The Natrium™ Technology

Sodium Fast Reactor &
Integrated Energy Storage

TerraPower NATRIUM

*Any country serious about achieving **net zero** must access the future potential of **advanced nuclear technologies** to succeed.*

TerraPower

2008

- TerraPower is officially launched as a nuclear innovation company.

TerraPower
A Nuclear Innovation Company

2012

- TerraPower laboratory is established.
- TerraPower identifies molten salt reactors as a research technology.

2006

Bill Gates and like-minded visionaries determine the private sector must act to develop clean energy resources to halt climate change and to raise global living standards.

2010

- Collaboration begins with multiple national laboratories.
- Materials development program is established.

2016

The U.S. Department of Energy awards TerraPower $40 million for the research, design and testing of the molten chloride fast reactor (MCFR) project.

2020

The DOE awards TerraPower **$2 billion** to demonstrate the Natrium™ reactor and integrated energy system with its technology co-developer GE Hitachi Nuclear Energy and engineering and construction partner Bechtel.

2014

TerraPower expands laboratory to a 10,000-square-foot research and development facility.

2018

TerraPower enters into an agreement to work on medical isotopes for Targeted Alpha Therapies.

U.S. DEPARTMENT OF ENERGY

ISOTEK systems Member of the SNC-Lavalin Group

ATKINS

TerraPower

2021

• TerraPower and PacifiCorp announce efforts to advance the Natrium™ reactor demonstration project at a retiring coal plant in Wyoming.

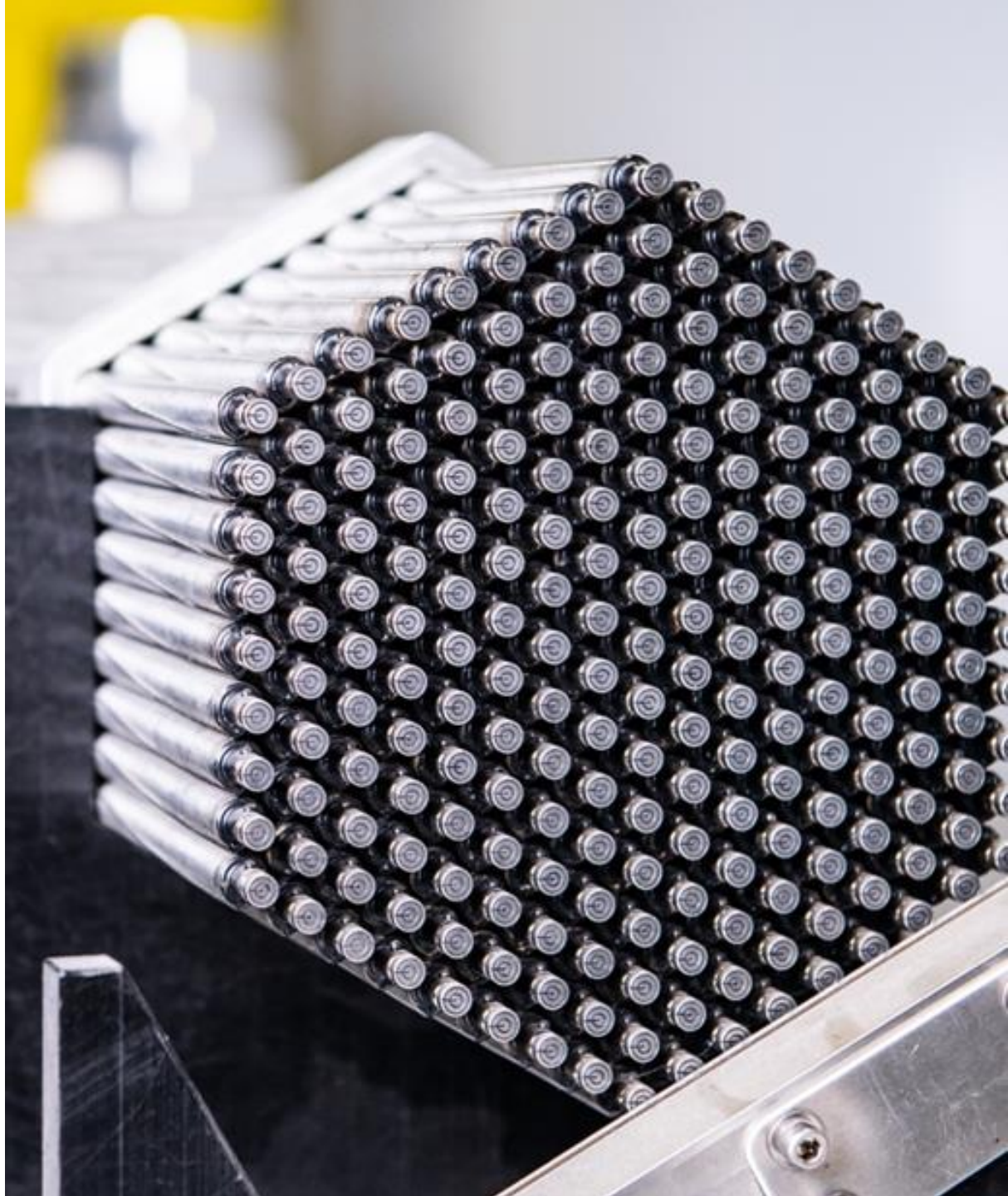
2022

• TerraPower secured a total of **$830 million** in the largest private fundraise among advanced nuclear companies.

• TerraPower begins work on Natrium reactor demonstration project.

•TerraPower and PacifiCorp announce a feasibility study of **5 additional Natrium units** in the Mountain West region of the U.S.

The Natrium Reactor



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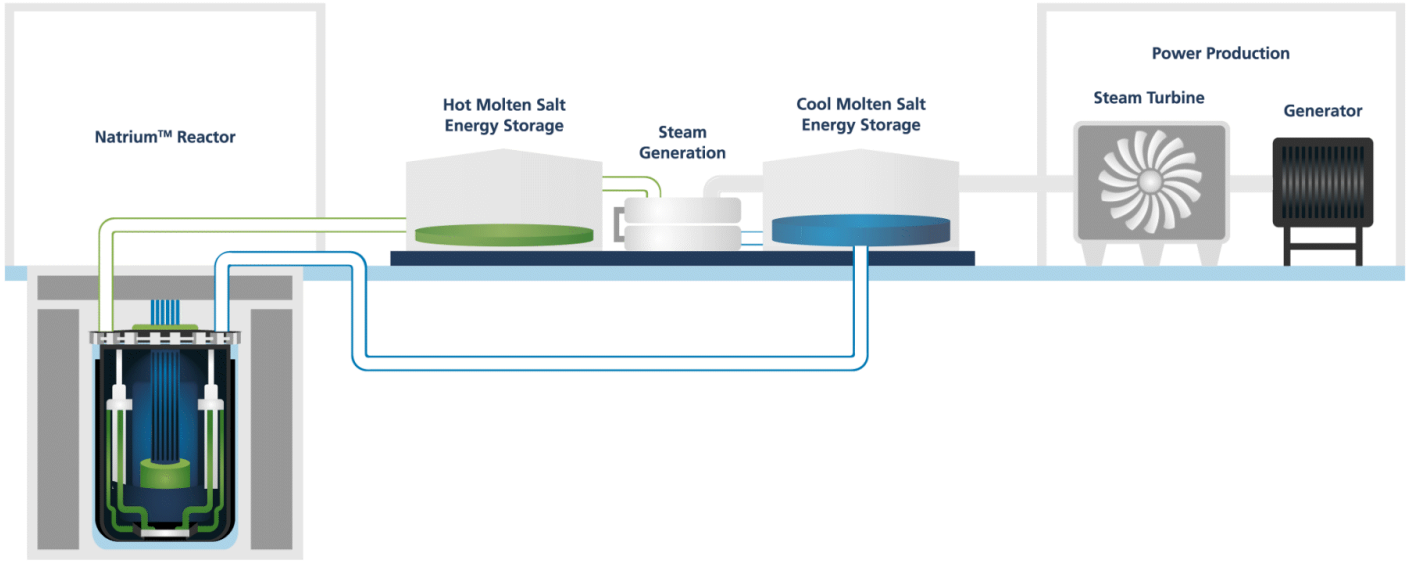
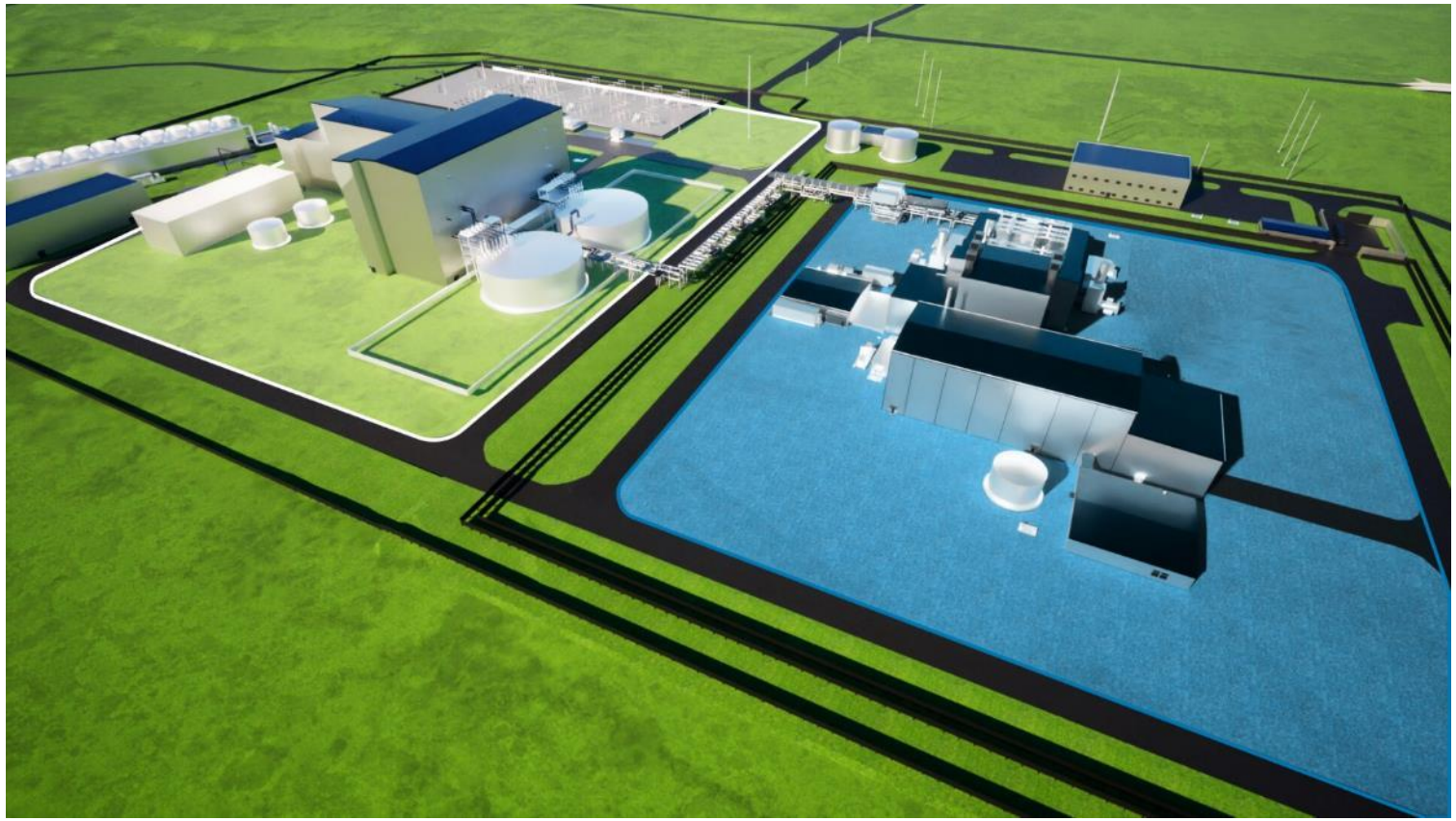
The Natrium Reactor



- 345 MWe reactor that can flex to 500 MWe for 5+ hours
- Builds on years of research and development in sodium reactors
- Incorporates learnings from concentrated solar power technologies with a focus on cost competitiveness
- Integrates on and fortifies grids with high renewables penetrations

The Natrium Plant



Nuclear Island

- Natrium reactor
- Nuclear-grade concrete

Energy Island

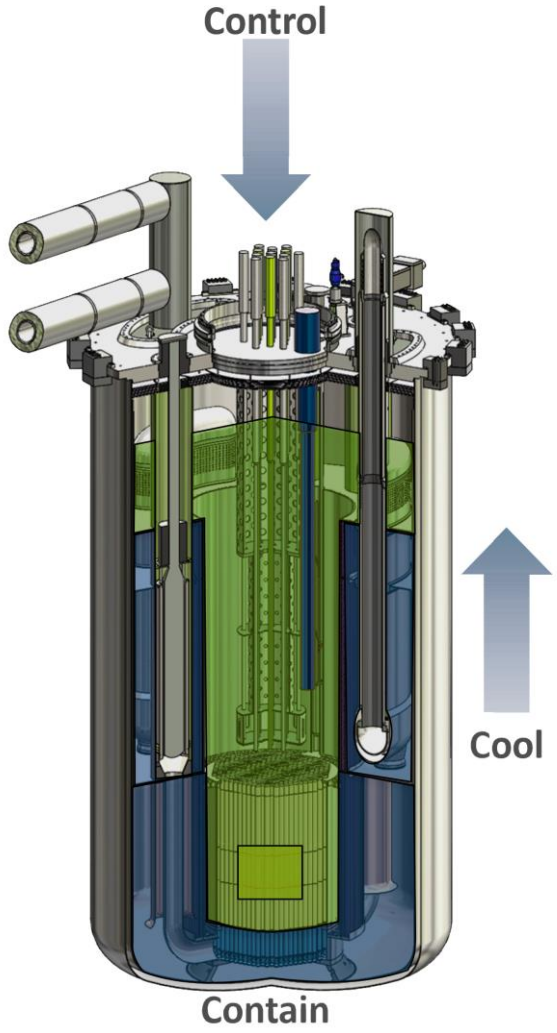
- Molten salt energy tanks
- Can be built to non-nuclear standards

Key Benefits of the Natrium Plant

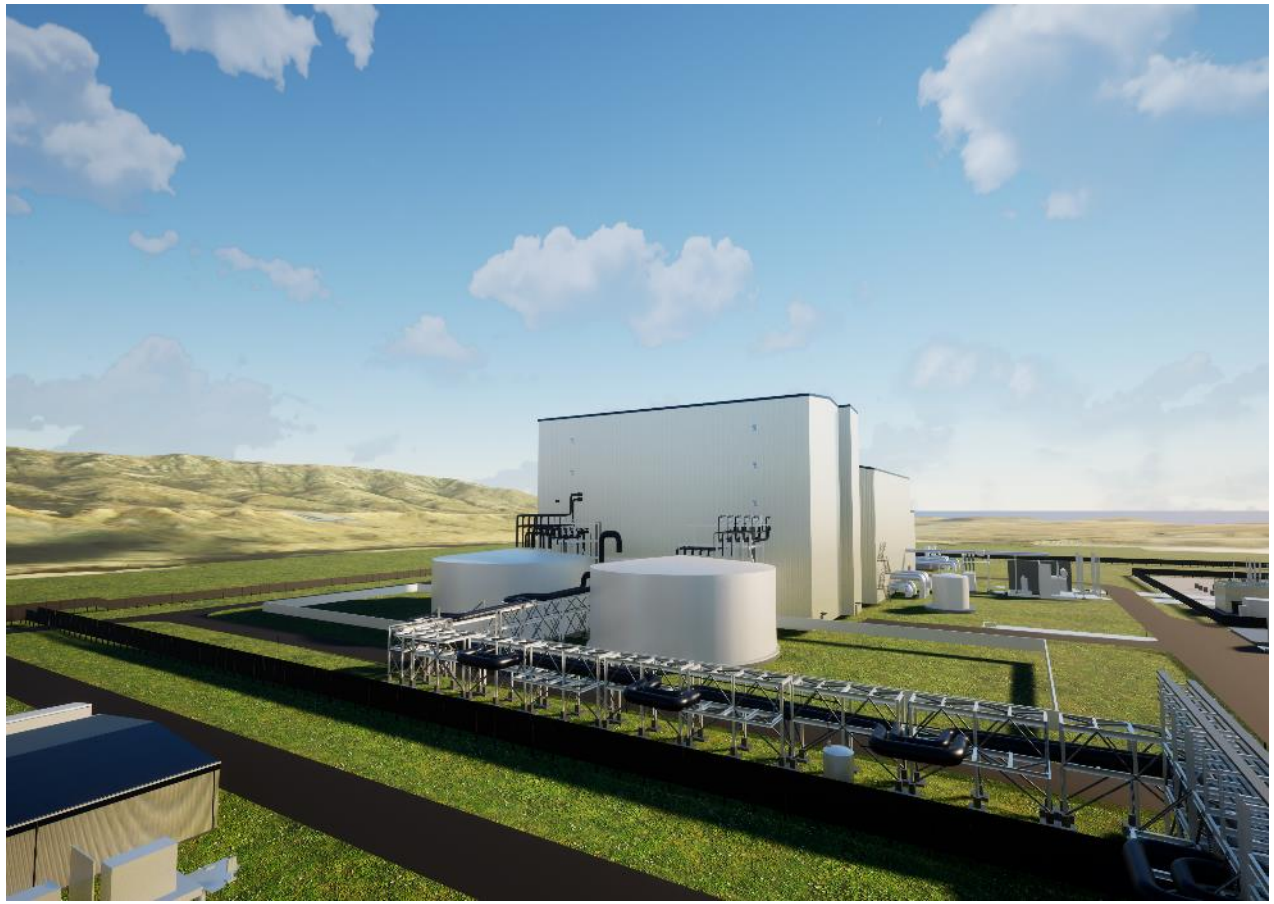
- Fast and efficient load following and **energy storage**
- **Simplified** design to reduce costs and shorten construction schedule
- **Small** Emergency Planning Zone (EPZ)
- **Efficient** fuel use

The Safety Case

- Control of the reactor during normal operation and unexpected events
- Cooling of the reactor during normal operation and unexpected events
- Containment of radioactive material within the power plant fuel, systems and components
- Advanced reactors like Natrium present a clear and positive safety case for the regulator and the public



The Future of Nuclear Energy



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
- Load following with reactor at 100% power 24/7
- 345 MWe baseload
- Flex to 500 MWe for 5+ hours with energy storage

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Natrium in Wyoming (U.S.)

- Evaluated four sites with retiring coal plants in Wyoming with PacifiCorp
- Announced final site choice in Kemmerer, Wyoming, November 2021
- 1,600 construction jobs at peak; 200-250 full time jobs when the plant is operational
- Non-nuclear construction to begin in 2024 and plant operational this decade

Natrium in Kemmerer

With a declining market for its coal, a Wyoming town deals with something new: uncertainty

Heather Richards Feb 24, 2019 Updated Dec 16, 2019 0 10 min to read

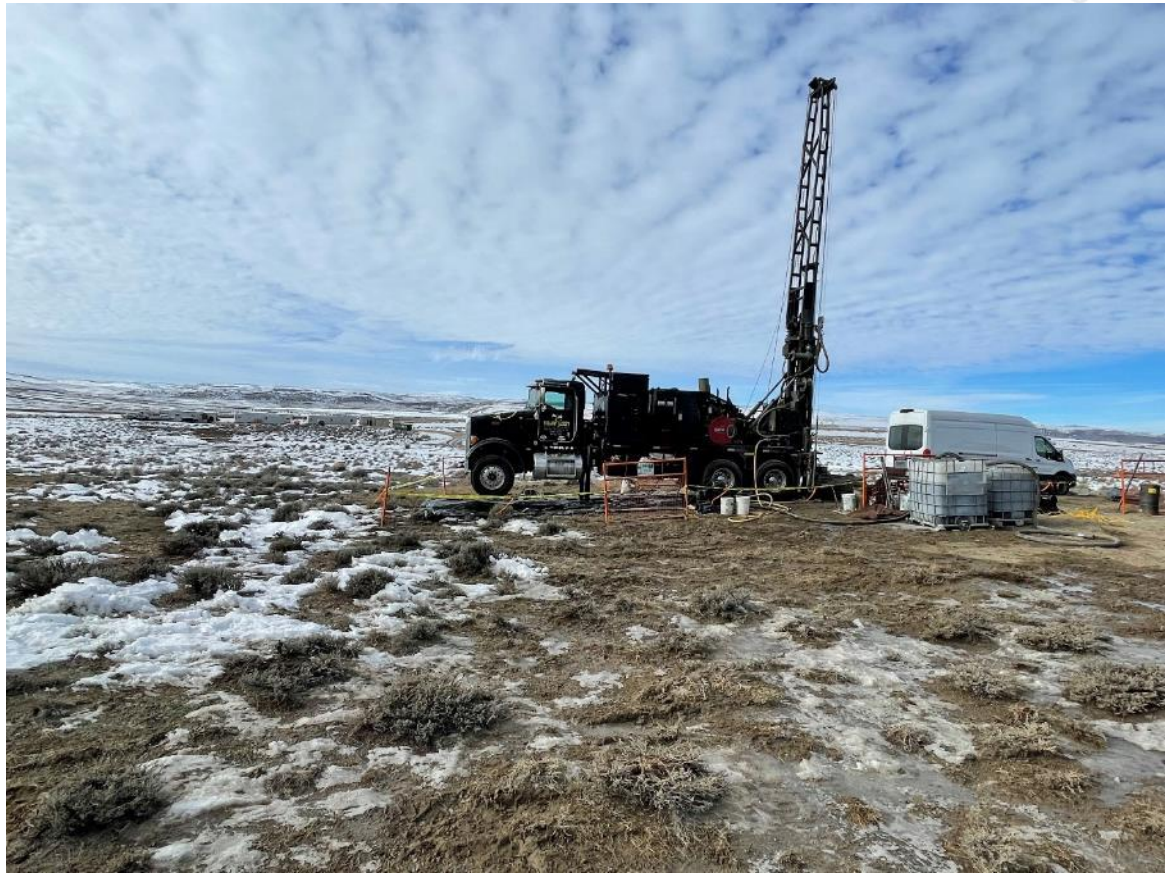
A pickup parked along Kemmerer's central square on Feb. 11. While Kemmerer and its sister community Diamondville are quiet, out-of-the-way towns, the coal mine and PacifiCorp's Naughton Power Plant provide a solid base of dependable, good-paying jobs.
Alan Rogers, Star-Tribune

- Kemmerer, Population ~2,700
- Coal Plant to Close, Adjacent Coal Mine Future in Doubt
- Coal plant built in 1963 – 109 Employees
- Kemmerer Mine – 1897, largest open pit coal mine in the US – 293 employees,

Opportunities in Coal-to-Nuclear

Energy Workforce

- Current workforce has **high Energy IQ**
- Highly skilled workforce
- Understand what it takes to produce energy and **support major energy projects**



Opportunities in Coal-to-Nuclear

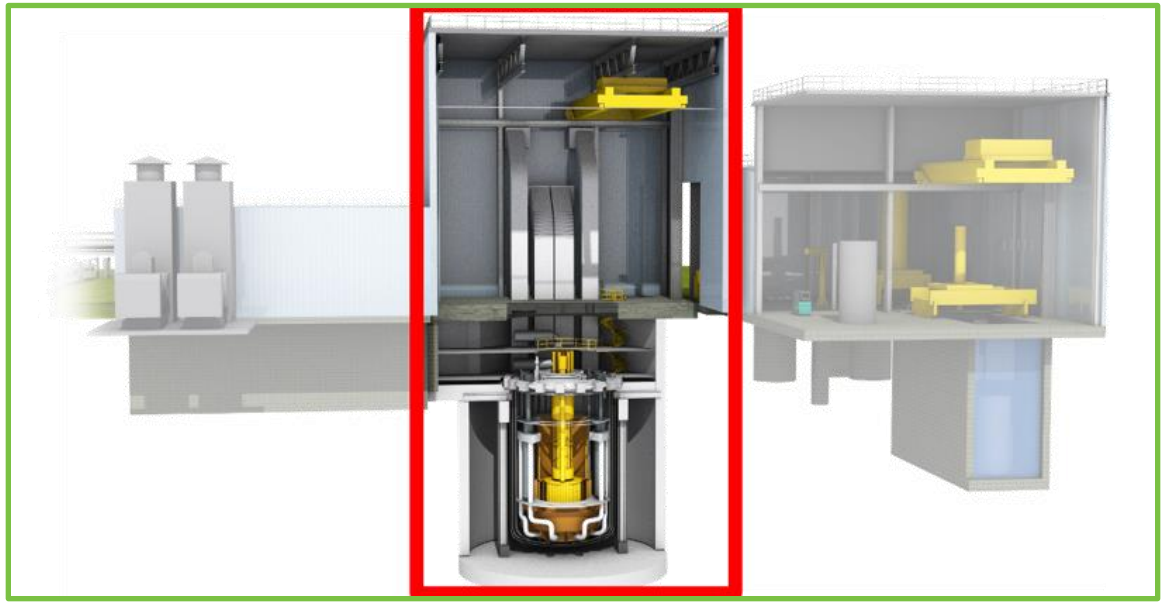
Infrastructure

- **Existing infrastructure is a benefit** to advanced nuclear:
  - Available land
  - Grid interconnection
  - Cooling water availability

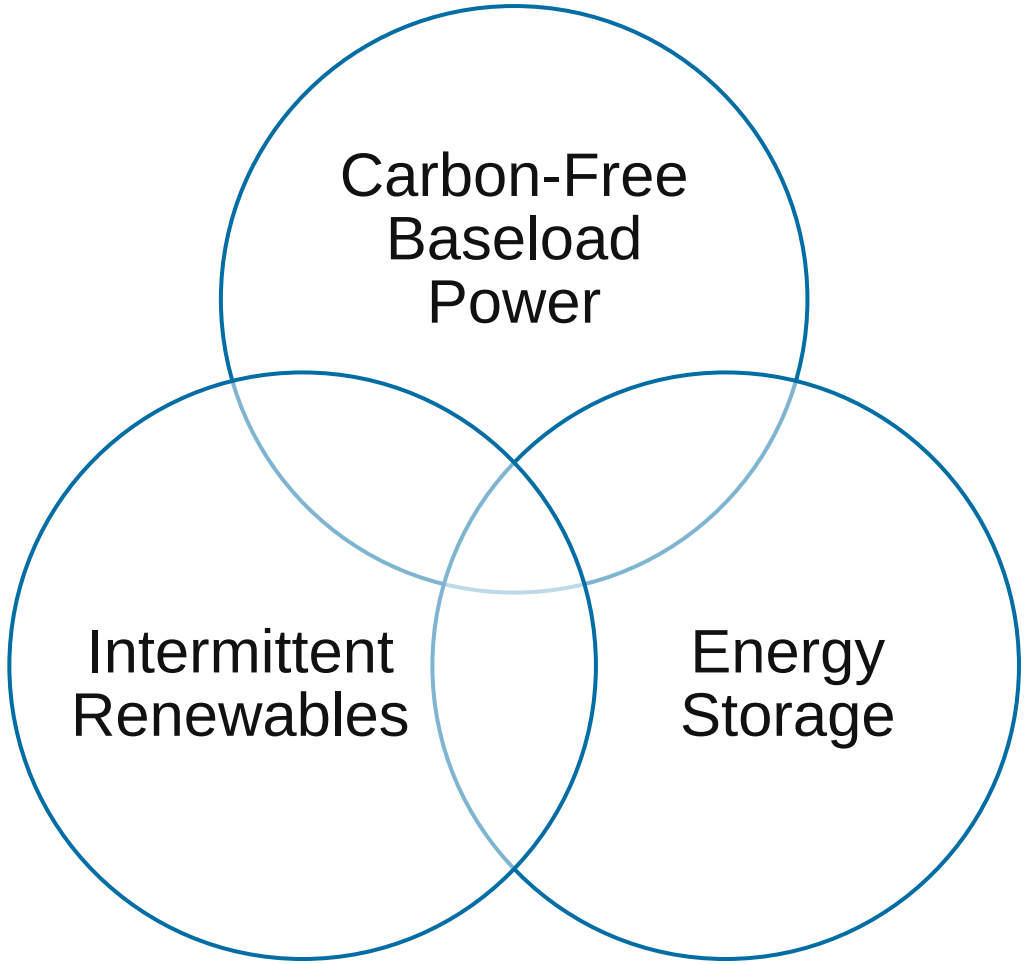
Opportunities in Coal-to-Nuclear

New Dispatchable Power

- **300 GW** of carbon-based generation is slated to close in the U.S. alone in the next decade
- Advanced nuclear provides **carbon-free, dispatchable power**



Energy Grid of the Future



Advanced Nuclear Supports Future Grid

Smaller

Baseload

Flexible

Energy Security

- Nuclear plays key role in maintaining secure, carbon-free power production
- **US Government leading in PPP to Develop Project; Licensing**
- Enabling clean energy technology to be deployed globally

*The twin challenges of **energy security and climate** have only increased the need for us to find responsible ways for **advanced nuclear** to continue its role as a clean energy enabler and baseload source.*

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THANK YOU

To learn more, visit **www.terrapower.com**