



NUSCALE[™]
Power for all humankind

NuScale Power Overview –Gen-IV Industry Forum

October 3, 2022

Toronto, Canada

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Director of Sales

Agenda

- Who is NuScale Power
 - Brief review of Company background
- Brief NuScale VOYGR™ Technology Overview
- Technology Applications
- Hydrogen Production

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 \$450M in DOE funding since then
- 628 patents granted or pending in nearly 20 countries
- >430 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\$1.4B



NuScale Engineering Offices Corvallis



One-third Scale NIST-2 Test Facility



NuScale Control Room Simulator

NuScale Power by the Numbers

1st

And Only SMR to Receive
NRC Standard Design Approval

1st

And Only Publicly Traded SMR
Technology Company

\$341m

Net proceeds after merger with
Spring Valley to bolster and
accelerate the commercialization

\$1.4bn

Cumulative Capital
Invested to Date

15 Years

R&D and Testing
Founded in 2007

485+

Employees with Unparalleled
Nuclear Experience
*37 PhDs
167 Master in Engineering / Science
Degrees*

639

Patents
*443 Granted, 196 Pending
Extensive Trade Secrets*

9

Strategic Investors Supporting
Global Customer Adoption
*Established Supply Chain Network
with Continued DOE Support*

Existing Investors

FLUOR

 **GS Energy**

JGC

DOOSAN

Sargent & Lundy

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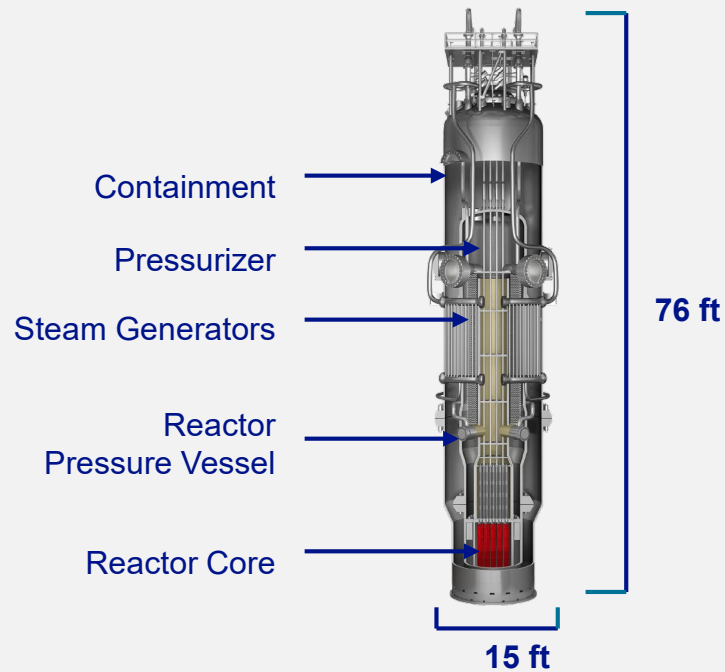
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 **SAMSUNG C&T**

 **JBIC**

NuScale's Core Technology: the NuScale Power Module™



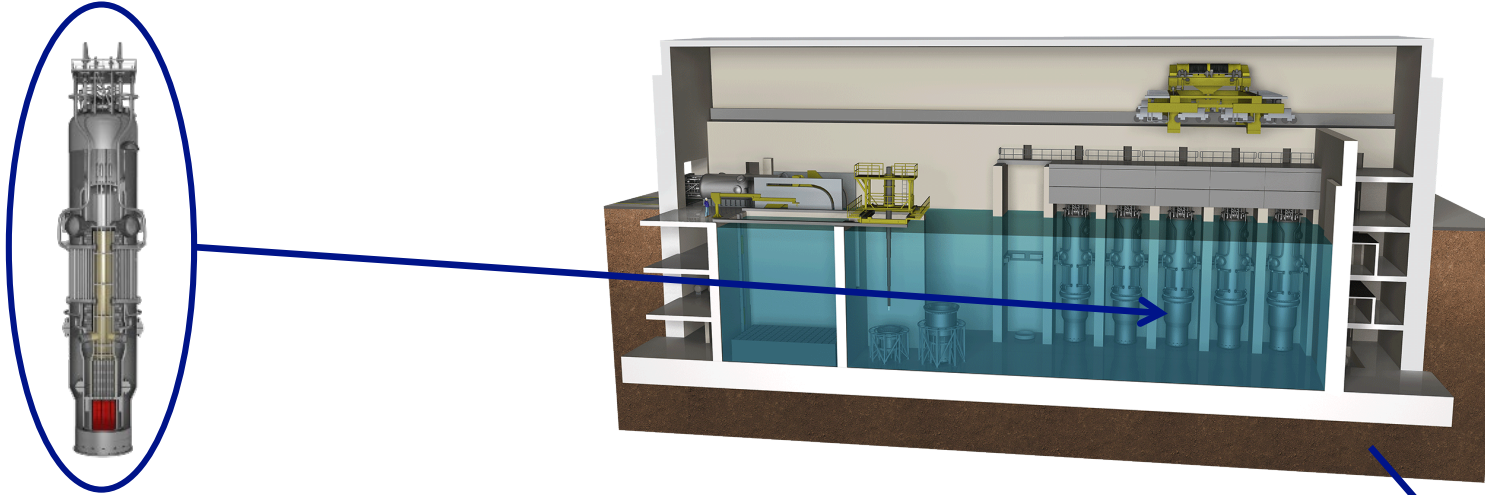
- Groundbreaking technology features a **fully factory fabricated** SMR referred to as a NuScale Power Module™ consisting of an **integral nuclear steam supply system** in which the reactor core, steam generators and pressurizer are all contained in a single vessel
- **Simple design** eliminates reactor coolant pumps, large bore piping and other systems and components found in conventional reactors
- Simplicity results in an extremely **strong safety case** and **reduced capital and operational costs**
- Modules can be incrementally added to match load growth

NuScale Power Module™ Specifications

Electrical Capacity	77 MWe
Modules per Plant	Up to 12 (924 MWe)
Design Life	60 years
Fuel Supply	Existing light water reactor nuclear fuel
Safety	Walk-away safe
Emergency Planning Zone (EPZ)	Supports site boundary EPZ



NuScale Advanced Small Reactor Overview

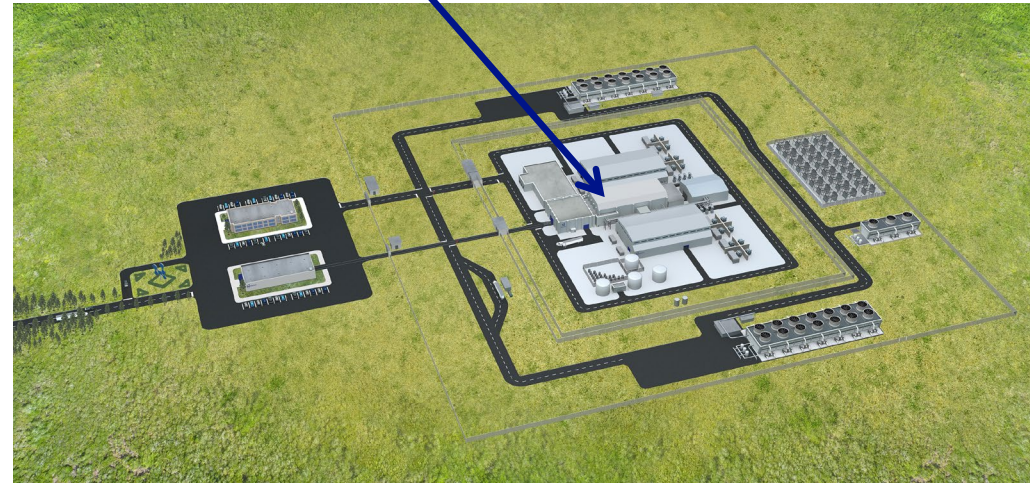


- Each module produces up to **77 MWe**
- Up to **12 modules** for **924 MWe** gross plant output
- Smaller power plant solutions available for 4-module (308 MWe) and 6-module (462 MWe) plants

Triple Crown of Safety - NuScale Plant safely shuts down with:

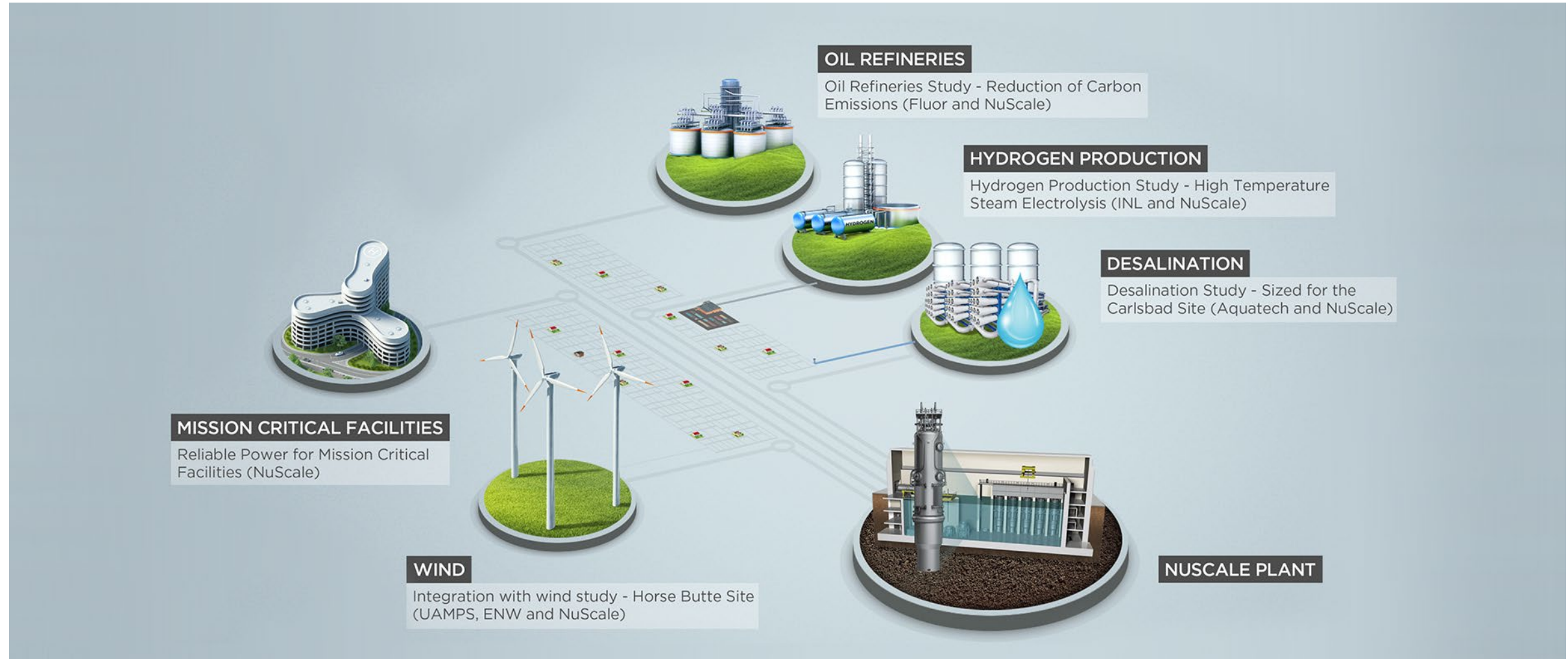
- No operator or control system actions
- No AC/DC power
- No additional water

Emergency planning zone (EPZ) ends at site boundary



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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NuScale Co-Generation Studies

Oil Refinery Study Reducing Carbon Emissions (Fluor and NuScale)

8-Module VOYGR-8 plant coupled to a 250,000 barrels/d refinery, thus avoiding ~200 MT/hr CO₂ emissions.



Desalination Study for Clean Water and Electricity (Aquatech and NuScale)

6-Module VOYGR-6 plant producing 77 Mgal (290 million liters) per day of clean water plus ~385 MWe to the grid.



High-Temp Steam Electrolysis for Carbon-free Hydrogen Production (INL and NuScale)

4-Module VOYGR-4 plant producing ~197 tons per day carbon-free hydrogen for ammonia plant.



Only 2% of electrical output (1.8 MWe) is used to increase process steam temperature from 300°C to 850°C

Summary of Key Results

H₂

Cost-Competitive, Carbon-Free Hydrogen Production

- **NuScale's innovative technology is ideal for producing clean hydrogen in a cost-competitive manner:**
 - *NuScale/HTSE offers high capacity factors and does not require significant land mass to achieve the production scale needed to achieve clean H₂ costs competitive with renewables.
 - *A single NuScale module can produce 2,053 kg/hour of hydrogen, or **50 tons/day** – enough hydrogen to power 38,000 fuel cell vehicles or 1,500 long-haul fuel cell trucks annually
 - *Hydrogen produced by an HTSE system using heat and electricity from a NuScale module is forecasted to be **cost competitive with green hydrogen** (produced from renewable electricity)

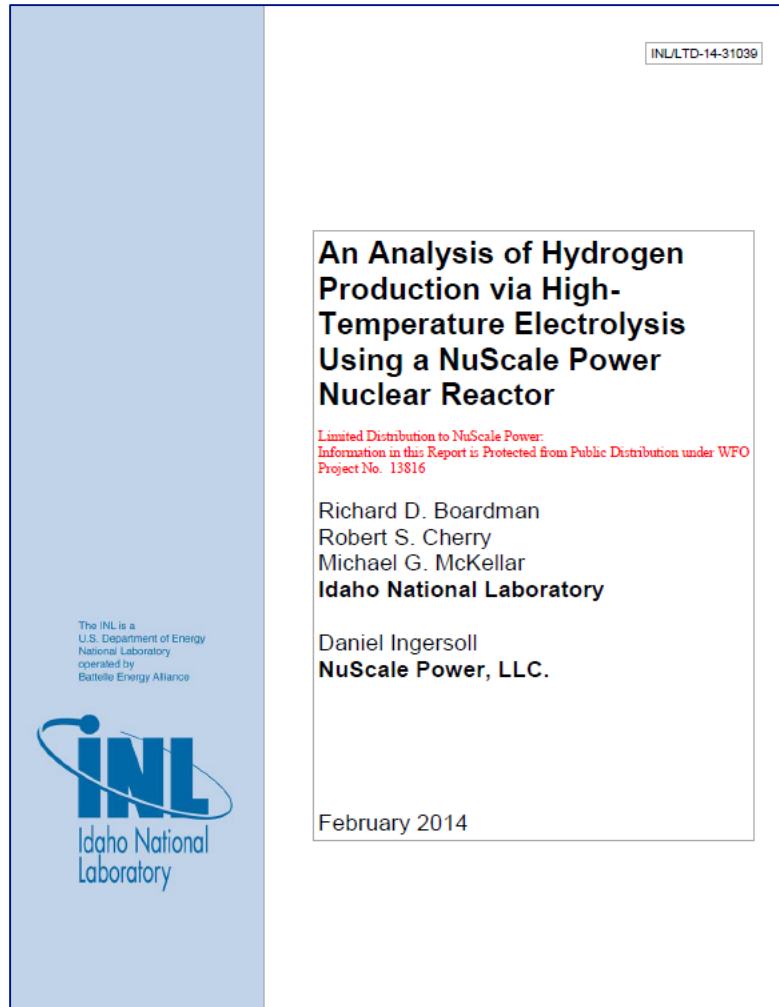
Summary of Key Results

H₂

Cost-Competitive, Carbon-Free Hydrogen Production

- **An NPM/HTSE plant could readily be used as a hybrid hydrogen production and electric power plant because:**
 - ✱ HTSE can be held on hot stand-by so it can be rapidly started and stopped without damaging the electrolysis cells.
 - ✱ NPM turbine/generator sets only require a 10% ramp down to transition from electricity production to hydrogen production.
 - ✱ The modular design of both the NPM and HTSE would allow proportional gain between 0% - 100% hydrogen/oxygen production and 100% electricity dispatch to the grid.

NuScale Collaboration with Idaho National Laboratory



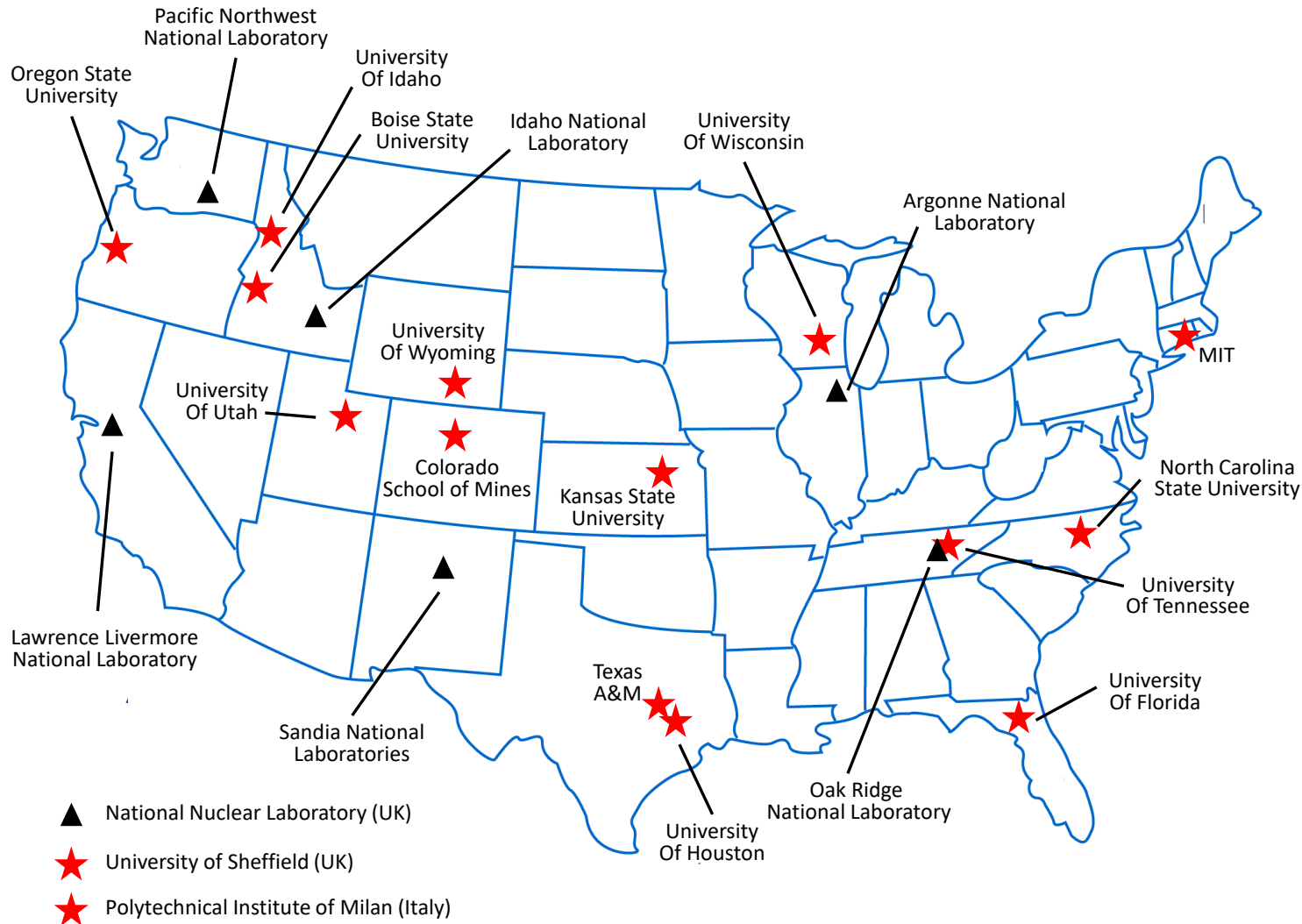
- In 2014, NuScale commissioned the Idaho National Laboratory to perform a study on Hydrogen production using a NuScale module integrated with a high temperature steam electrolysis process.
- DOE sponsors H2@Scale programs at US National Laboratories.
- HTSE using heat and electricity from one of Xcel Energy's nuclear plants, likely the Prairie Island Nuclear Generating Station.

Additional Areas of Research

- INL continues to investigate [U.S. National Laboratory H2@Scale Technical Report, NREL/TP-6A20-77610, Oct 2020](#)
 - The improvement of the long-duration performance of the cells, currently limited by degradation, and
 - The development of techniques for manufacturing and assembling large area cells in order to reduce the overall cost of the commercial plant.
 - Lower temperature steam electrolysis (400-500°C). Further enhances NuScale/HTSE efficiency and lowers cost.
- The NuScale multi-module plant simulator can provide dynamic modeling of the steam turbine bypass operations needed to support an HTSE system.



Innovation and Research Collaboration Programs



- Since 2012, NuScale has leveraged \$62M in external research through collaborations with industry, universities, and national laboratories
- Internationally, collaborations have included research organizations in Czech Republic, France, Finland, Italy, and the United Kingdom
- 110 Total Projects
 - 49 Industry Projects
 - 31 University Projects
 - 30 National Laboratory Projects



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