

TERRAPOWER'S TRAVELING WAVE TECHNOLOGY:

SCALABLE CLEAN ENERGY

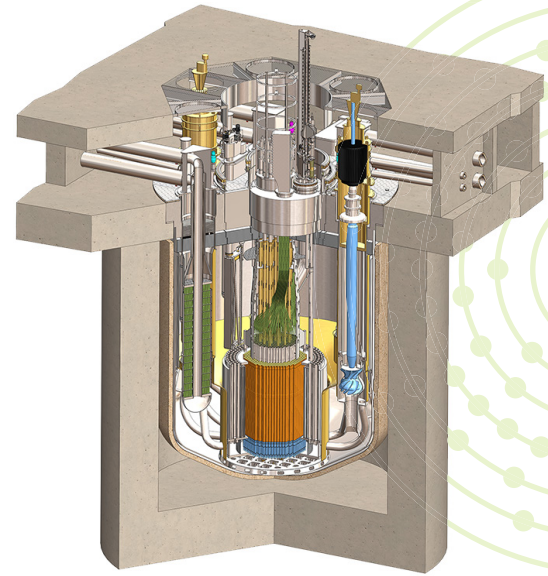
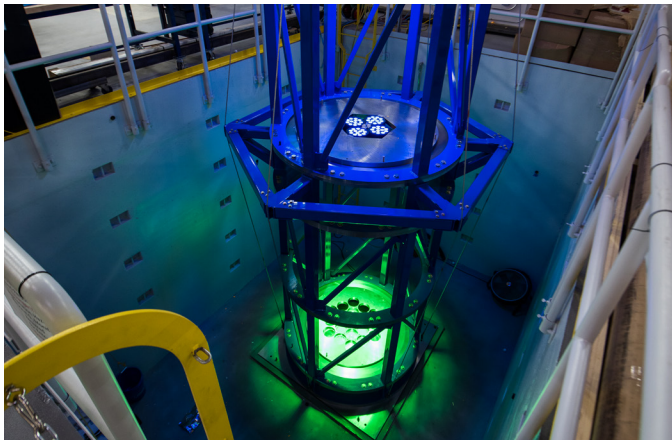
TerraPower's traveling wave reactor (TWR[®]) technology is designed to be a liquid sodium-cooled fast reactor that will greatly simplify the current nuclear fuel cycle, reducing the need for uranium mining and spent fuel storage facilities.

Eventually, it will eliminate the need for enrichment facilities and reprocessing plants. This will result in enormous cost savings, highly enhanced safety, greatly reduced waste, greater ease in waste disposal and a high level of proliferation resistance.

Today, the TWR design remains an important, long-term goal of the Natrium™ program.¹ A fleet of TWR plants will be able to operate for centuries with unenriched uranium fuel, needing enriched uranium to start only the first reactor in the long chain of plants. The TWR design offers 30 times more efficient use of mined uranium and a factor of five reduction in waste, all based on a once-through fuel cycle without the safety and proliferation concerns of reprocessing used fuel. Unlike previous sodium fast reactor programs, the TWR eliminates reprocessing, reducing proliferation concerns and lowering overall fuel cycle costs.

With its major non-proliferation benefits, it will be an ideal technology for international deployment, as many new countries turn to emissions-free nuclear energy to meet the needs of their citizens and growing economies.

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.



TWR conceptual design

MAJOR TWR BENEFITS

- **SAFE.** TWR systems rely on the natural laws of physics to maintain the safety of the plant without operator intervention.
- **AFFORDABLE.** Atmospheric pressure operation and very low fuel costs allow for lower capital and operating costs.
- **CLEAN.** Used fuel is stored inside the core, slashing the need for external storage and transportation of waste. Longer operating high-efficiency cycles keep carbon-free electricity reliably supplied with reduced needs for mining, enrichment and waste disposal.
- **SECURE.** The traveling wave makes the reactor capable of sustaining a fission chain reaction without interruption that can run for decades without need for fuel procurement and interruptions for refueling. Eliminating the need for reprocessing radioactive used fuel and eventual elimination of enrichment facilities greatly reduces proliferation risk.

¹A TerraPower and GE-Hitachi technology