ARDP AWARDS

Guest Speakers

Chris Levesque and Clay Sell

WHAT *Inspires* US

NRIC WEBINAR SERIES

January 7, 2021

NRIC National Reactor Innovation Center

Ashley Finan, Ph.D.

Director National Reactor Innovation Center

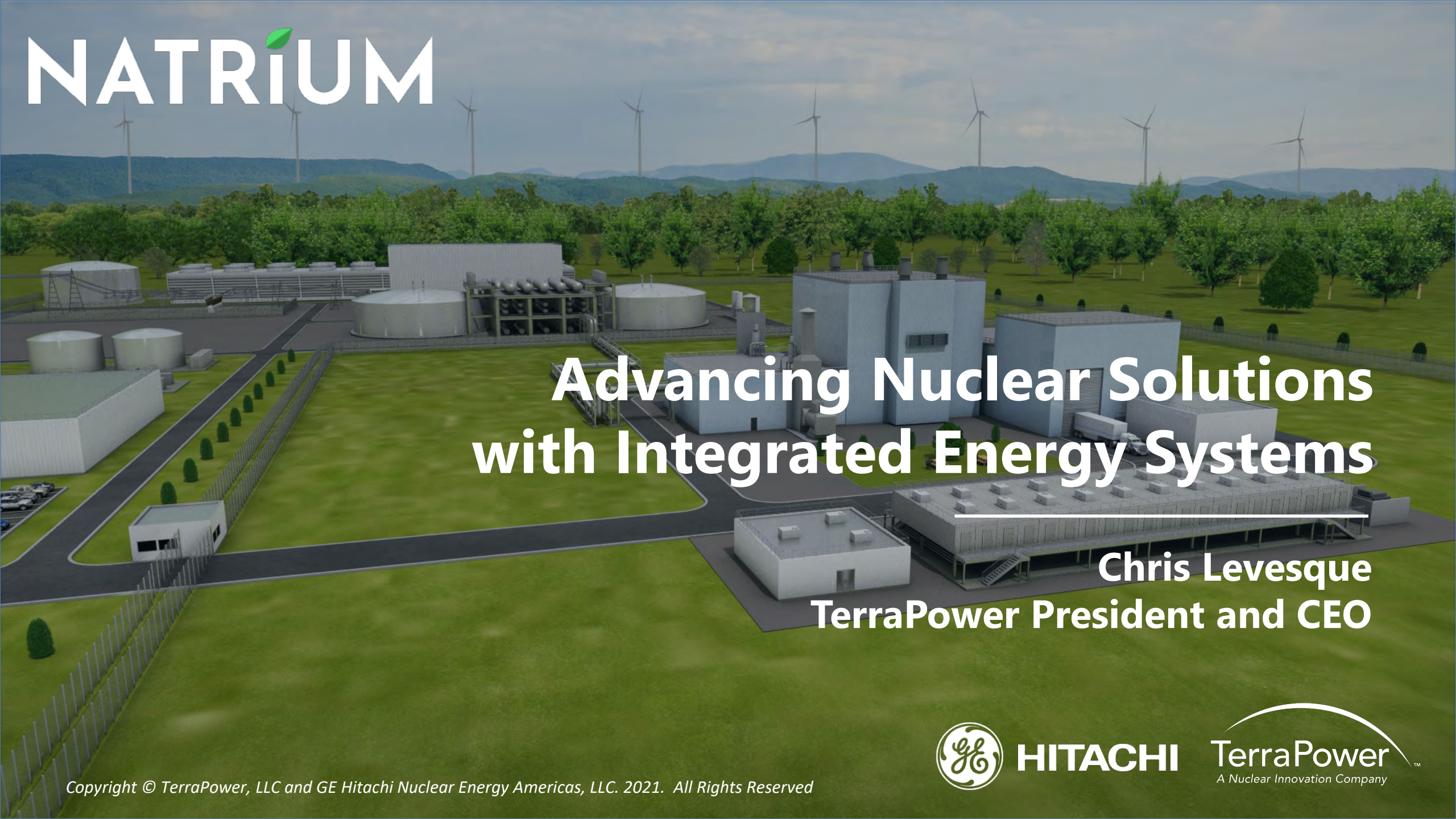
Mike Simpson

U.S. Congressman for Idaho 2nd District

Chris Levesque

President and Chief Executive Officer
TerraPower

NATRIUM



Advancing Nuclear Solutions with Integrated Energy Systems

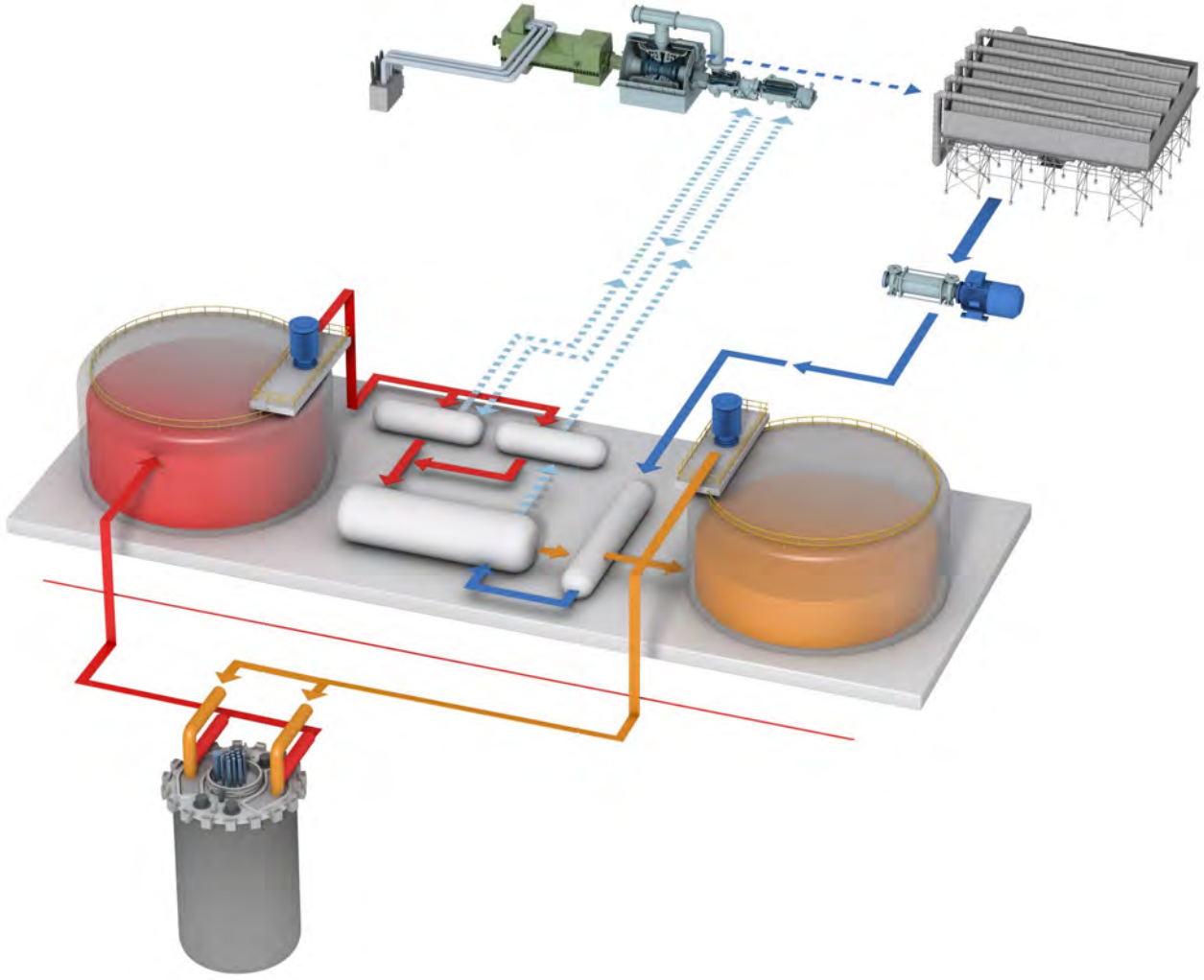
Chris Levesque
TerraPower President and CEO

HITACHI

TerraPower
A Nuclear Innovation Company

Introducing the Natrium™ Technology

- Developed through close collaboration between TerraPower and GE Hitachi
- Builds on PRISM, TWR and concentrated solar-power technologies with a focus on cost competitiveness
- Integrates on and fortifies grids with high-renewables penetrations
- 345MWe reactor that can flex to 500MWe for 5.5 hours when needed



HITACHI

TerraPower

Strong Team with Complementary Expertise

HITACHI

- Nuclear design experience
- Involved in delivering more than 80 nuclear power plants globally
- Fuel fabricator and nuclear services provider for those plants
- Original equipment manufacturer supplier and supply chain
- Established presence in international markets
- GE corporate experience

TerraPower™

- Nuclear design experience
- Technology development, component and system testing
- SFR fuel development and qualification
- Advanced computational tools for integrated design of nuclear reactors
- Strong mission-driven and innovation culture
- Access to partners and private capital

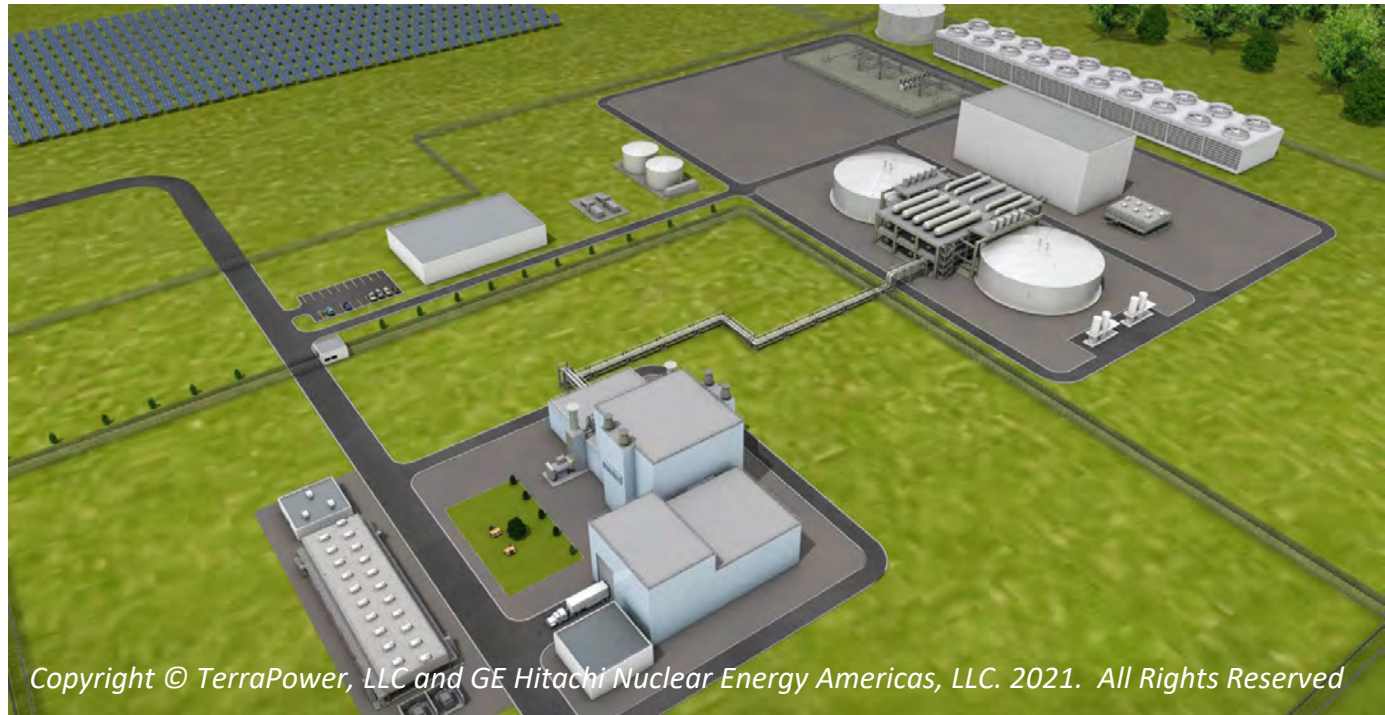
Rethinking What Nuclear Can Be

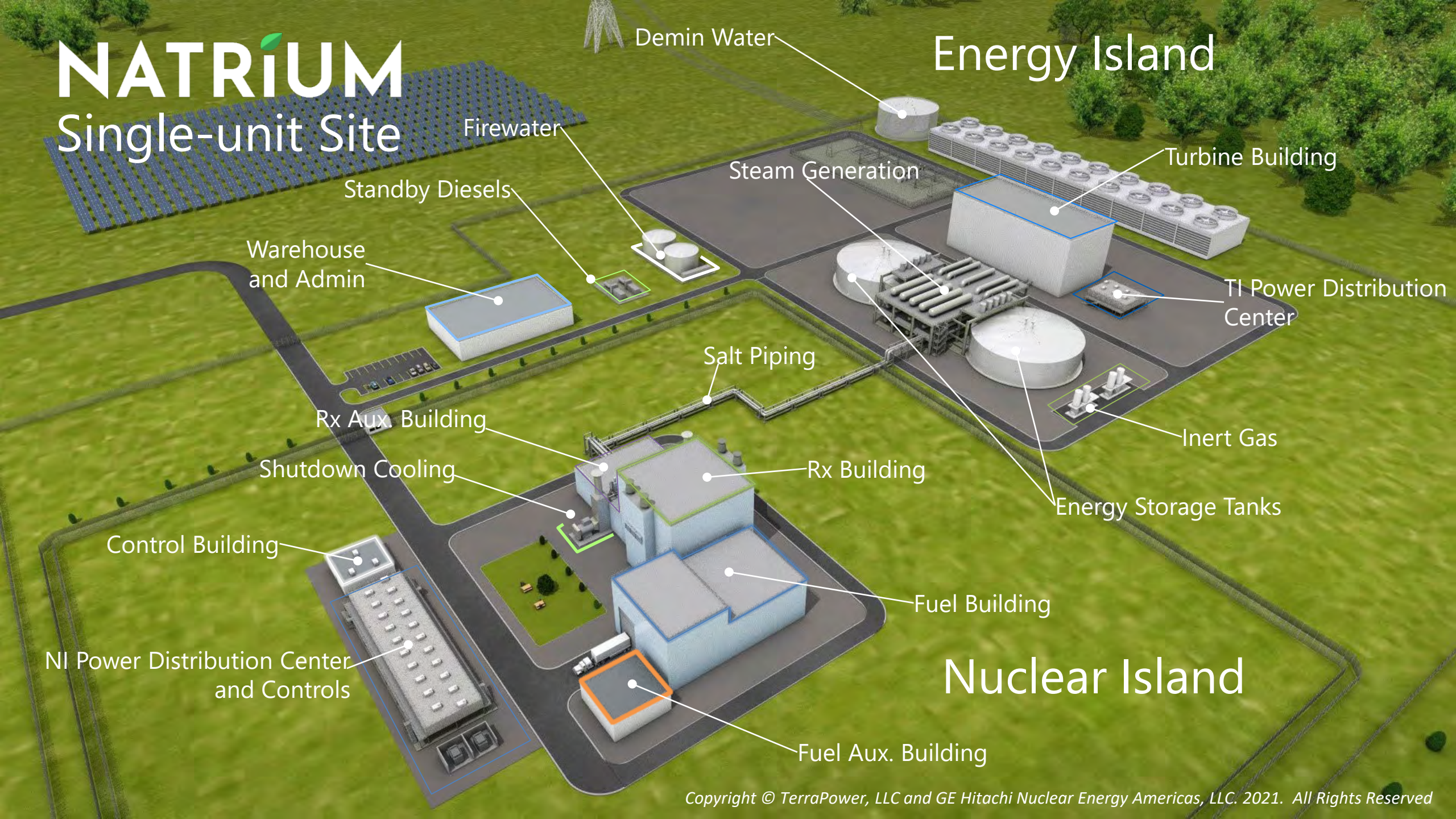
Nuclear redefined

- Eliminates nuclear "sprawl"
  - Design to cost
  - Simplicity
  - Rapid construction
  - Design-specific staffing
- ~41% net thermal efficiency

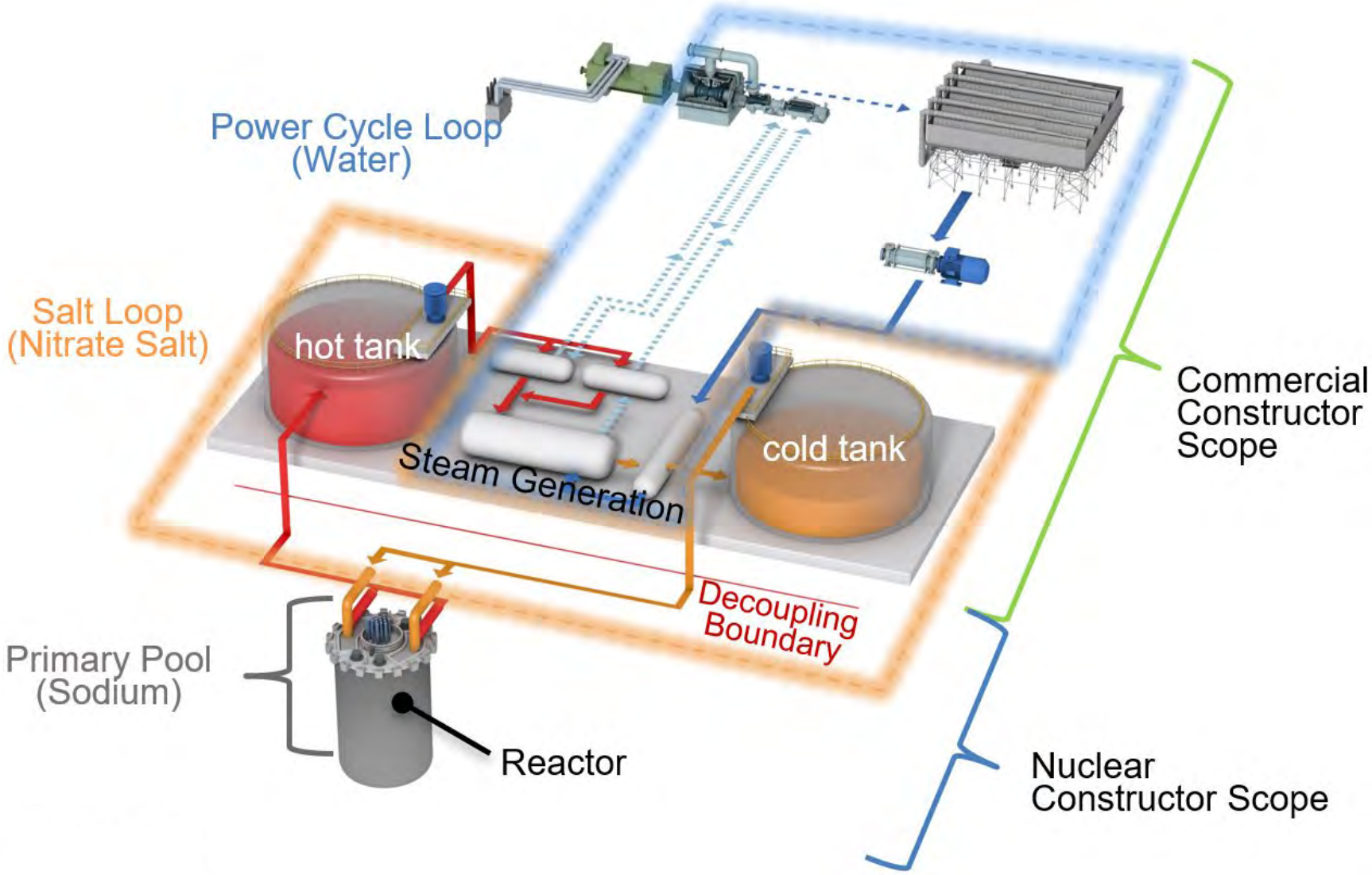
Integrating with renewables

- Zero-emission, dispatchable resource
- Price follower with reactor at 100% power 24/7
- 345 MWe nominal
- Flex to 500 MWe for 5.5 hours with energy storage





Integrated Energy System (IES)



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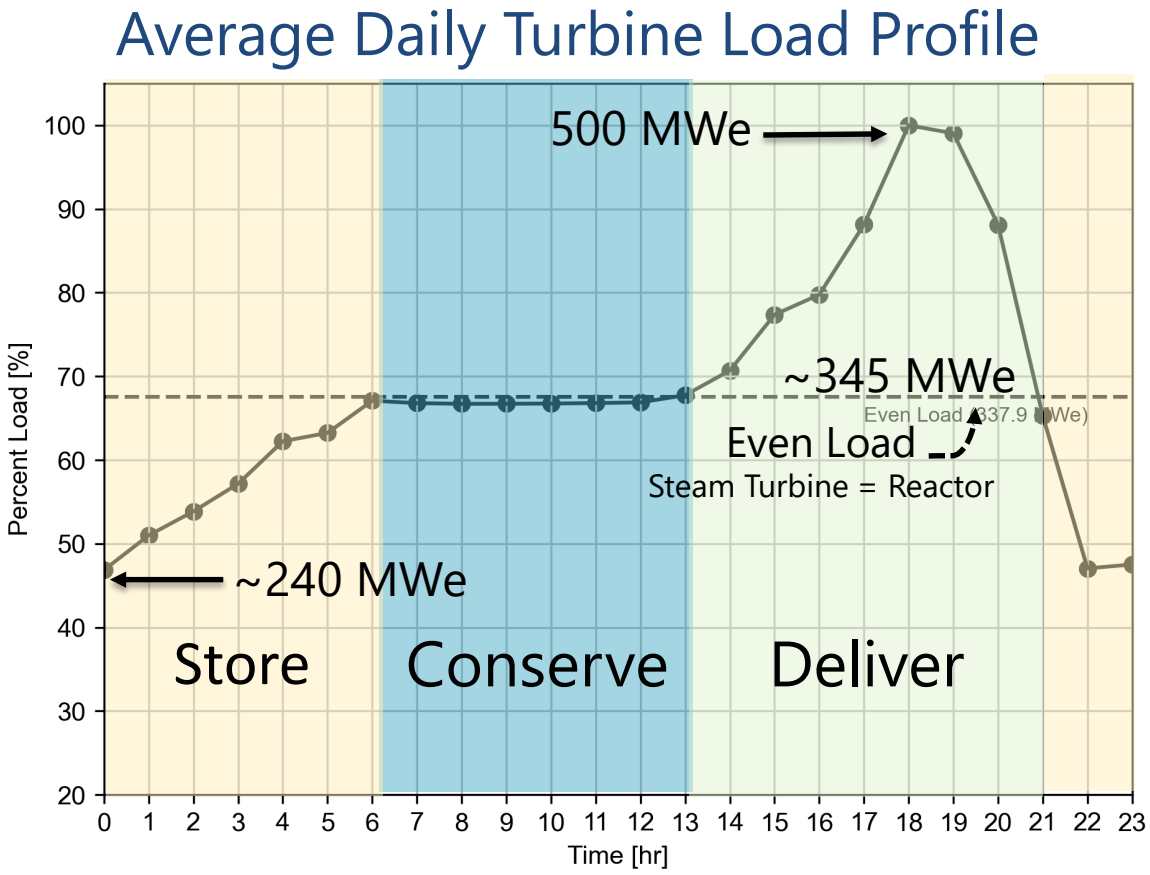
California Rolling Blackouts: Aug. 12-25, 2020

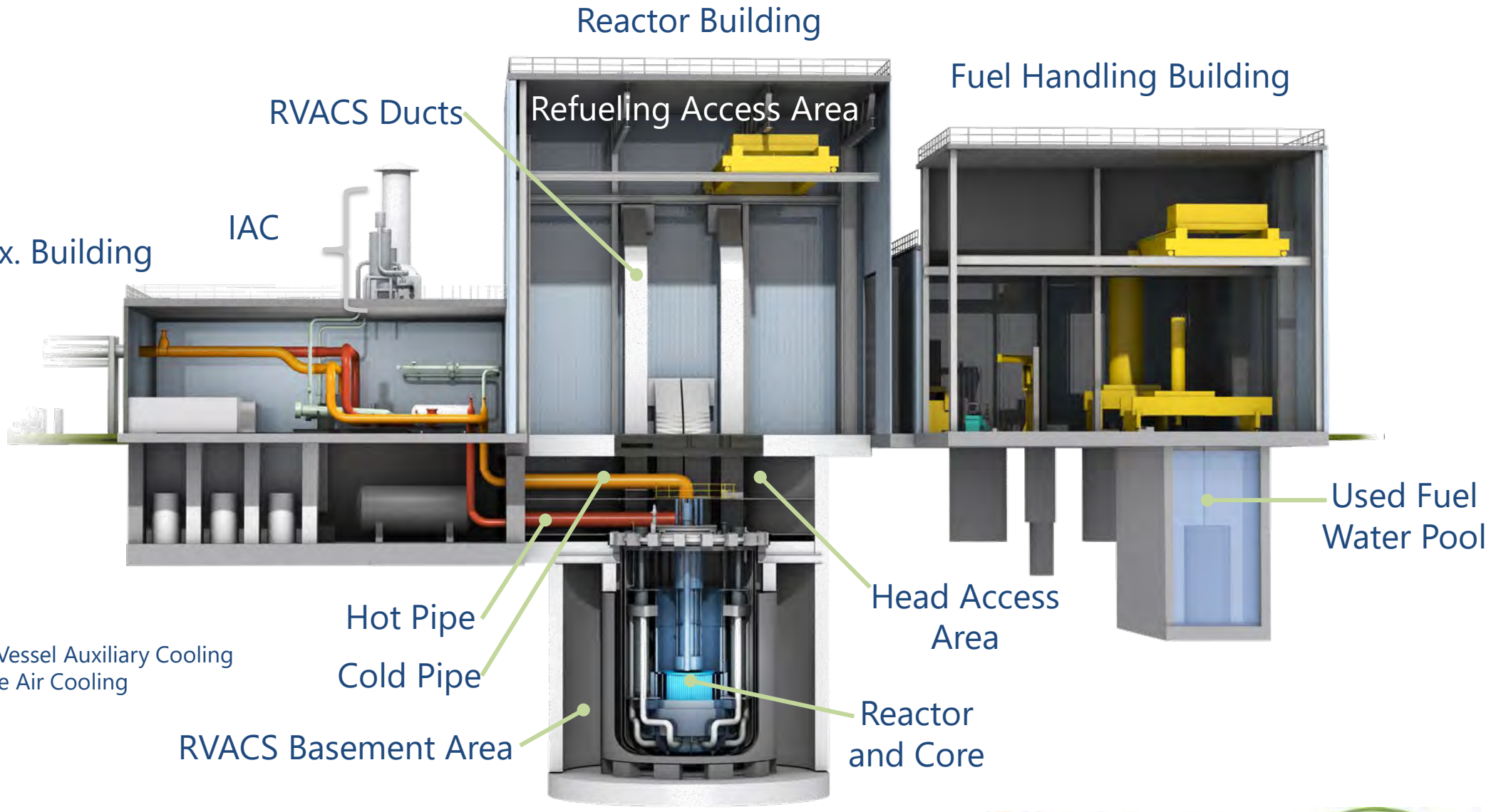


NATRIUM

Midnight – 6 a.m.
Ramp in early morning. Charging tanks.
6 a.m. – 1 p.m.
Hold even load.
1 p.m. – 6 p.m.
Ramp to peak load. Discharging tanks.
7 p.m. – 9 p.m.
Ramp down. Discharging tanks.
9 p.m. – Midnight
Ramp down. Charging tanks.

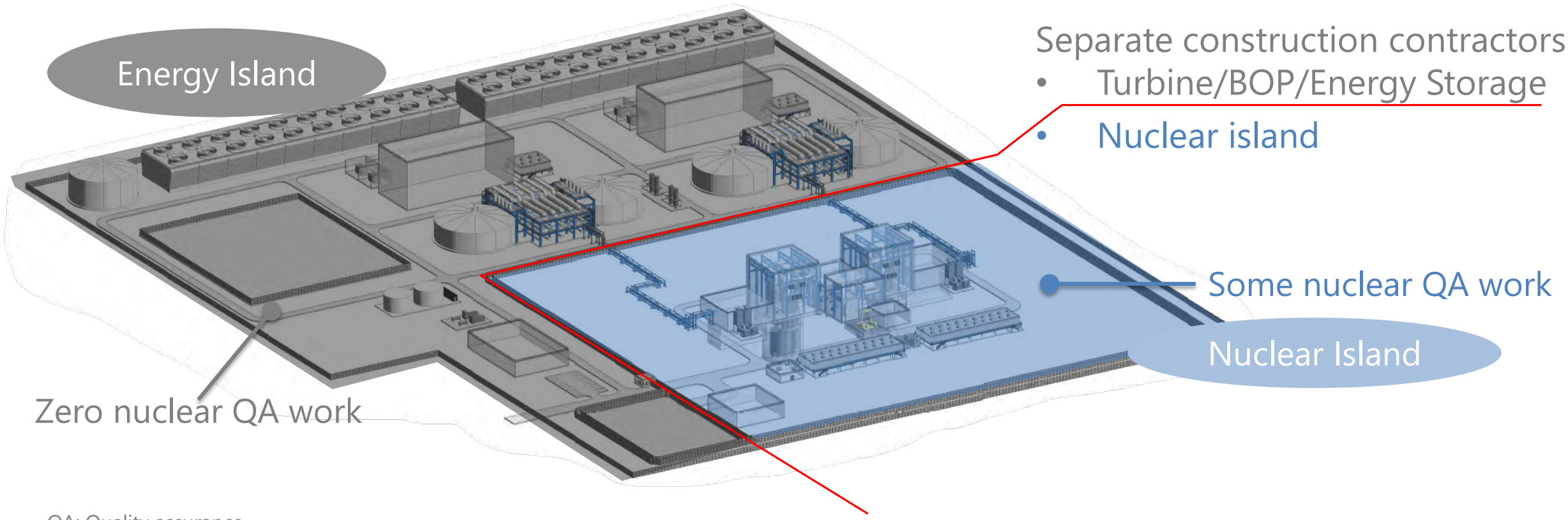
HITACHI TerraPower

Reactor Building



RVACS: Reactor Vessel Auxiliary Cooling
IAC: Intermediate Air Cooling

A Decoupled Approach



QA: Quality assurance

HITACHI TerraPower

NATRIUM

Competitive Clean Energy

Simple Nuclear System

- Exceptional heat transfer
- Passive air cooling
- Low pressure
- Optimized layout

Flexible Power Generation

- Dispatchable power
- Energy storage and price following
- Integrate with renewables
- Process heat

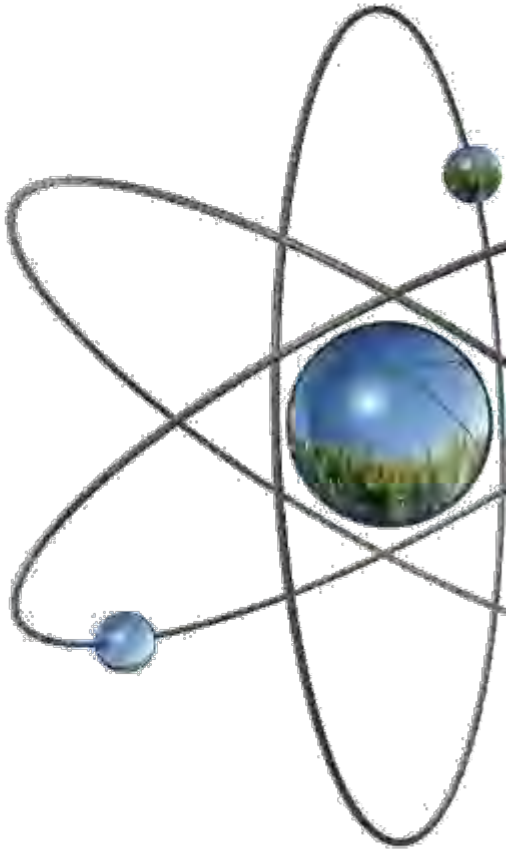
Adjacent Innovations

- Concentrated solar power industry
- Tunneling industry (vertical cut)
- Combined cycle gas turbine industry

TerraPower™
A Nuclear Innovation Company

GE HITACHI

Learn more at NatriumPower.com



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TerraPower

J. Clay Sell

Chief Executive Officer
X-energy

NRIC Webinar: “What Inspires Us”

J. Clay Sell, Chief Executive Officer

January 7, 2021

X-energy's timing is meeting the larger moment

Never before has there been such a crossroads of need, opportunity & ability.

The X-energy value proposition

Zero carbon emissions	Clean	Unlike coal and natural gas plants
Always on	24/7	Unlike intermittent renewables
Cost down to ~$50.00 per MWh	Affordable	At or below natural gas
Low project risk	Simple	Simplified permitting & licensing
Power plants that can't melt down	Safe	Never a danger to the public
3-4 years to deploy vs. 10 years	Efficient	'Plug-and-play' scalable growth into new markets
Greatest geographic flexibility	Anywhere	No need to be by water, 400m vs 10mile safety zone
Modernized licensing case	Global	Easier new market entry
Proliferation resistance	Secure	Ideal for foreign markets

Our traction, accomplishments & risk reduction to date

Founded by Kam Ghaffarian

2009

2010

Reactor science team in place, led by Dr. Eben Mulder & Dr. Martin Van Staden

Completes market study, design choices, and finalizes design parameters for Xe-100

2014

Xe gets into the fuel business. Hires Dr. Pete Pappano, builds fuel team.

2015

2016

Forms Customer Advisory Council

Achieves 50% conceptual design on Xe-100

Established pebble fuel manufacturing capability

Begins regulatory engagement with NRC. Produces first pebble in pilot fuel facility

Canada passes a carbon tax

2018

2019

Formally initiates commercialization track in Canada

Executed LOI with Jordan to deploy SMR

EIA reports 95 Gigawatts of coal capacity closed or switched to another fuel over the previous decade, with another 25 GW slated to shut down by 2025

Selected by U.S. DOE for Advanced Reactor Demonstration Program

Selected by U.S. DOD for preliminary design of a mobile nuclear power plant

OPG advances engineering and design work with X-energy

Completes conceptual design; 50% of basic design complete

2020

We've pinpointed the technology & revolutionized its approach

We are capitalizing on decades of learning & best practices in High Temperature Gas-cooled Reactor design.

>$700 million U.S. DOE investment, including development and testing of the safest fuel – UCO TRISO coated particles

Our optimized, meltdown-proof Xe-100 is the only Gen IV reactor deployable within 5 years.

We are leveraging proven technology & billions of dollars of prior investment

USA

1944
ORNL

UK

1966-1975
Dragon

USA

1966-1974
Peach Bottom

Germany

1967-1988
AVR

USA

1967-1988
Fort St. Vrain

Germany

1986-1989
THTR

Japan

1998-Present
HTTR

China

2000-Present
HTR-10

USA
2005 – Present

The Ladder of Innovation

X-energy's innovations compound, with the benefits accruing to our customers

Our innovation story results in more safety, lower cost, and a more reliable product delivery platform

1. Intrinsically Safe Fuel

X-energy produces its own fuel that is intrinsically safe – it cannot melt down

2. Intrinsically Safe Reactor

Because the fuel can't melt down, the reactor does not require mechanical safety systems – it relies on physics and intrinsic safety features

3. Simplified Reactor Design

Because the Xe-100 is dependent on intrinsic safety, rather than complex mechanical safety, the design is radically simpler with 1/10th the components of a traditional reactor

4. Simplified Licensing Case

Because the reactor is simplified and relies on intrinsic safety, licensing is less complex and faster

5. Road-Shippable & Modular

Because the licensing is not prescriptive and the reactor is simplified, it is easier to produce modular components. These can be road-shipped and assembled on-site

6. Standardization & Integrated Delivery

Because X-energy produces its own TRISO fuel and the Xe-100 is a radically simplified reactor, X-energy can disrupt the broken nuclear product delivery model and create more value for customers

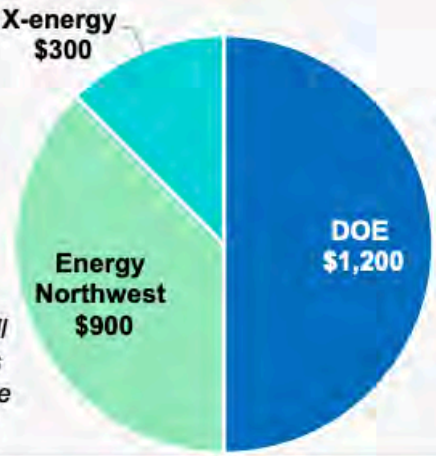
Case Study: Advanced Reactor Demonstration Program (ARDP)

ARDP Details

- In May 2020, the Department of Energy announced the Advanced Reactor Demonstration Program (ARDP)
- X-energy and TerraPower were selected as program winners in October 2020
- Program designed as a public-private partnership:
  - Government provides winning bids with 50% cost share for first-of-a-kind advanced nuclear plant
  - Plant must be commercial (*not* demonstration)
  - Plant must be ready for deployment by 2027
  - Private sector partner applies with 1) utility customer and 2) qualified site
  - ✓ Government motive? Kick-start advanced nuclear industry
- X-energy partnered with Energy Northwest, a top-tier customer

Cost Share ($mm)

X-energy *capital raise covers non-recurring engineering/regulatory costs*



Department of Energy *cost share does not include equity, royalties, or any intellectual property rights*

Energy Northwest *will issue municipal bonds and pass the cost to the rate-payer*

Energy Northwest

ENERGY NORTHWEST

- Membership includes 27 public power utilities, including 23 of Washington state's 29 public utility districts
- Challenged by state law that mandates zero carbon grid by 2045, with limited additional upside in Washington state for wind, solar, or hydro
- Public agency with tax-advantaged capital access

What ARDP Means to X-energy…

1. ***Final design, engineering, and licensing***
2. ***Commercial fuel facility***
3. ***First advanced nuclear plant in the market***


energy
empowering earth
Clean • Safe • Secure • Affordable

Q & A

All proceedings will be uploaded to nric.inl.gov

NRIC National Reactor Innovation Center