

# TERRAPOWER'S LABORATORY: HOME TO GROUNDBREAKING RESEARCH

TerraPower invests in state-of-the-art laboratory facilities to support and accelerate the company's nuclear technology research and engineering work. Starting with 10,000 square feet when the company began, TerraPower has expanded to 65,000 square feet of facilities. With success in demonstrating aspects of its energy systems and validating components and materials, TerraPower expanded its laboratory facilities to accommodate growth in testing capabilities to demonstrate key components and physical properties of materials.

## FROM CONCEPT TO COMMERCIALIZATION

TerraPower's laboratory supports a variety of research, including the verification and validation of codes and models, and the development of equipment, instrumentation and processes. TerraPower's materials development and innovation programs also rely on the facilities in the lab.

Testing follows Technology Readiness Level methodology. This operational testing approach originated at NASA and has a long history of use by the Department of Defense; TerraPower uses it to estimate technology maturity of critical elements. During the development process, Technology Readiness Assessments help keep work focused. Selected reactor components, fuels and materials technologies go through a four-step process:

- Bench testing to determine which processes or materials should be tested further.
- Scaled-up testing using larger-scale components, which helps further develop and refine testing and analytical techniques to ensure they will be valid for prototype testing.
- Prototype testing of scaled and full-sized components or final testing of materials.
- Integration with other technologies, components and/or materials being developed, tested and analyzed in the lab.

Each step of this process may include testing in increasingly difficult media (air to water to liquid sodium) and temperatures (low to elevated) on the path to a final technology.



*TerraPower's 10,000-square-foot laboratory space in Bellevue, Washington.*

### PRIMARY ACTIVITIES AT THE LAB

**Component Testing** – finding where small changes can produce great results

**Model Validation** – proving out new codes and models

**Instrumentation** – developing and fabricating custom, cutting-edge testing equipment

**Innovation** – performing first-rung research on new nuclear-related technologies

**Materials Exploration** – developing or adapting metal alloys and coatings

## BRINGING NEW TECHNOLOGIES TO LIFE



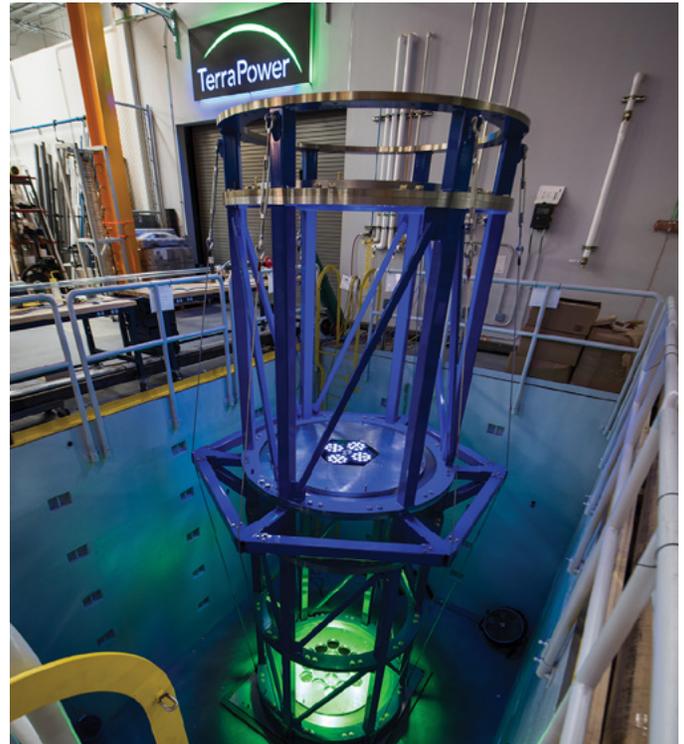
TerraPower rigorously tests molten salts through proprietary loops that demonstrate flow, corrosion and performance at varying temperatures and durations with a variety of structural materials.



A TerraPower engineer runs a test on a prototype vacuum quench furnace. The full-sized equipment will be used to heat-treat uranium metal to be used in fuel rods.



A technician places a full-size test fuel pin bundle in TerraPower's pin duct interaction test apparatus. TerraPower manufactures bench- and full-scale fuel pins and pin bundles for testing in the lab.



This full-scale fuel assembly test stand provides data on the metal-on-metal interactions that take place in a reactor's core. Tests provide data on thermal-mechanical behavior of the fuel inside the reactor core, a critical step in benchmarking experiments against design models.



A TerraPower engineer performs chemical experiments in a fume hood. This equipment allows engineers to safely conduct experiments in an air atmosphere.

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