AIChE® 13th SOUTHWEST PROCESS TECHNOLOGY CONFERENCE

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Sugar Land Marriott Town Square, Texas

NuScale Power

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Acknowledgement and Disclaimer

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Who is NuScale Power?

- NuScale Power was formed in 2007 for the sole purpose of completing the design and commercializing a small modular reactor (SMR) – the NuScale Power Module™
- Initial concept was in development and testing since the 2000 U.S. Department of Energy (DOE) MASLWR program
- Fluor Corporation, global engineering and construction company, became lead investor in 2011
  - In 2013, NuScale won a competitive U.S. DOE Funding Opportunity for matching funds, and has been awarded over $400M in DOE funding since then
- >560 patents granted or pending in nearly 20 countries
- >400 employees in 5 offices in the U.S. and 1 office in the U.K.
- Rigorous design review by the U.S. Nuclear Regulatory Commission (NRC)—NuScale received Design Approval in August 2020
- Total investment in NuScale to date is greater than US$1.2B

NuScale Engineering Offices Corvallis

One-third Scale NIST-2 Test Facility

NuScale Control Room Simulator

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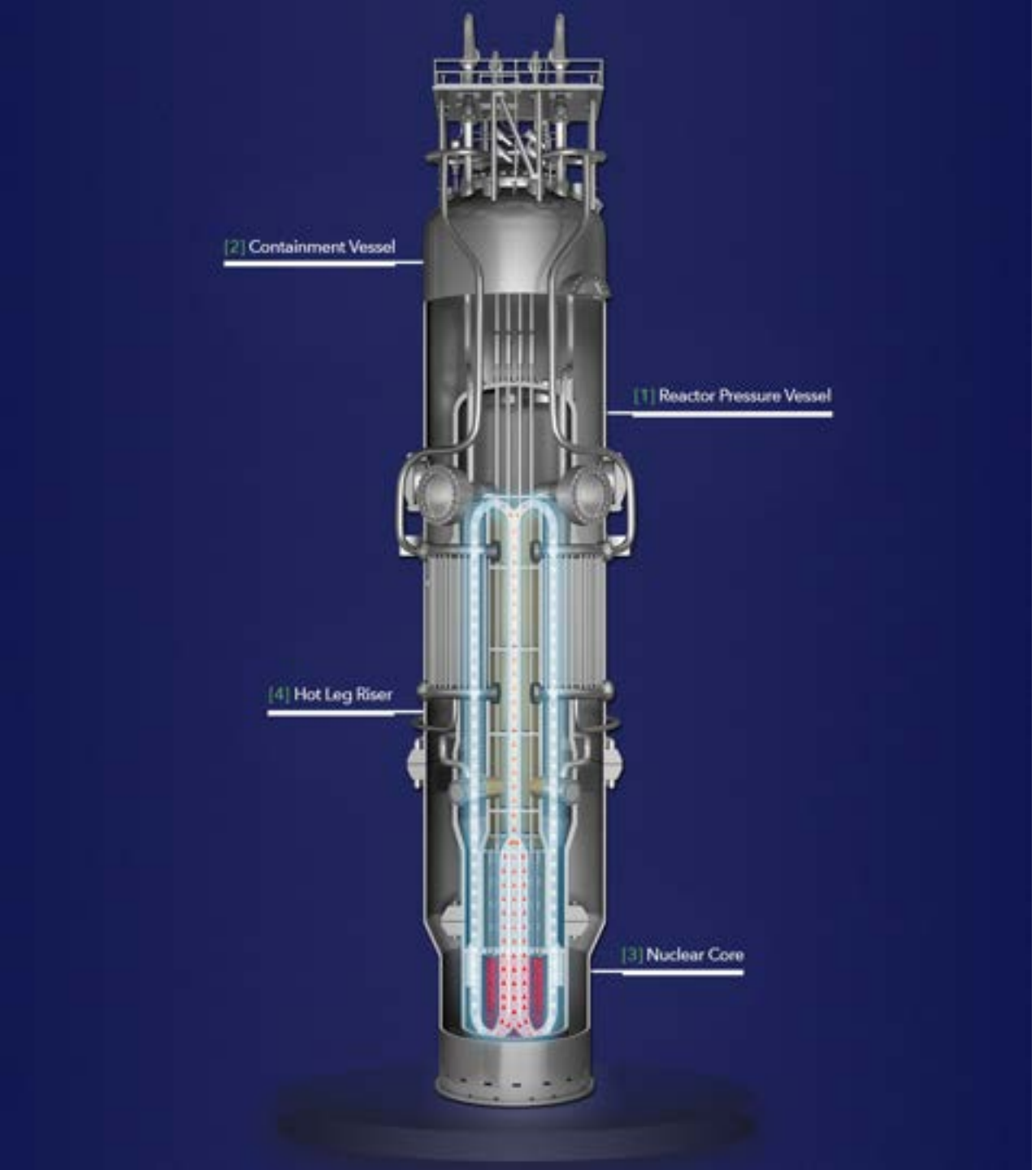

Core Technology: NuScale Power Module™

- A NuScale Power Module™ (NPM) includes the reactor vessel, steam generators, pressurizer, and containment in an integral package – simple design that eliminates reactor coolant pumps, large bore piping and other systems and components found in conventional reactors
- Each module produces up to 77 MWe
  - Small enough to be factory built for easy transport and installation
  - Dedicated power conversion system for flexible, independent operation
- Modules are incrementally added to match load growth
  - Up to 12 modules for 924 MWe gross output
  - Smaller power plant solutions available for 4-module (308 MWe) and 6-module (462 MWe) plants

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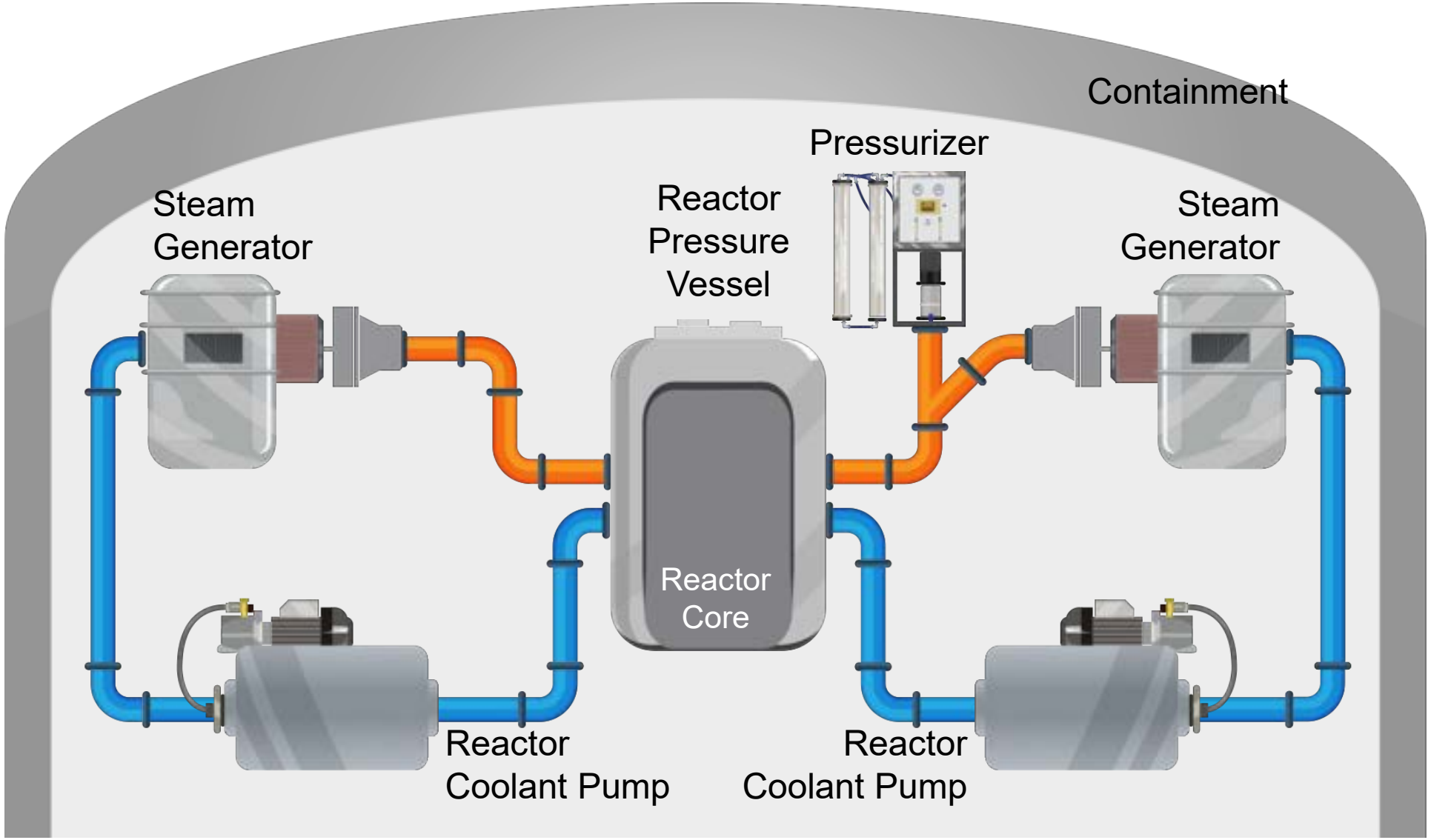
Typical Pressurized Water Reactor



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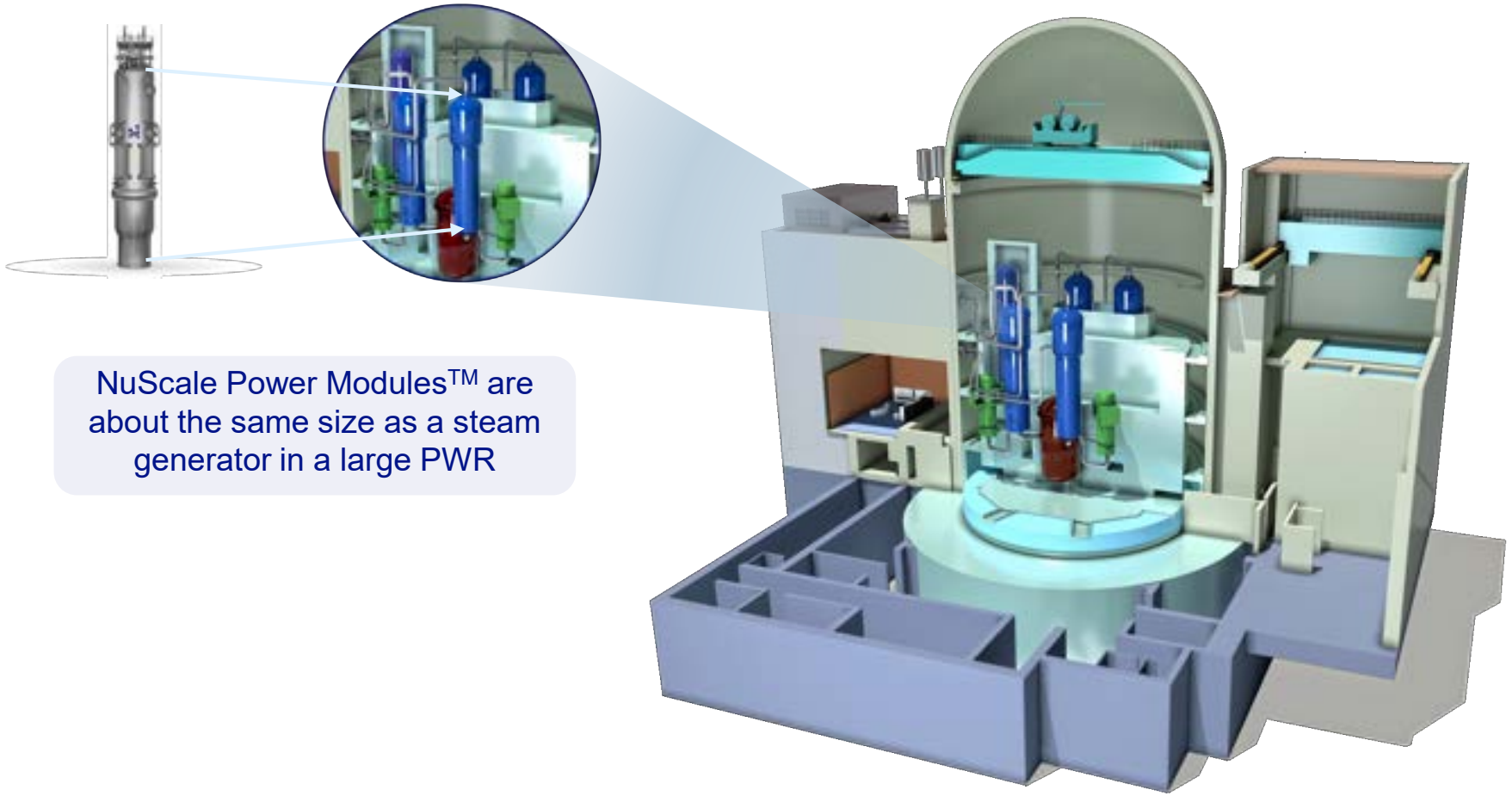
Comparison to a Large Pressurized Water Reactor (PWR)



NuScale Power Modules™ are about the same size as a steam generator in a large PWR

Typical Large PWR

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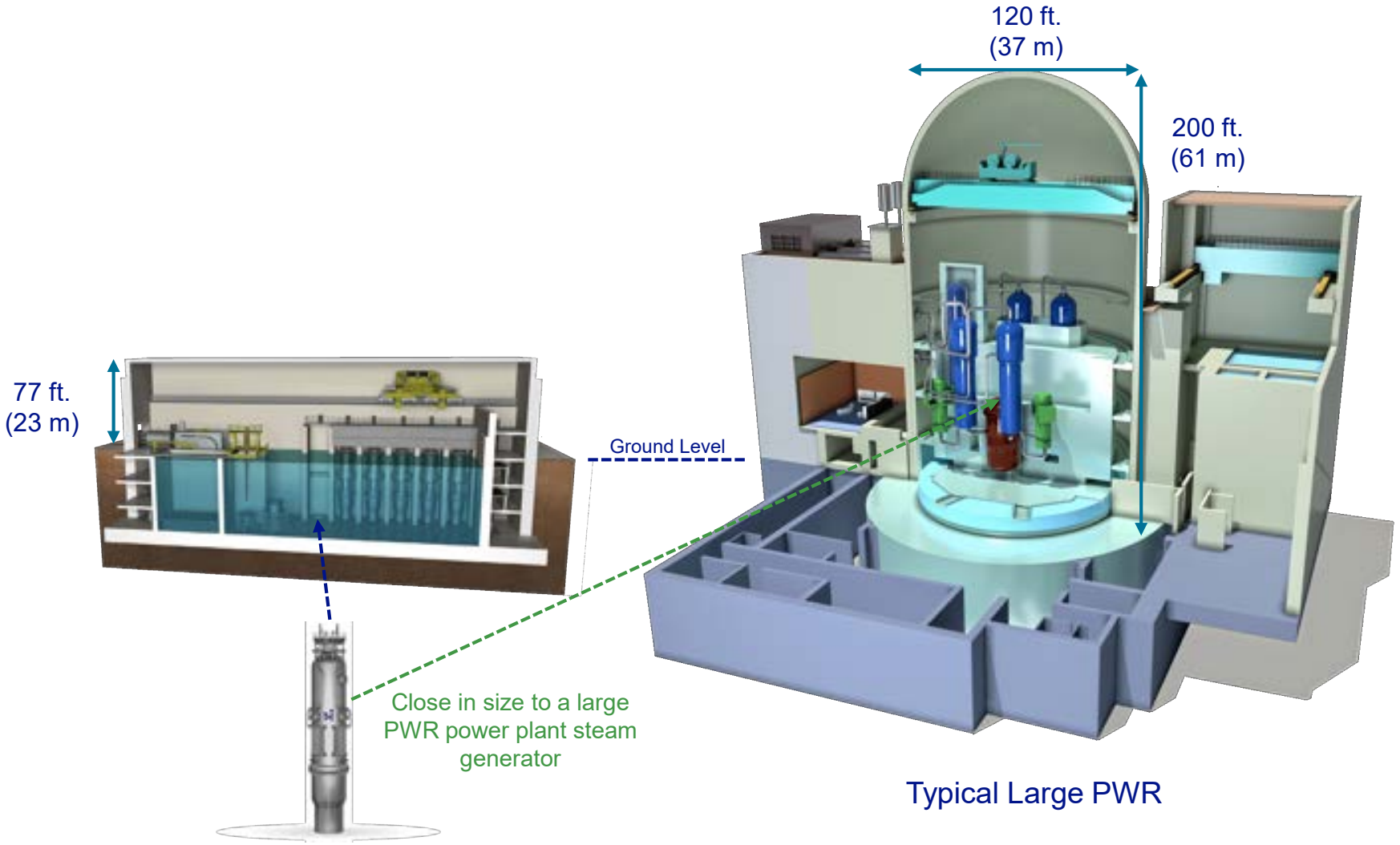
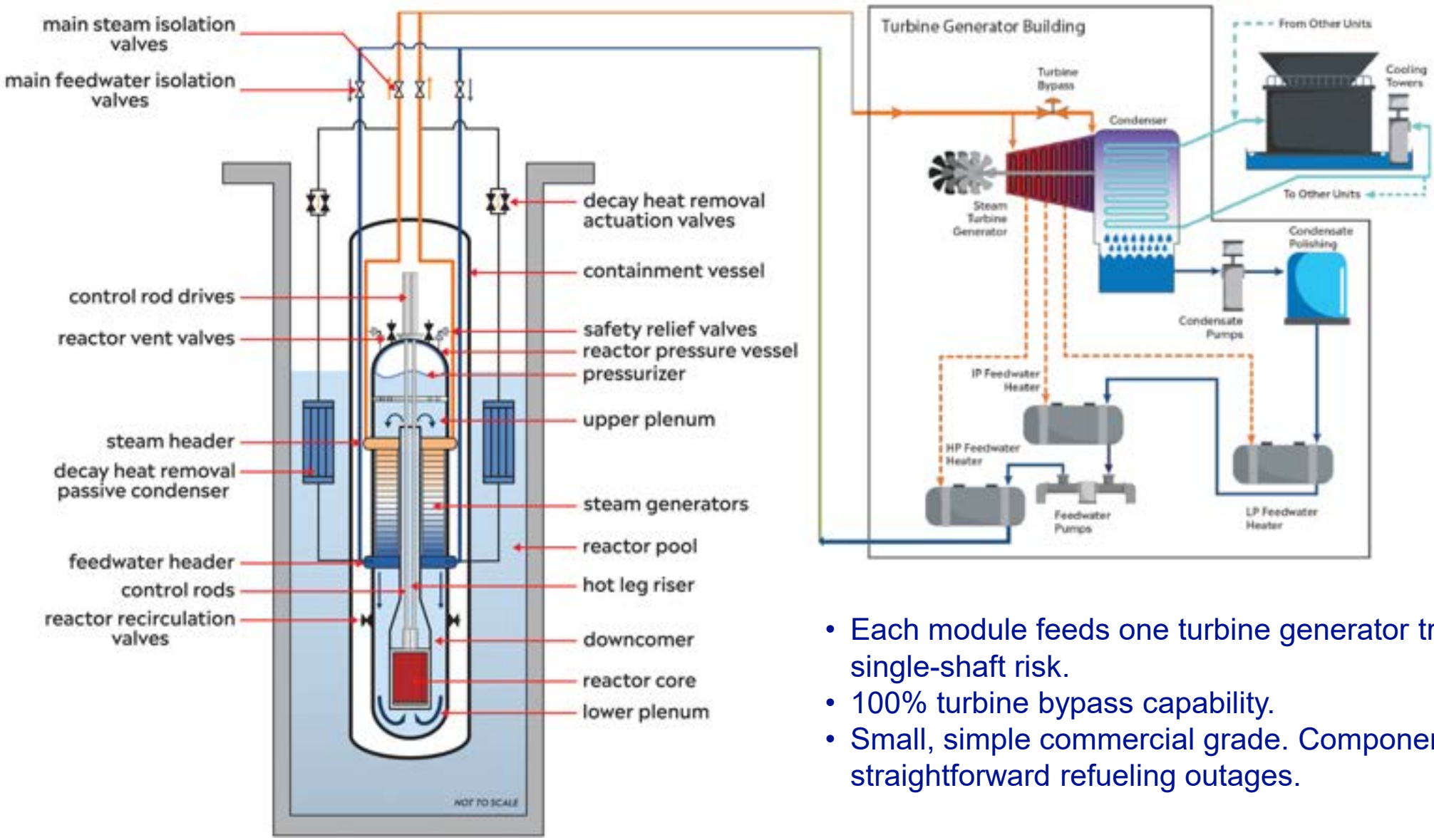
Comparison to a Large Pressurized Water Reactor (PWR)



Images not to scale

NuScale Power Train



- Each module feeds one turbine generator train, eliminating single-shaft risk.
- 100% turbine bypass capability.
- Small, simple commercial grade. Components support short straightforward refueling outages.

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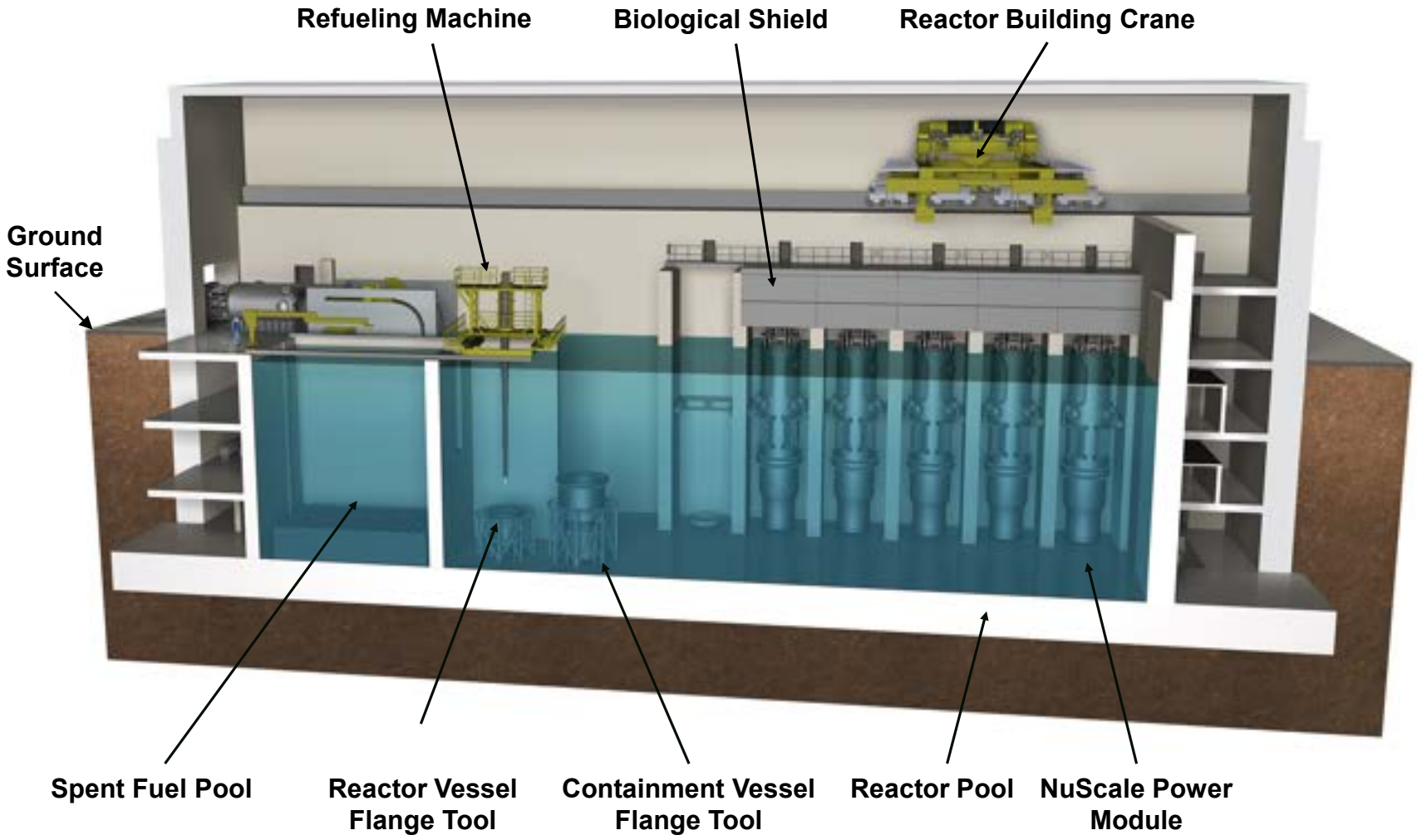
Reactor Building Houses NuScale Power Modules™, Spent Fuel Pool, and Reactor Pool



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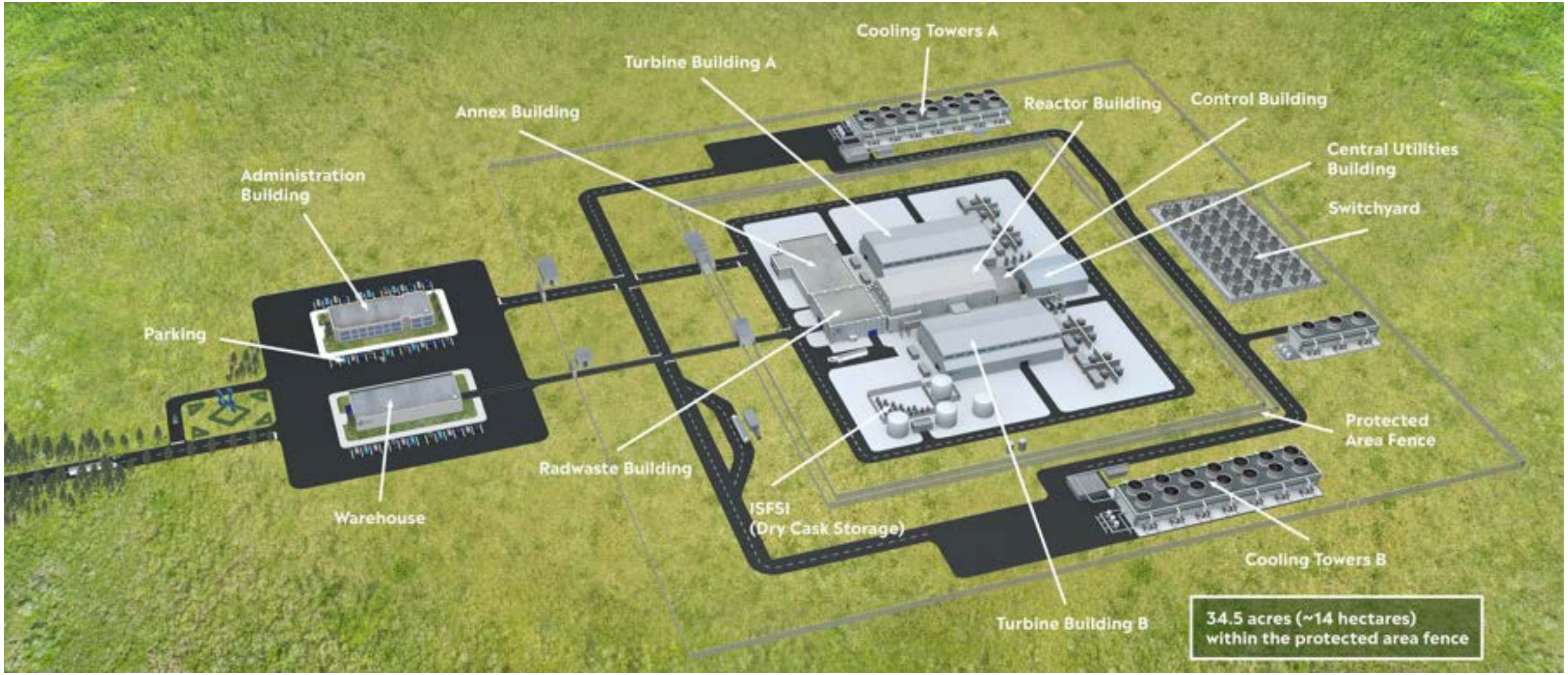
Detailed Plant Site Layout



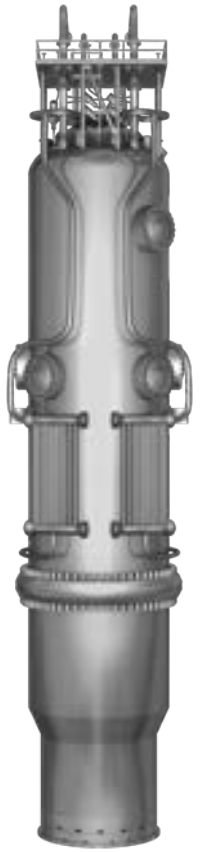
Providing Identical Technology for Every Implementation

6-module plant

462 MWe (gross)

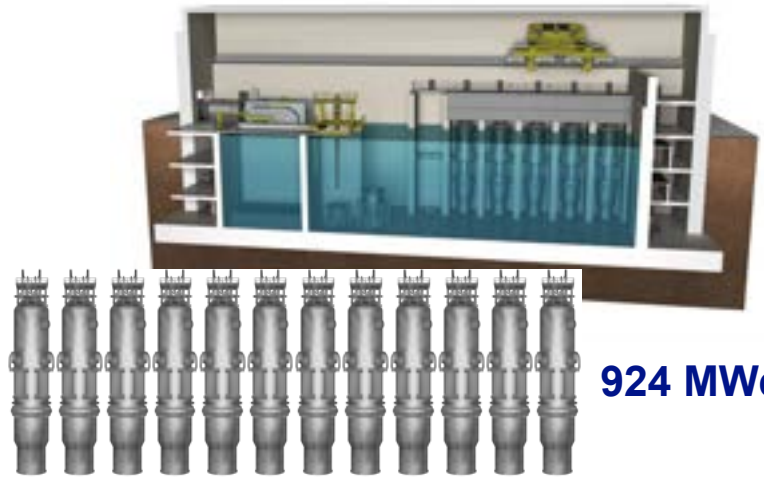
4-module plant

308 MWe (gross)



NuScale Power Module™
77 MWe (gross)

12-module plant



924 MWe (gross)

- Flexibility in size and cost advantages, with the same operational flexibility and unparalleled safety case.
- Each module feeds one turbine generator train, eliminating single-shaft risk.
- Demonstrated resiliency for every configuration (black-start, island mode, seismically robust, cyber secure, etc.)

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A New Approach to Construction and Operation

NuScale has revolutionized the nuclear supply chain with modular manufacturing of NPM units in-house that are shipped to sites

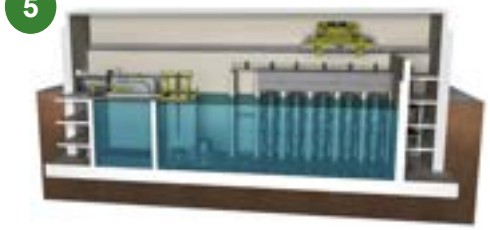
1

Factory fabrication

2

NuScale Power Module including containment and reactor vessel

5



Housed in a 12-module reactor building

4

To the plant site

3

Shipped by truck, rail, or barge

Low carbon, secure electricity

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Simplicity Enhances Safety

Natural Convection for Cooling

- Passively safe - cooling water circulates through the nuclear core by natural convection eliminating the need for pumps.

Seismically Robust

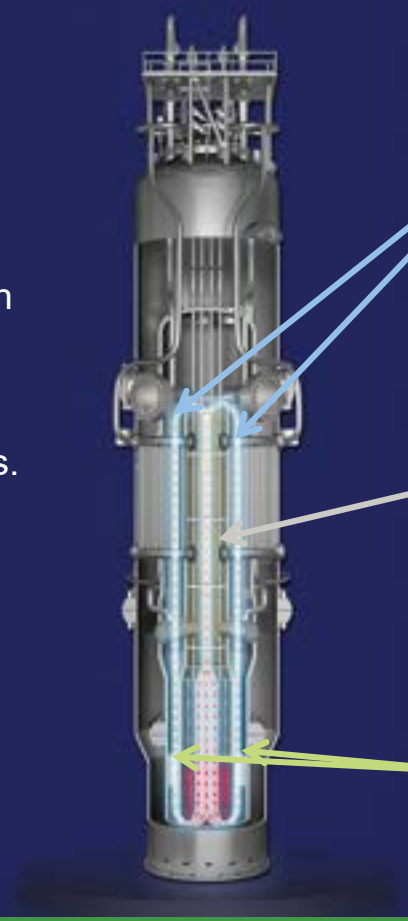
- System submerged in a below-grade pool of water in an earthquake and aircraft impact resistant building.

Simple and Small

- Reactor core is 1/20th the size of large reactor cores.
- Integrated reactor design - no large-break loss-of-coolant accidents.

Defense-in-Depth

- Multiple additional barriers to protect against the release of radiation to the environment.



Conduction **– the water heated by the nuclear reaction (primary water) transfers its heat through the walls of the tubes in the steam generator, heating the water inside the tubes (secondary water) and turning it to steam. This heat transfer cools the primary water.**

Convection **– energy from the nuclear reaction heats the primary water causing it to rise by convection and buoyancy through the riser, much like a chimney effect.**

Gravity / Buoyancy **– colder (denser) primary water "falls" to bottom of reactor pressure vessel, and the natural circulation cycle continues.**

Second-to-none safety case – site boundary Emergency Planning Zone capable

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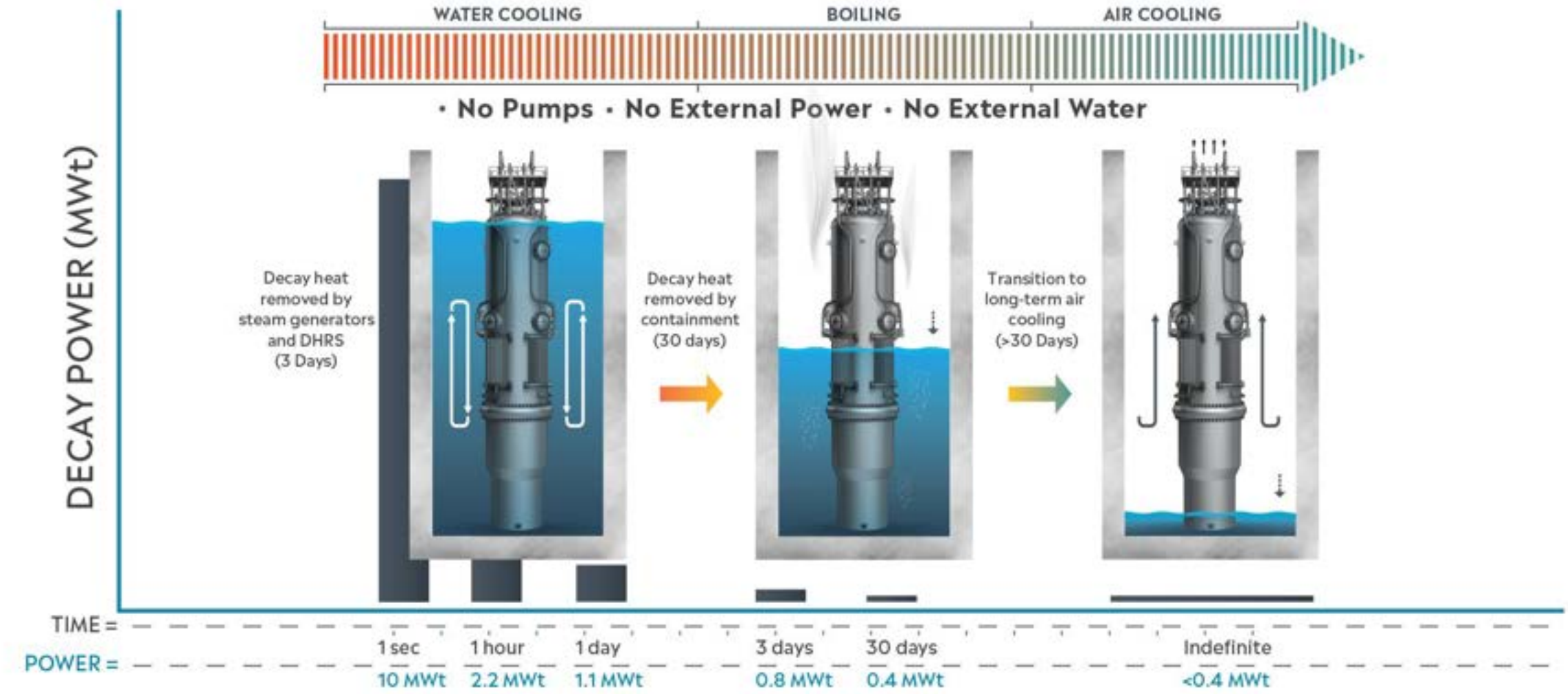
Innovative Advancements to Reactor Safety

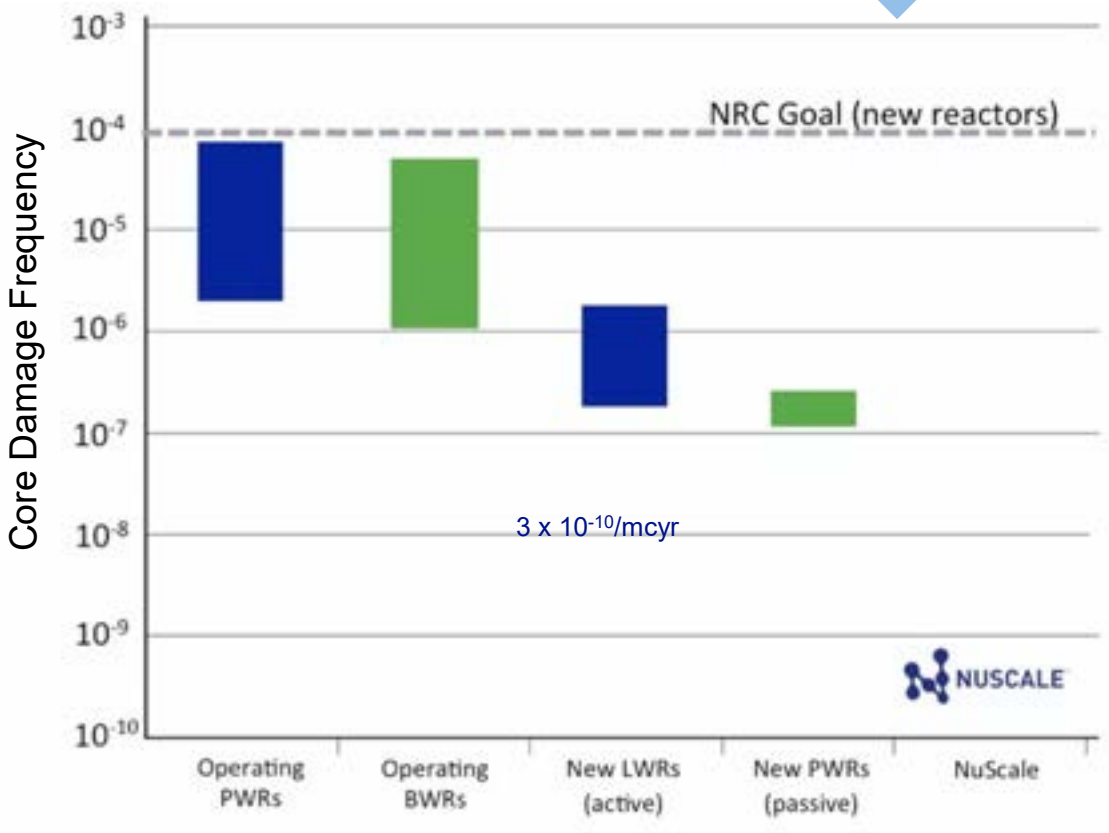
Nuclear fuel cooled indefinitely without AC or DC power*



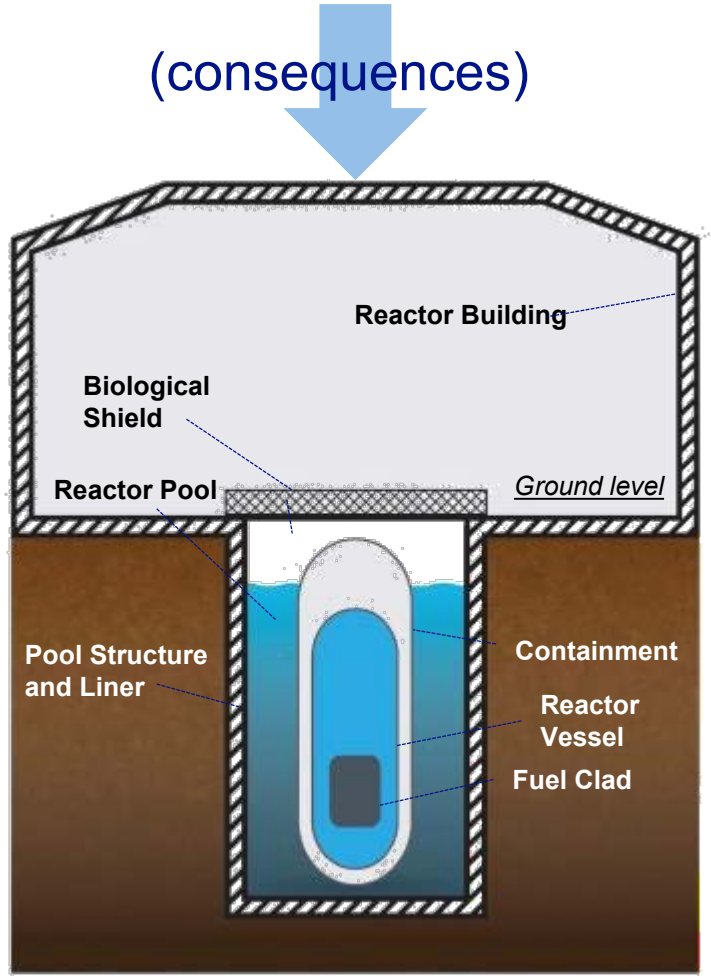
*Alternate 1E power system design eliminates the need for 1E qualified batteries to perform ESFAS protective functions – Patent Pending

Reducing Plant Risk

Risk = (frequency of failure) X (consequences)



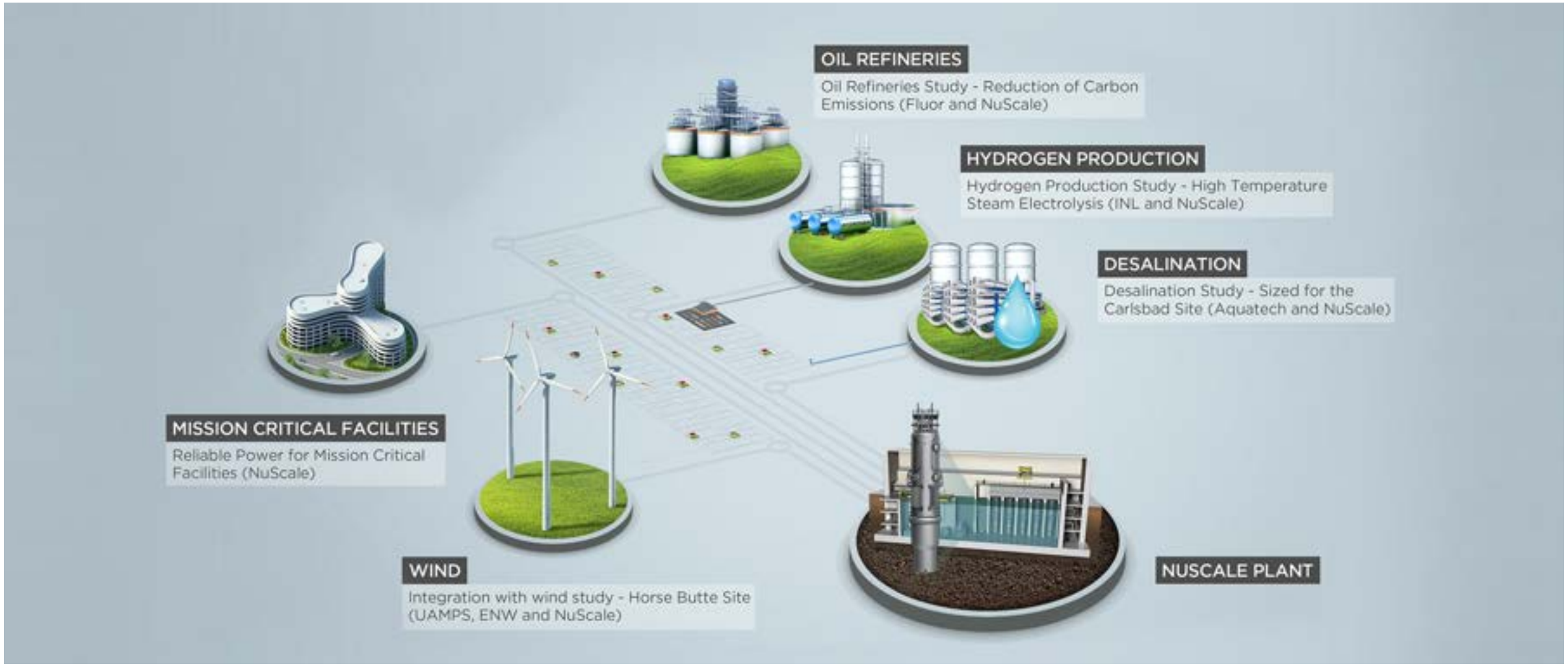
*Probability of core damage (full power, internal events) due to NuScale reactor equipment failures is **1 event per module every ~3 Billion Years.***



Four additional barriers to release of radioactivity from a NuScale plant.

Beyond Baseload: NuScale Diverse Energy Platform

More Than Reliable Baseload and Load-following Electricity Generation



Reports for associated technical studies are available at: www.nuscalepower.com/technology/technical-publications

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A New Level of Plant Resiliency

Features and Capabilities Not Found in Other Nuclear Plants

Climate Adaptation

Black-Start and Island Mode Following Loss of Offsite Power

A single module can be Black-Started and can power the entire plant in case of loss of the grid; no operator or computer actions, AC/DC power or additional water required to keep the reactors safe.

First Responder Power

On loss of the offsite grid, through variable (0% to 100%) steam bypass, all 12 modules can remain at power and be available to provide electricity to the grid as soon as the grid is restored.

Resilience to Natural Events

Reactor modules and fuel pool located below grade in a Seismic Category 1 Building

- Capable of withstanding a Fukushima type seismic event
- Capable of withstanding hurricanes, tornados, and floods.

Resilience to Aircraft Impact

Reactor building is able to withstand aircraft impact as specified by the NRC aircraft impact rule.

Cybersecurity

Module and plant protection systems are non-microprocessor based using field programmable gate arrays that do not use software and are therefore not vulnerable to internet cyber-attacks.

Electromagnetic Pulse (EMP/GMD)

Resilience to solar-induced geomagnetic disturbances (GMDs) and electromagnetic pulse (EMP) events beyond current nuclear fleet.

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What About the Waste, i.e., Used Fuel?

- What you normally hear about as nuclear “waste” is really the used fuel removed from a reactor, which still contains **~96% of the unused energy** that can be recovered to produce new fuel.
- All of the used nuclear fuel produced by the nuclear energy industry in the last 60 years has been safely managed and stored, primarily at plant sites in pools or dry cask storage.
- The NuScale power plant design includes a proven **safe and secure used fuel management system**.
- Used fuel management, storage, and disposal is regulated by U.S. Nuclear Regulatory Commission (NRC) and the **U.S. Department of Energy (DOE)** has responsibility for its ultimate disposal.
- **Recycling used fuel** could significantly reduce the burden of mining and disposing of used fuel, making our nuclear fuel cycle more sustainable.

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Used Fuel Management at NuScale Plant

- NuScale reactor building and plant design incorporates a proven safe, secure, and effective used fuel management system.
- Stainless steel lined concrete pool holds used fuel for at least 10 years under 60 feet of water.
- The used fuel is protected both by the ground and the Seismic Category 1 reinforced concrete reactor building designed to withstand an aircraft impact, and a variety of natural and man-made phenomena.

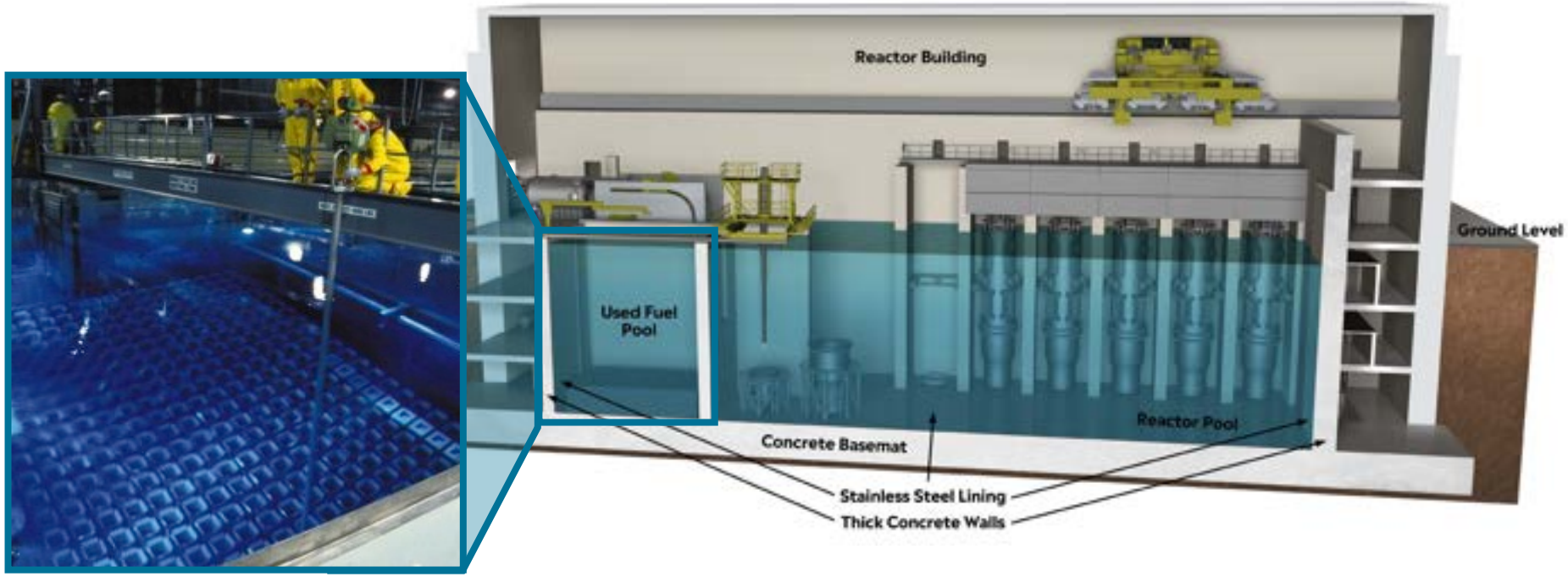

Image Credit: Nuclear Energy Institute

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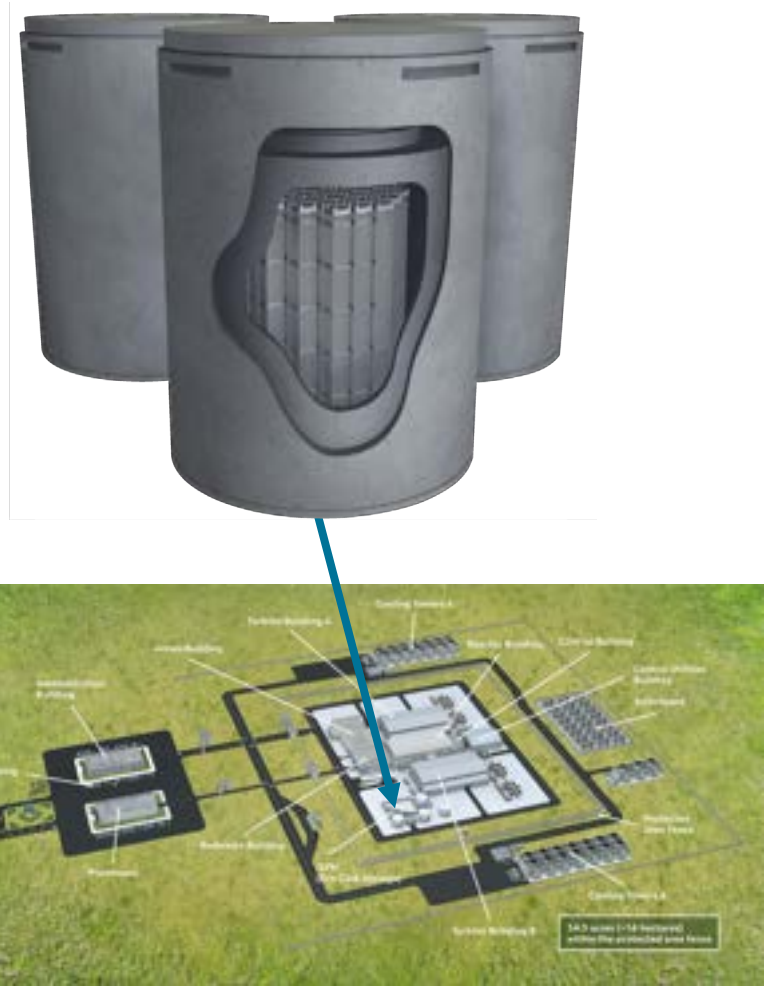
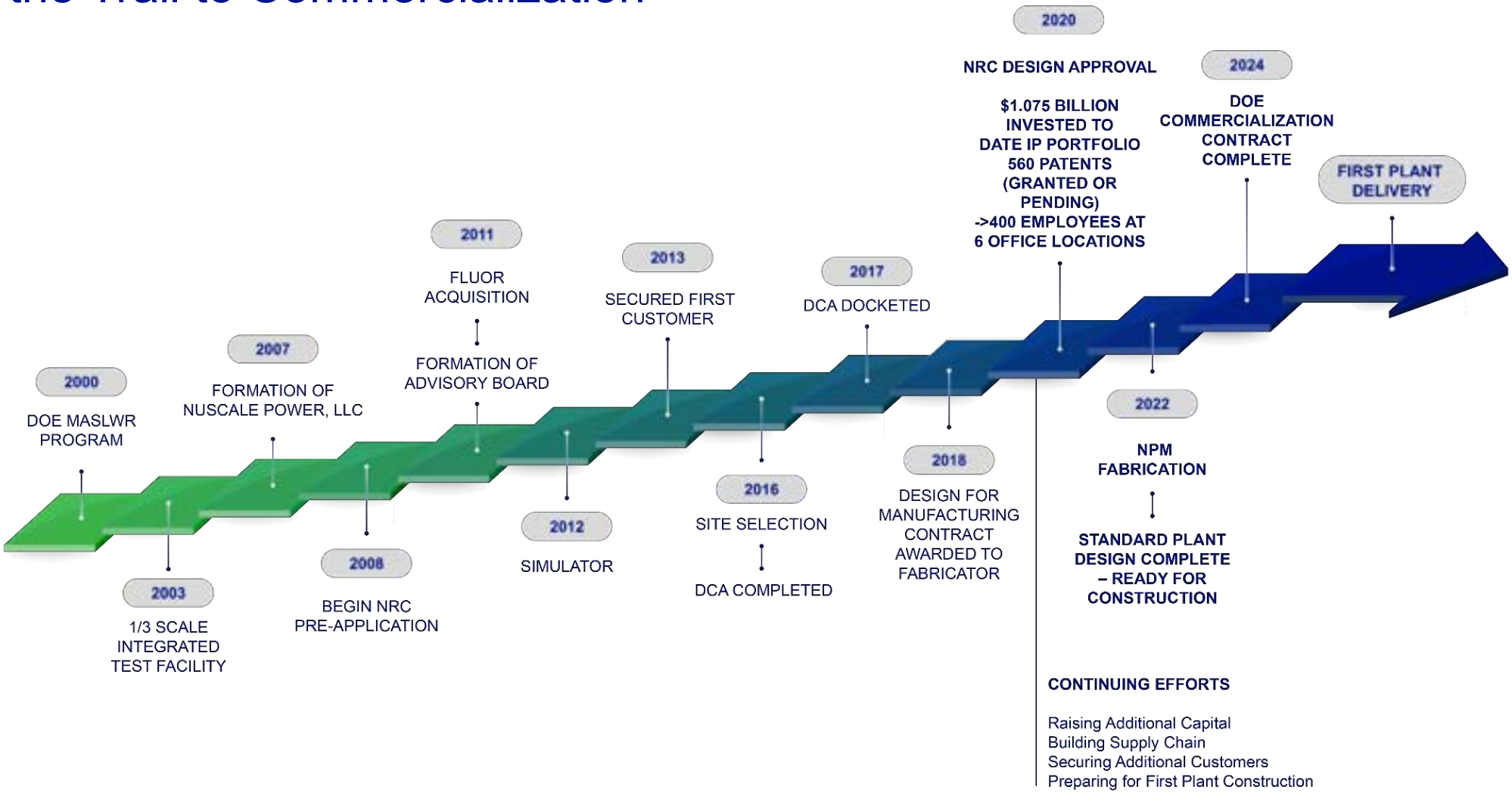
Used Fuel Storage & Disposal



- After cooling in the spent fuel pool, used fuel is placed into certified casks – steel containers with concrete shells – on site of the plant.
  - NRC's Waste Confidence Rule states that dry cask storage is a safe and acceptable way to store used fuel for an interim period at the plant up to 60 years beyond the licensed life of any reactor (i.e., for up to 120 years).
  - **NuScale's standard facility design includes an area for the dry storage of all of the spent fuel produced during the 60-year life of the plant.**
- U.S. Department of Energy (DOE) has responsibility for the final disposal of used fuel under the Nuclear Waste Policy Act.
  - Under the Act, the generators of electricity from nuclear power plants must pay into a fund to be used for the long-term disposal of this used fuel; over $40 billion is currently in the Nuclear Waste Fund.

Sources: U.S. NRC, U.S. DOE, Nuclear Energy Institute

Blazing the Trail to Commercialization



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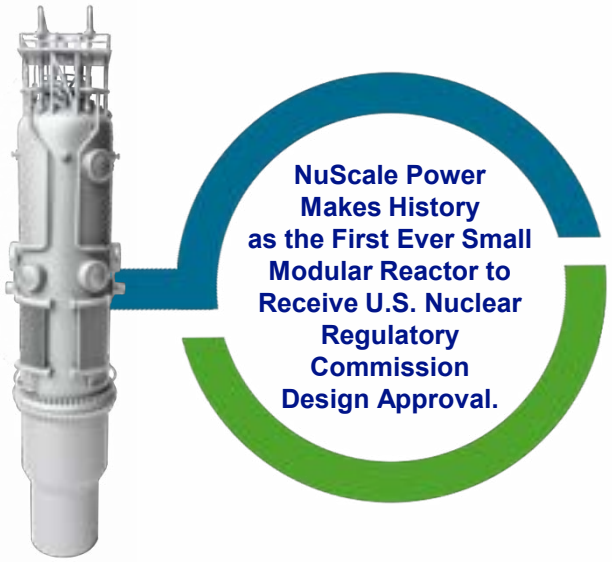
First SMR to Undergo Licensing in the U.S.

- Design Certification Application (DCA) completed in December 2016.
- Docketed and review commenced by U.S. Nuclear Regulatory Commission (NRC) in March 2017.
- NuScale received standard design approval in September 2020.
- Final Rule Publication Date: August 19 August 19, 2022



DCA Statistics

- **12,000+** pages
- **14** Topical Reports
- **>2 million** labor hours
- **>800** people
- **>50** supplier/partners
- Over **$500M**

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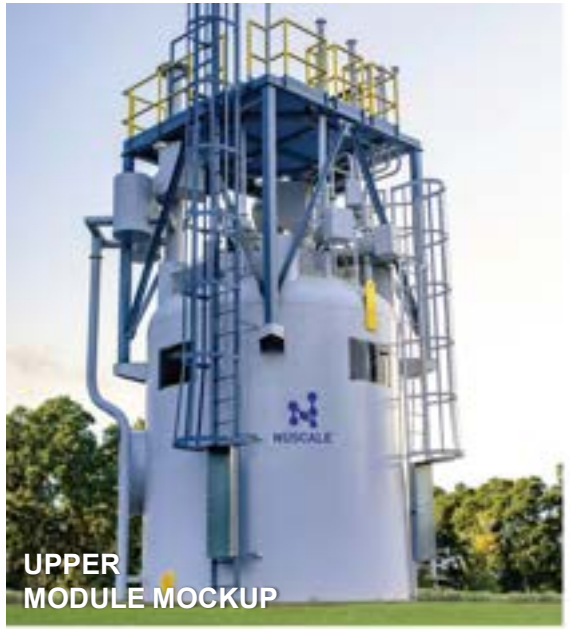
Manufacturing and Testing of Real Components



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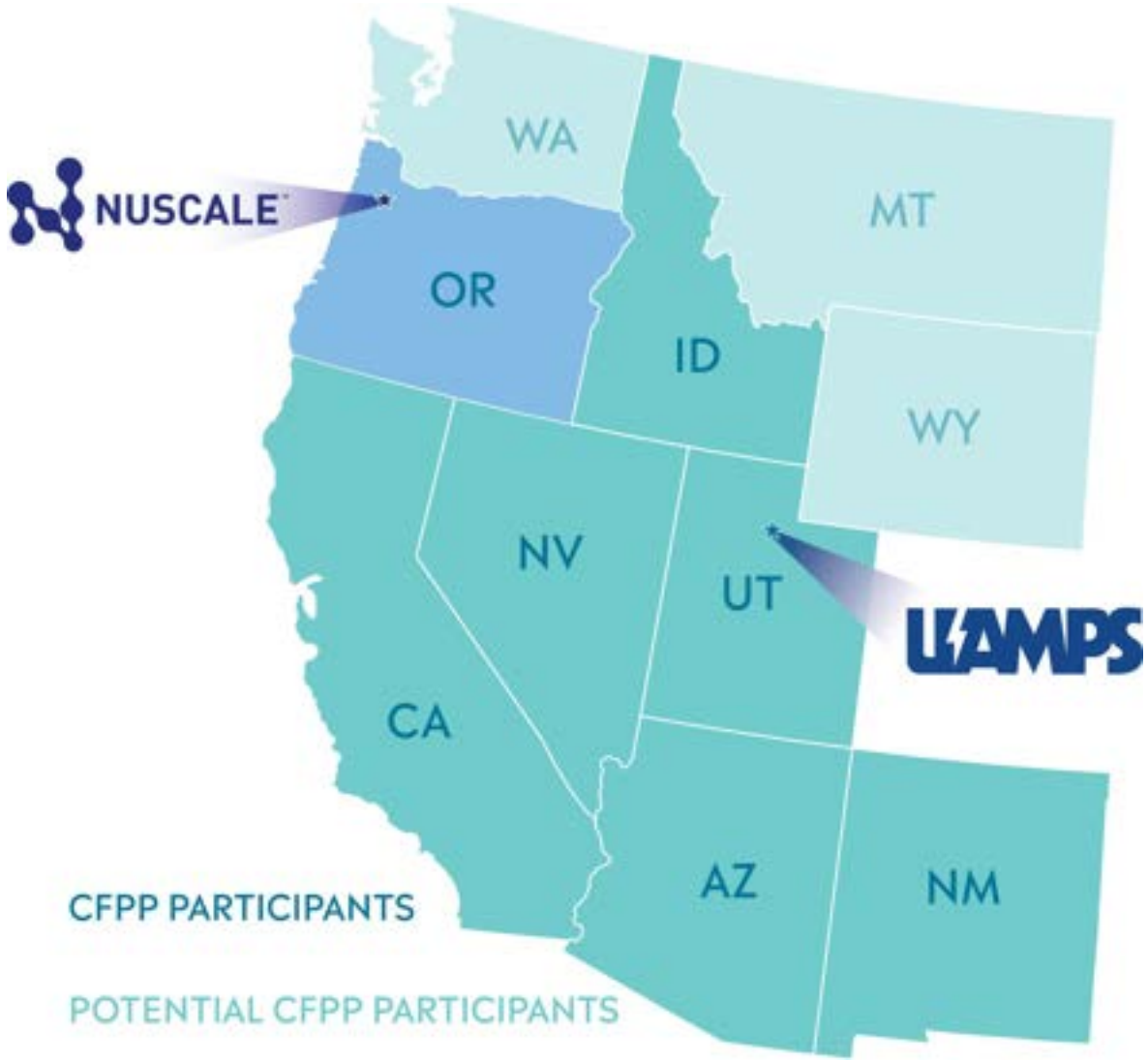

First Deployment: UAMPS Carbon Free Power Project

- Utah Associated Municipal Power Systems (UAMPS) provides energy services to community-owned power systems throughout the Intermountain West
  - 49 members in Utah, California, Idaho, Nevada, New Mexico and Wyoming.
  - 28 members are ***CFPP participants*** in Utah, Arizona, California, Idaho, Nevada, New Mexico
  - Discussions with ***potential CFPP participants*** in Montana, Wyoming, Arizona and Washington.
- First commercial deployment of the NuScale plant will be at the Idaho National Laboratory (INL) as part of the UAMPS Carbon Free Power Project
- In January 2021, UAMPS and Fluor signed a cost-reimbursable development agreement to provide estimating, development, design and engineering services to develop the site-specific cost estimates for deployment of the NuScale technology at the INL site.

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Carbon Free Power Project (CFPP) Timeline

2020

2020
Site characterization activities began

2021-2023
Site characterization activities increase

2024
Full site mobilization for construction

2029
First NuScale Power Module™ installed

2030
Remaining modules installed for full plant operation

2030

Artistic concept of the NuScale Power Plant

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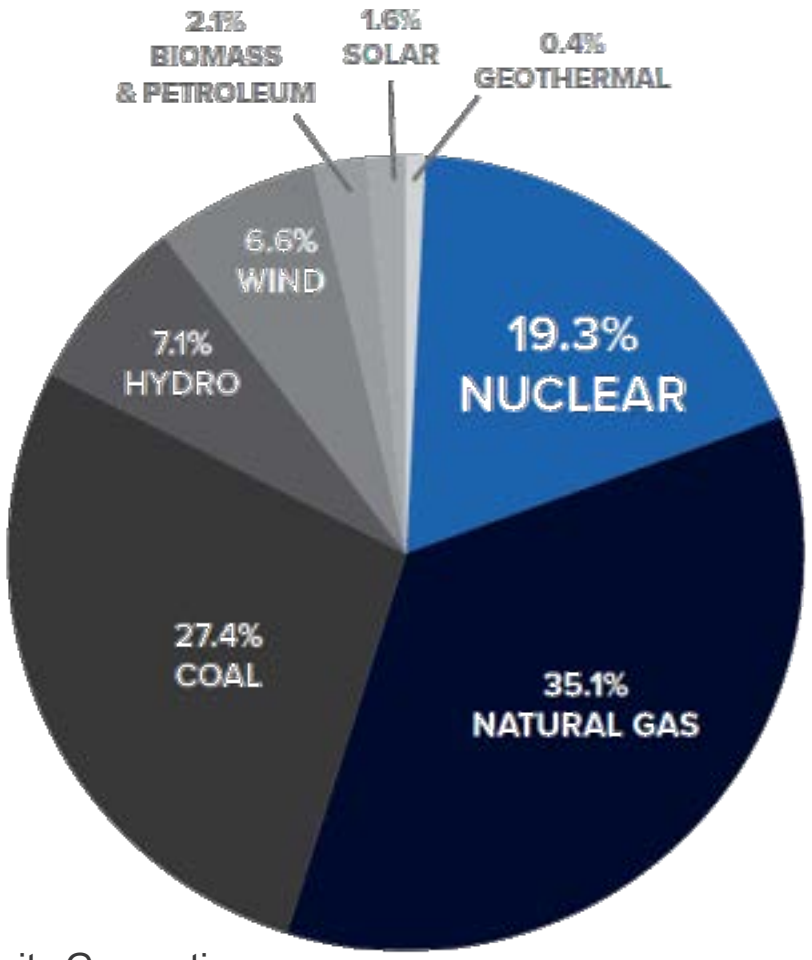
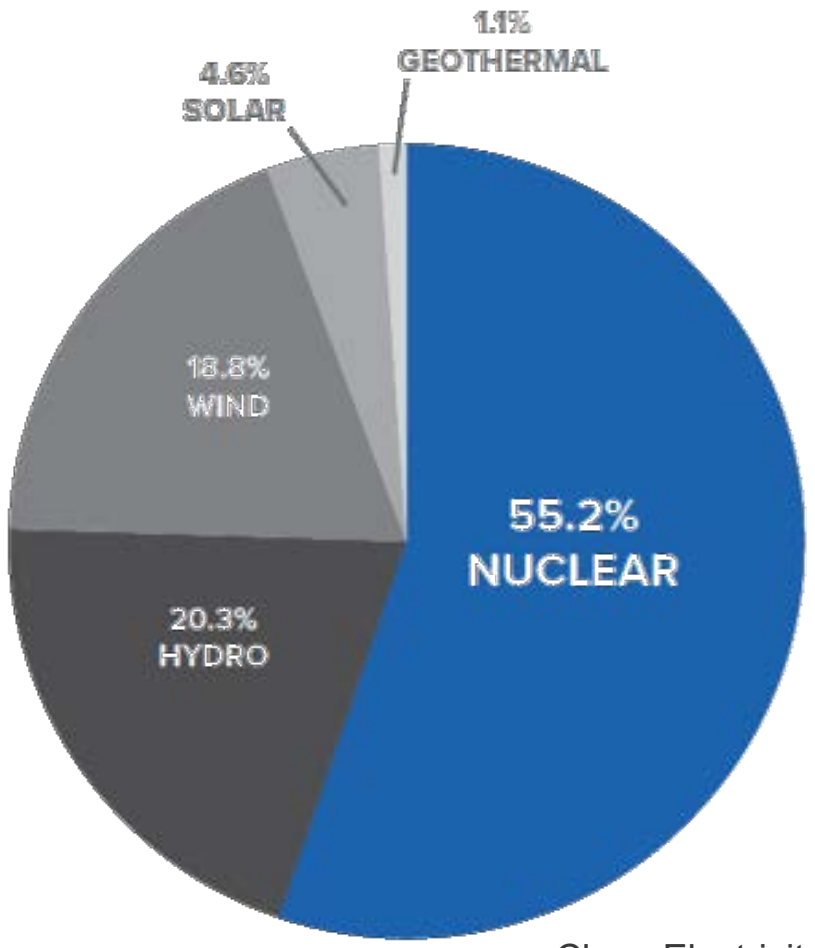
Electricity Sources in the U.S.



Total Electricity Generation



Clean Electricity Generation

Nuclear energy generates more emissions-free electricity than all other clean energy sources combined.

Source: Nuclear Energy Institute

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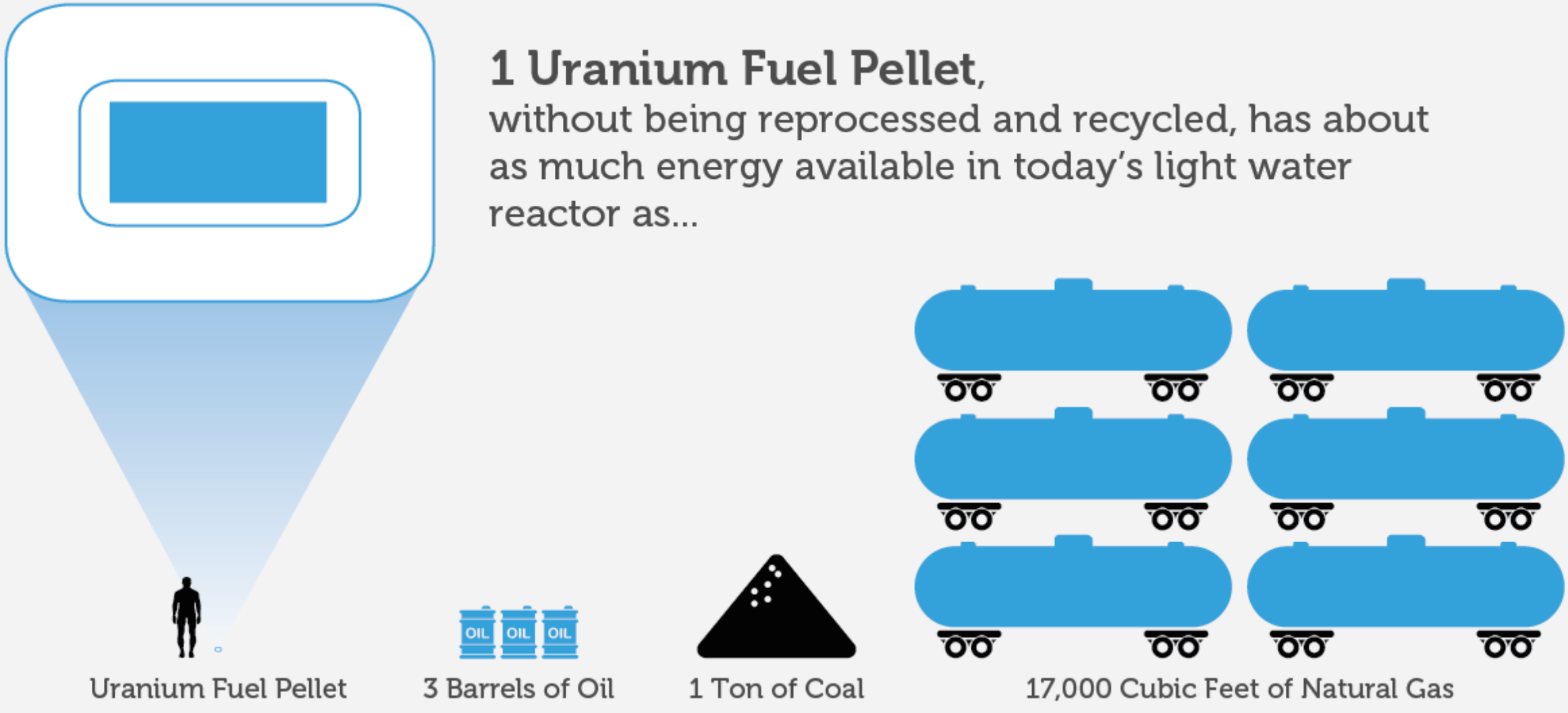
Energy Equivalents



Source: American Nuclear Society