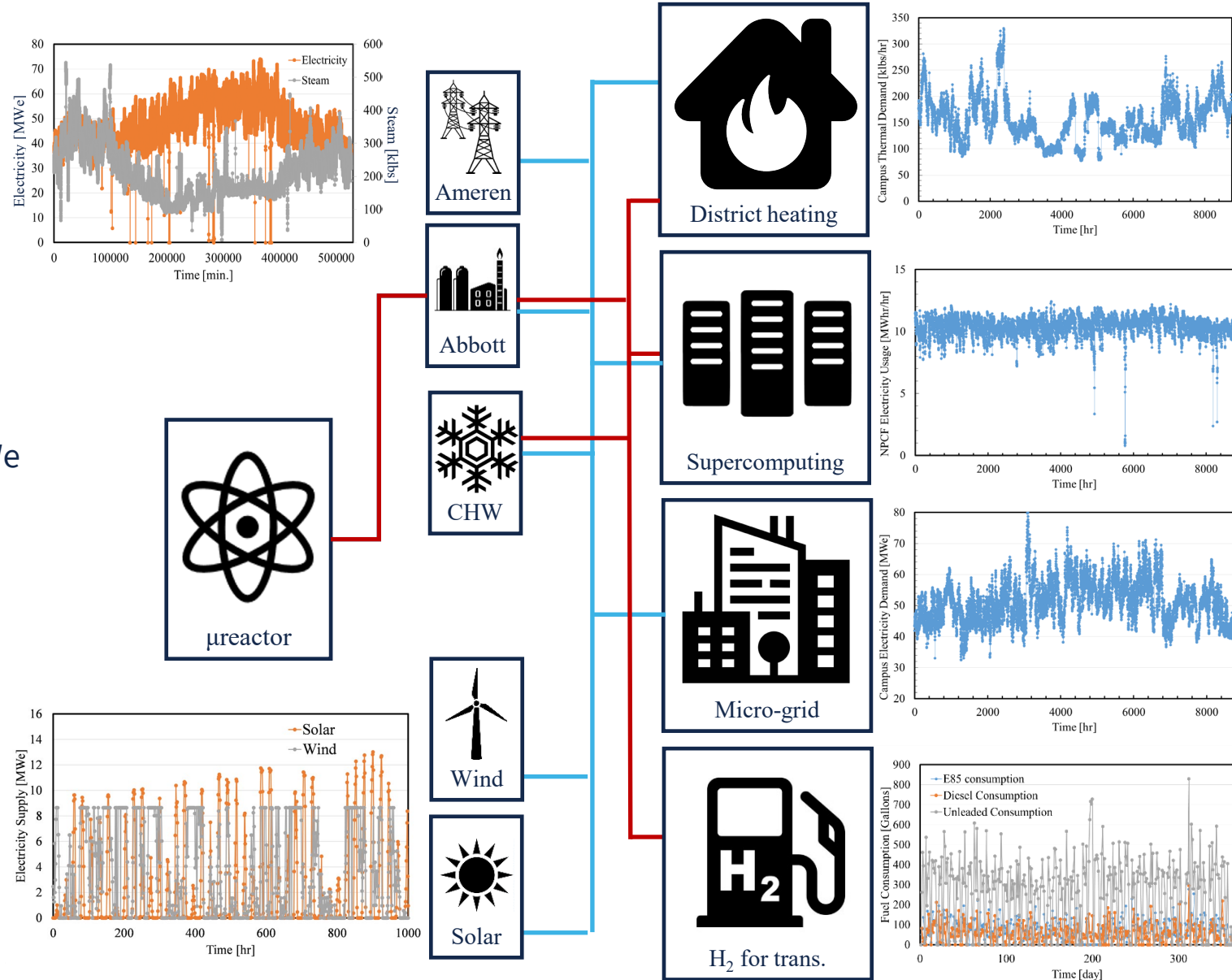
- 55 MWe average demand
- Past Blue Waters Supercomputer up to ~12 MWe
- Wind: ~25,000 MWh/yr
- Solar: ~25,000 MWh/yr with 2 solar farms
- Chillers: ~8.5 MWe peak

Thermal

- 60 MWt average demand
- 7 Chilled water plants (2 steam, 5 electric)
- Energy storage (37,500 tons chilled water)

Transportation

- Campus fleet ~ 800 gallons/day
- Campus bus system: up to 3,400 gallons/day
- Bus system already investing in H₂ busses



SITING

Champaign

- Founded 1855
- Population 87,600 (2019)
- Parkland College (10,300 students)
- Research Park (120+ companies)

Urbana

- Chartered 1855
- Population 42,700 (2019)
- UIUC (56,000+ students)

Savoy

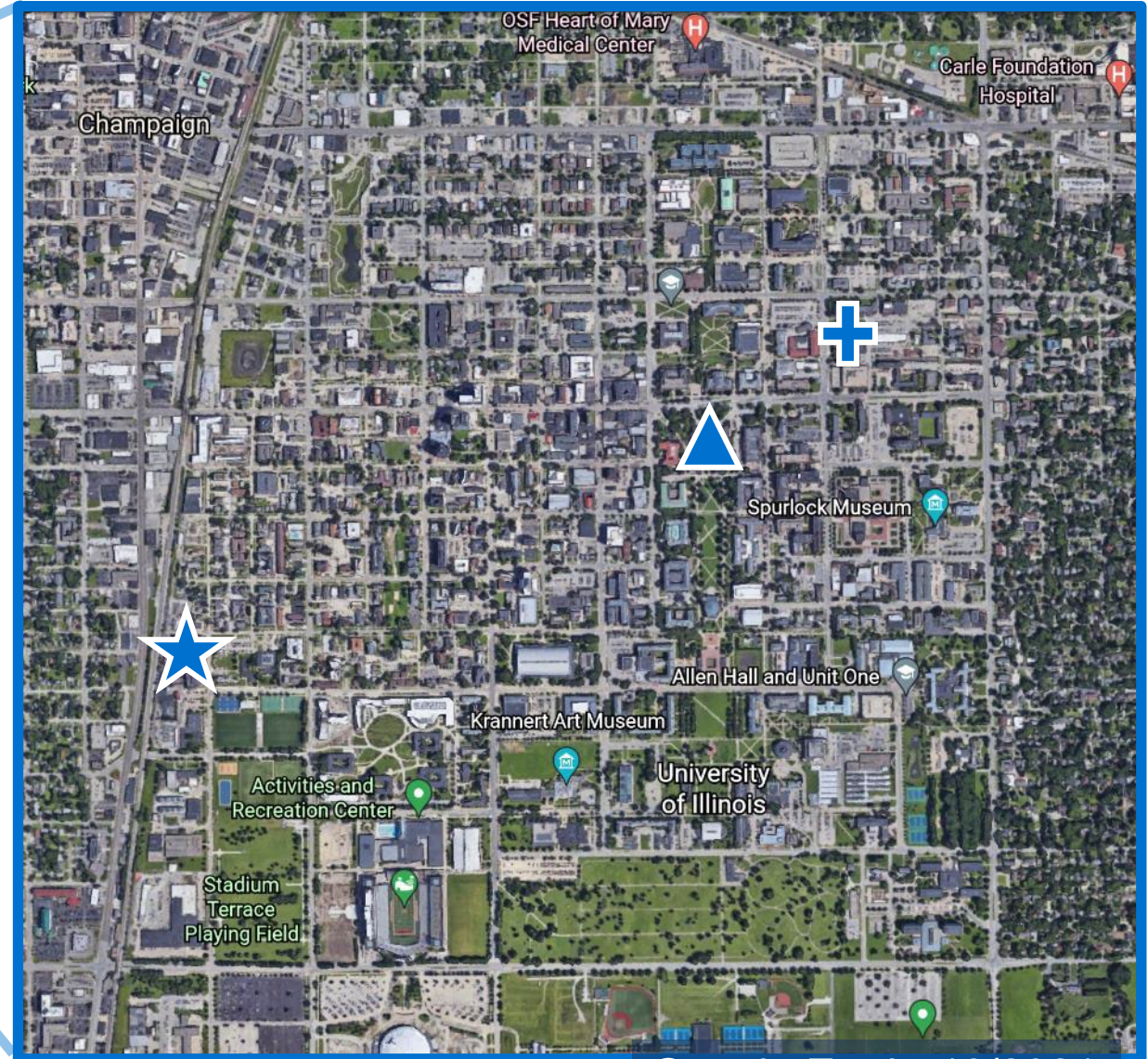
- Founded 1956
- Population 8,500 (2019)
- Willard Airport



SITING



- ▲ Illini Union Building (campus center)
- + UIUC TRIGA reactor site
- ★ Abbott Power Plant



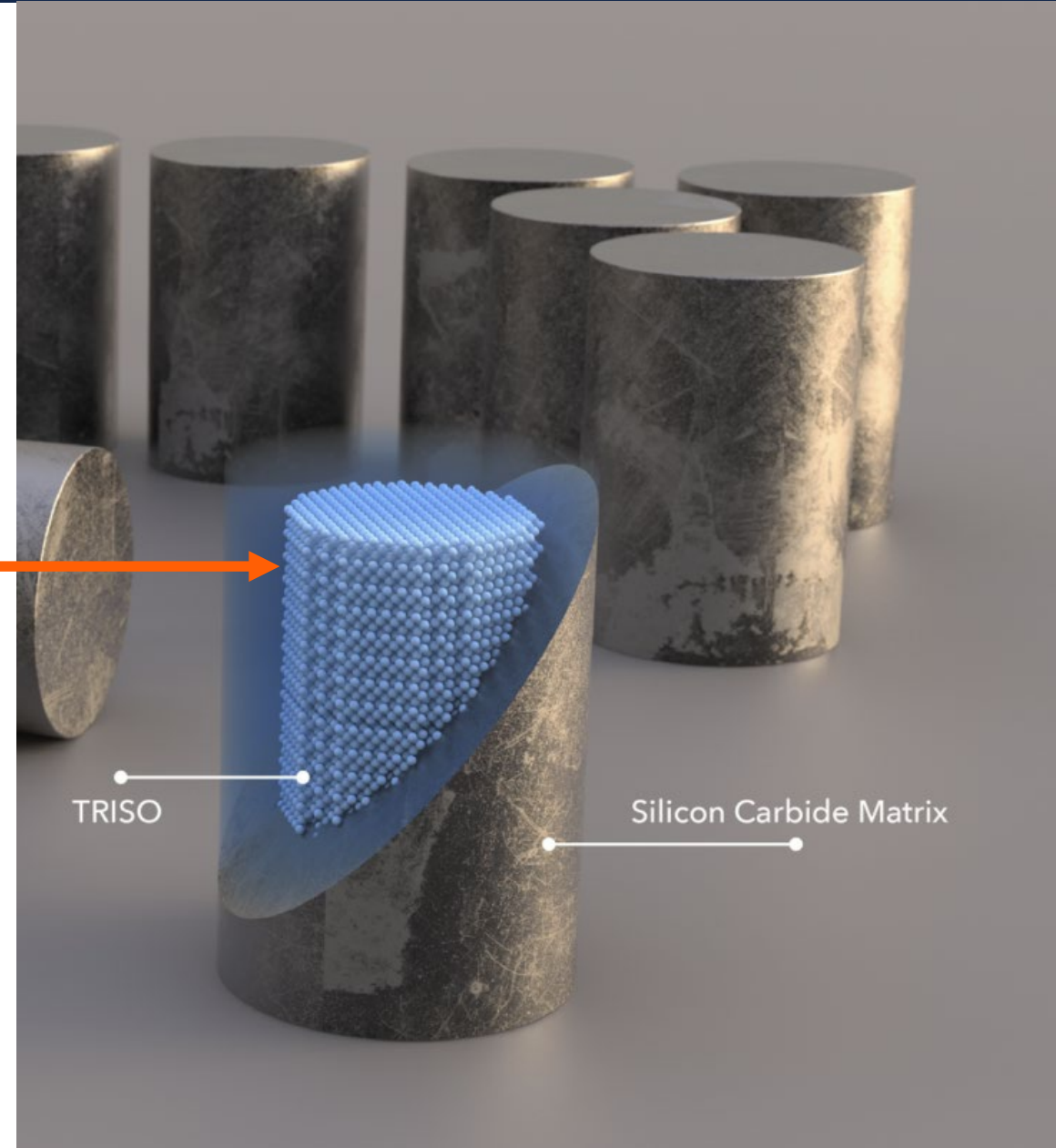
TECHNOLOGY OVERVIEW



FUEL FORM: FCM



Fuel Kernel | 0.8mm



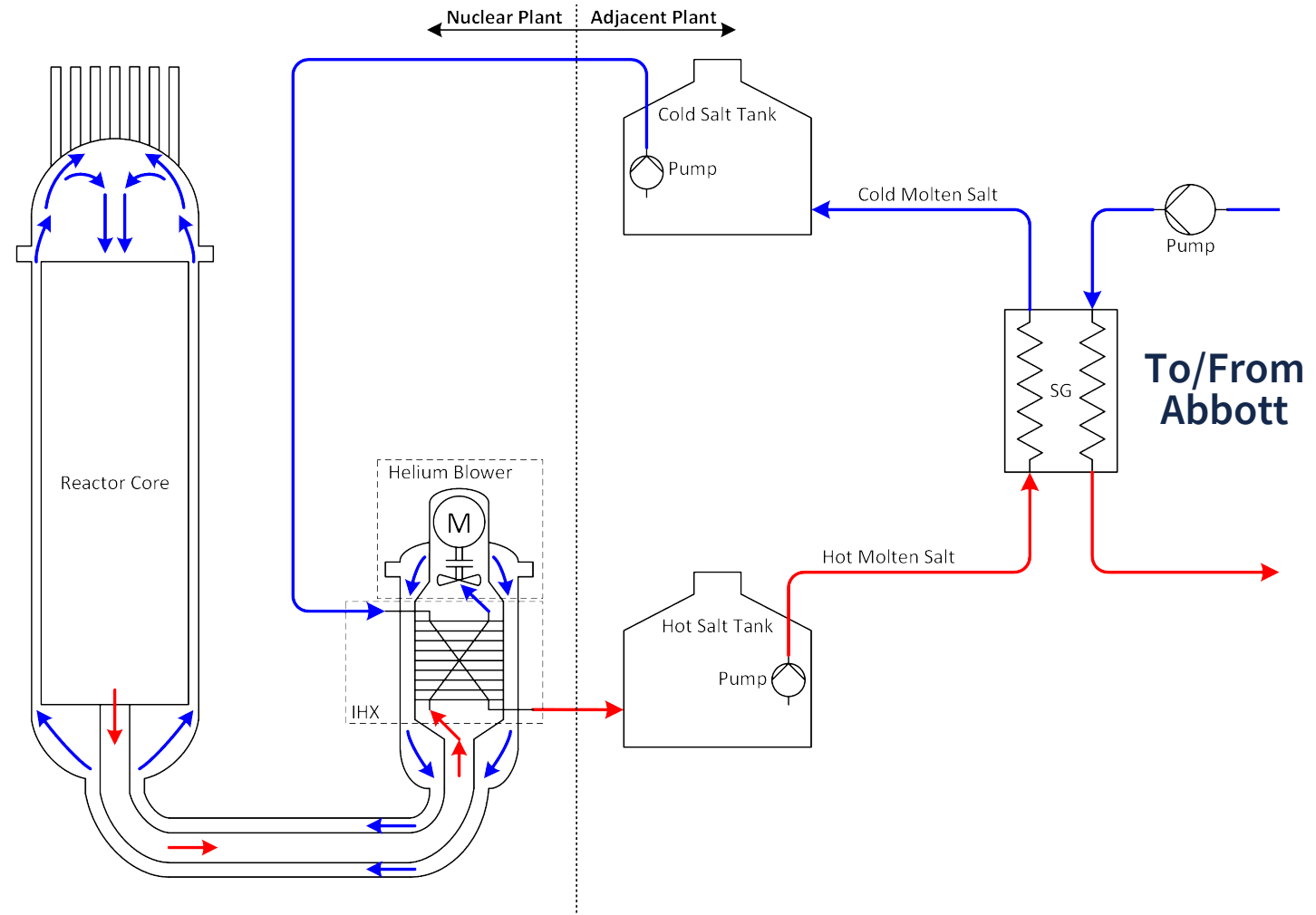
KRONOS MICRO-MODULAR REACTOR (MMR)

Primary Loop

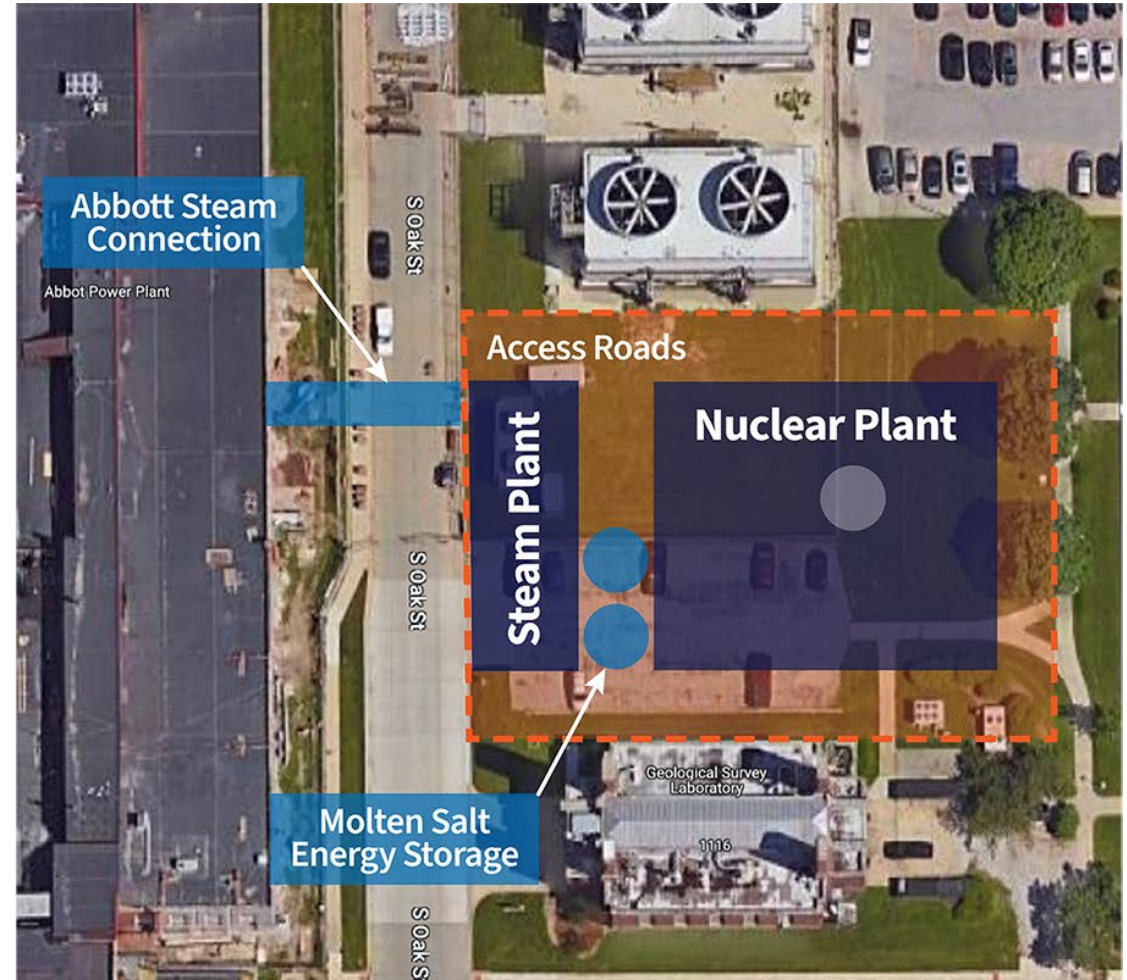
- Hundreds of degrees of margin between operating temps and safety limits
- Helium
 - 6 MPa,
 - 300°C - 660°C

Intermediate Loop

- Decouple reactor operations from process heat dispatch
- Molten Salt
 - 0.3 MPa
 - 275°C - 565°C

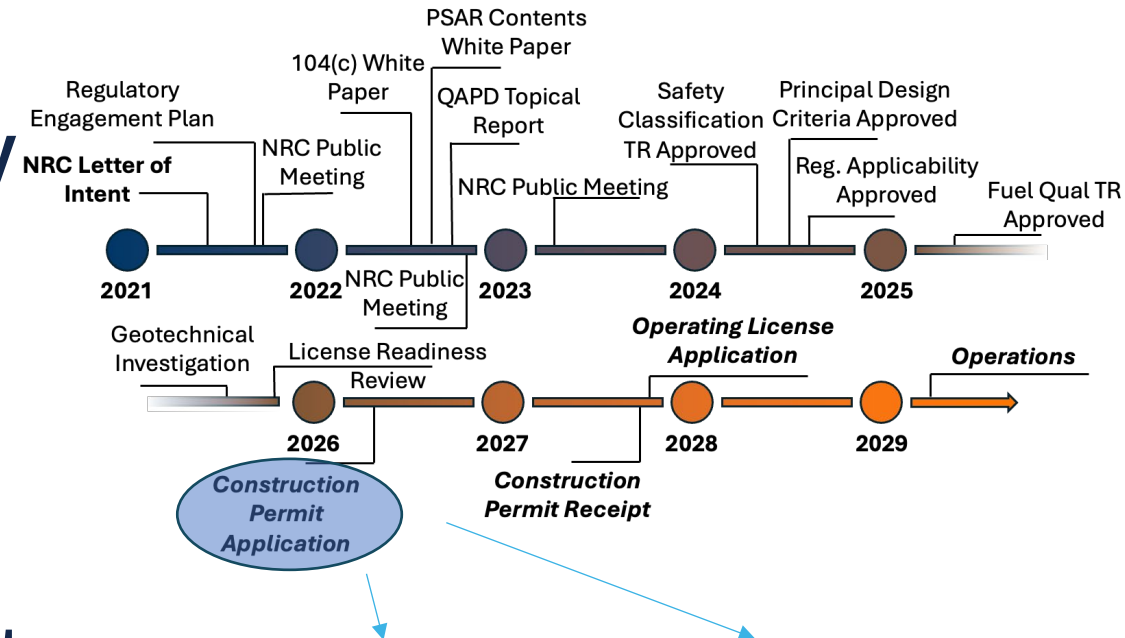


SITING



Regulatory Engagement & Project Status

- Nearly 5 years of Nuclear Regulatory Commission (NRC) engagement
- Construction Permit Application (CPA) submitted 3/31
- Next steps
 - Respond to Regulatory questions throughout the CPA review
 - Development of the Operating License Application
 - Continue to engage with community about the project



Preliminary Safety
Analysis Report



Environmental
Report

CRITICAL PATH

U. of I./NANO Partnership



- Preliminary T&C
- Supporting Team
- Institutional Alignment

License Application



- Pre-App Engagement
- CP: PSAR & ER
- OL: FSAR

Fuel Procurement & Fabrication



- Fuel Fab. Facilities
- UF4 Supply (& Approps)
- Fuel Qualification

Site Preparation & Construction



- AE/Constr. Firm Selection
- MMR Manufacturing
- Abbott Integration

Commissioning & Operations



- Reactor Utilization
- Workforce & Op. Training
- Product Demonstration

Target Dates

- Engagement with NRC | **Active**
- Construction Permit App. | **Under Review (Q1 2026)**
- Issuance of CP | **Q3 2027**
- Operating License Application | **Q3 2027**
- Operations | **2029**

PUBLIC ENGAGEMENT