



Global Technical Training Services, Inc. Newsletter



The State of the Industry

Sid Crouch, GTTSi Chief Technical Consultant

Our industry has entered a period never seen before – parallel nuclear and gas turbine expansion. Surging electricity demand, driven by AI data centers, electrification, and decarbonization objectives, has exposed a timing mismatch in generation resources. While nuclear is central to our long-term climate and reliability goals, new-build nuclear power plants require 10-19 years from planning to operation. In contrast, heavy-duty gas turbine power plants can be planned, built, and commissioned within 2-5 years, positioning them as the only scalable, dispatchable solution available in this decade. Coordinated actions are underway to accelerate nuclear deployment and supply chain restoration:

1. Restart of shutdown nuclear plants (Duane Arnold, Palisades, TMI)
2. Renewed efforts to finish V.C. Summer 2&3
3. Plans to build and operate SMRs in TN, MI, WY, OH, & WA
4. Eleven microreactors projects underway, with the goal that 3 of the 11 achieve initial criticality by July 4th
5. Rebuilding our uranium supply chain (federal investment \$2.7B) supporting domestic LEU and HALEU production, eliminating reliance on Russian fuel

Even with those efforts, gas turbines are not a transitional afterthought; they are critical for load growth and grid stability through the mid-2030s until nuclear arrives. A strategic advantage favors organizations that can and will invest in a dual-track mindset: near-term dispatchable generation coupled with long-term nuclear optionality.

I welcome your comments or questions - sid.crouch@gttsi.com

HIGHLIGHTS

 NUCLEAR POWER
 ENGINEERING
 TECHNOLOGY AT
 CHATTSTATE

 NUCLEAR FUEL
 REPROCESSING GIVEN
 NEW LIFE

 GE VERNOVA RAMPES UP
 TO MEET GAS TURBINE
 DEMAND

 DID YOU KNOW?

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THE NEXT ATOMIC AGE IS BEING BUILT AT CHATTSTATE COMMUNITY COLLEGE

In September 1965, Chattanooga State Community College, commonly known as ChattState, began its mission of serving the business, industrial, and professional needs of the Chattanooga region. For more than six decades, the college has built a reputation for innovation and workforce development, particularly in technical education. Today, that same forward-thinking approach is helping prepare the next generation of professionals for America's rapidly growing nuclear energy industry.

Located in one of the Southeast's most technologically advanced regions, Chattanooga has become a major hub for innovation and high-tech infrastructure. The city is home to organizations and facilities such as the EPB Quantum Network, DC BLOX Tier III data centers, the Volkswagen electric vehicle manufacturing facility and battery lab, and the U.S. Nuclear Regulatory Commission Technical Training Center. Just 21 miles away sits Sequoyah Nuclear Station, one of the Tennessee Valley Authority's major nuclear generating stations.

Chattanooga has also earned the nickname "Gig City" because of its extensive fiber-optic infrastructure, which supports technologies ranging from advanced manufacturing and 3D printing to quantum computing research through the Institute of Quantum Innovation. It is a city increasingly defined by technology, energy, and innovation and ChattState is positioned directly in the middle of that transformation.

Recognizing the growing demand for clean,



reliable energy and highly skilled technical workers, ChattState launched its Nuclear Power Engineering Technology (NPET) program three years ago. College leadership understood early that the United States was entering a new era of nuclear energy development, with ambitious plans to significantly expand nuclear generating capacity by 2050 in support of net-zero emissions goals and the exploding electricity demands driven by AI data centers and advanced computing infrastructure.

What began with just seven students has rapidly grown into one of the college's most exciting technical programs, with 43 students enrolled this fall. That growth reflects the increasing need for qualified nuclear professionals across the country, particularly as utilities, reactor developers, and advanced nuclear companies compete for the next generation of operators, technicians, and plant support personnel.

Graduates of the ChattState NPET concentration program develop the knowledge, skills, and abilities necessary to successfully enter the operational environment of a nuclear power facility. Students are trained **continued**

to safely operate equipment, follow detailed procedures, identify abnormal conditions, and communicate effectively in high-consequence environments. The curriculum emphasizes plant systems, component operations, nuclear safety, and operational awareness - critical competencies within the power generation industry.

In addition to preparing students for careers in nuclear power plant operations, the program also opens doors in fossil plant operations, chemical processing facilities, advanced manufacturing environments, and other energy-related industries where operational discipline and technical expertise are highly valued.

Recently, ChattState NPET students joined fellow American Nuclear Society student chapter members at the 2026 ANS Student Conference hosted by Texas A&M University. During the trip, students toured the Aalo Atomics pilot factory facility in Austin, Texas, where they received a firsthand look at the future of advanced nuclear technology.

The visit provided students with unique insight into the company's sodium-cooled Extra Modular Reactor (XMR), known as the Aalo-X, a 10 MWe microreactor currently under development. Students learned about the manufacturing process for modular reactors and explored how advanced nuclear systems are being designed specifically to support the growing energy demands of data centers and industrial facilities.


At the Austin pilot factory, reactor modules are manufactured prior to shipment to Idaho National Laboratory for testing and deployment activities. Aalo's long-term commercial vision includes the "Aalo Pod," a scalable energy platform combining five 10 MWe reactors into a single 50 MWe power plant designed specifically for data center applications. The company's goal is to have commercial units online by 2029 while



Terry Newman, Associate Professor, AAS Engineering Technology, Nuclear Power ET
Photo Credit: Nuclear Power and Radiation Protection Engineering Technology Degrees, YouTube

simultaneously developing a gigafactory capable of producing hundreds of reactors annually.

For ChattState students, experiences like this bring classroom instruction to life. They are not simply learning reactor theory, they are learning how to think, communicate, and perform like future nuclear operators in an industry undergoing historic transformation. Exposure to emerging technologies and real-world applications reinforces the mission of the NPET program and demonstrates the critical role these students will play in America's energy future.

The Second Atomic Age is no longer a concept for the future - it is happening right now. At Chattanooga State Community College, the next generation of nuclear professionals is preparing to help build it. 



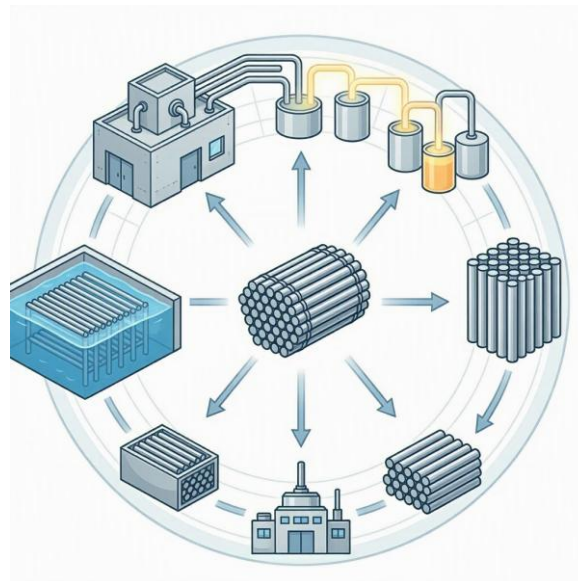
COULD SPENT FUEL REPROCESSING FINALLY OCCUR IN THE U.S.?

Did you know that less than 5% of the potential energy within the fuel assemblies of our commercial nuclear reactors is used after five years of operation? The fuel assemblies stay inside a reactor for roughly four to six years where only 3-5% of the uranium atoms actually fission. The fission products build up, the neutron-absorbing materials accumulate, and the fuel becomes less efficient. Even after removal, 95 percent of the original uranium remains.

What can be done to recover this remaining potential energy? Recycle the used fuel. We have 95,000 metric tons of used (spent) nuclear fuel stored at 79 commercial reactor sites across 28 states. Recycling this fuel could increase resource utilization by 95%, reduce waste by 90%, and decrease the amount of uranium needed to operate our commercial nuclear reactors. In addition, there are other benefits to recycling this fuel, like the recovery and extraction of valuable radioisotopes for medical, industrial, and defense purposes.

While other countries like France, Russia, Japan, and the United Kingdom have reprocessed spent fuel to recover uranium and plutonium for reuse, the United States largely stopped commercial re-processing decades ago.

Now the Department of Energy's (DOE) Office of Nuclear Energy has recently announced an ambitious new initiative. This initiative, through the Defense Production Act (DPA) Nuclear Fuel Cycle Consortium, aims to secure the nation's nuclear fuel supply chain to ensure that we continue to have enough nuclear fuel to power our current nuclear reactor fleet, as




well as future advanced reactors. The initiative will address all facets of the nuclear fuel supply chain including milling, conversion, enrichment, deconversion, fabrication, recycling, and reprocessing.

The DOE has awarded a total of \$19.3 million to five companies (Alpha Nur Inc., Curio Solutions, LLC., Flibe Energy Inc., Oklo Inc., and Shine Technologies, LLC.) to help solve the economic and technological challenges associated with nuclear fuel recycling technologies that also meet the USA's strict non-proliferation standards and national security goals.

The U.S. has tried this before. In 1971, construction of the Barnwell Nuclear Fuel Reprocessing plant (formally the Barnwell Nuclear Fuel Plant or BNFP) was begun. The project, in Barnwell, South Carolina, was led by Allied-General Nuclear Services (AGNS), a consortium including Allied Chemical and Gulf Oil. The facility was 94% complete by 1976 at a cost of over half a billion dollars, but never began commercial operations due to federal policy changes and the ban of commercial reprocessing in 1977 by President Carter to prevent nuclear proliferation. *continued*

The Reagan administration later lifted the commercial reprocessing ban, but economic factors and anti-proliferation concerns nixed its completion. By 1983, it was abandoned, although the buildings and structure remained. At this point, there is no announced plan to restart or complete the Barnwell Nuclear Fuel Reprocessing plant as a commercial

reprocessing facility. That said, most of the momentum today is centered around the Savannah River site, a U.S. DOE nuclear reservation located near Aiken, South Carolina, where the DOE recently announced plans to restart the HB-Line facility to recycle surplus plutonium into fuel for advanced reactors. 

COMPANIES RECEIVING \$19.3M FOR FUEL RECYCLING

The DOE has awarded a total of \$19.3 million to five companies to help solve the economic and technological challenges associated with nuclear fuel recycling. Here is a brief summary of what each company will do:



- Alpha Nur Inc. will research a process to recover highly enriched uranium (HEU) from spent fuel used in U.S. research reactors and convert it into HALEU (high-assay low-enriched uranium). HALEU is expected to be a key fuel source for many advanced reactors and small modular reactors (SMRs).



- Curio Solutions, LLC will develop technology to convert used nuclear fuel into uranium hexafluoride (UF₆) gas, which can then be re-enriched and reused as reactor fuel. Their broader NuCycle approach is intended to improve recycling economics, recover valuable isotopes, and reduce high-level waste generation.



- Flibe Energy Inc. will study electrochemical recycling methods for processing used nuclear fuel. This work focuses on advanced chemical techniques that may allow fuel materials to be separated and reused more efficiently in future reactor systems.



- Oklo Inc. will study how heavy radioactive elements behave and deposit within molten salt systems. The research is intended to improve the design of pyroprocessing plants that could recycle used fuel for advanced reactors, including Oklo's own fast-reactor concepts.



- Shine Technologies, LLC will develop an integrated recycling process that combines transportation, storage, disposal, and hydrometallurgical processing ("hydro-processing") of used nuclear fuel into a single coordinated system.

The DOE said these projects could help the U.S. recover up to 95% of the remaining energy in used nuclear fuel while potentially reducing waste volumes by as much as 90%.

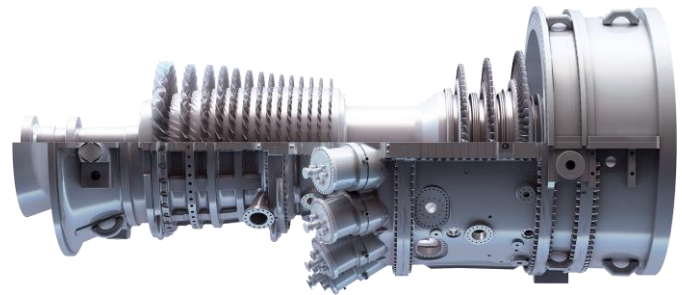
GE VERNOVA RESPONDS TO THE GAS TURBINE RENAISSANCE

GE Vernova reported a massive jump in its gas power backlog, reaching 100 GW in the first quarter 2026, up sharply from 83 GW at the end of 2025. The company shipped 25 gas turbines first quarter, a 32% increase from the first quarter of 2025. This upsurge looks to continue as GE Vernova is experiencing purchase agreements for production slots into 2030.

Most of these turbine orders are for heavy-duty gas turbines. Heavy-duty gas turbines refers to robust, stationary power units that are designed for long-term, reliable service in large-scale power generation or industrial applications, unlike the lighter, faster-starting "aeroderivative" turbines which are adapted from aircraft jet engines typically used for peaking units. The heavy-duty gas turbines are built to operate continuously for thousands of hours with high efficiency and lower maintenance costs over their lifespan. While historically, heavy-duty gas turbines were less efficient than the aeroderivative gas turbines, today GE Vernova's heavy-duty gas turbines can achieve a combined-cycle efficiency of 60% or more.

These heavy-duty machines range from ~75 MW for smaller frames up to 500 MW or more. They usually operate at fixed speeds (e.g., 3000/3600 RPM) synchronized with their local grid frequency, which is a slower speed when compared to aeroderivative gas turbines. In addition, heavy-duty turbines are designed to burn a wide variety of fuels, including natural gas, liquid residual fuels, and low-quality fuels, making them versatile for different environments.

The demand is truly diversified, with major

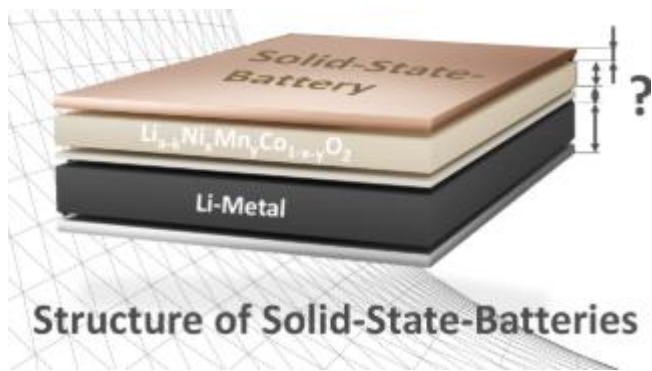


*GE Vernova's 9F Gas Turbine
Photo Credit: governova.com*

contracts signed in the U.S., Vietnam, Mexico, Brazil, and Canada. To meet this trajectory, GE Vernova is scaling its manufacturing capacity to 24 GW annually by 2028, supported by significant capital expansions at its Greenville, South Carolina and Schenectady, New York facilities.

As electrification and hyper-scale data centers are rising, demand is outpacing our grid capacity, and the gas turbine has transitioned from a legacy asset to a strategic one. For many of these developers, the gas turbine is no longer the bottleneck; it is the EPC (Engineering, Procurement, & Construction) schedules, permitting, and fuel supply. By locking in 2030 slots now, utilities and private power producers are treating gas turbines as the foundational "firming" capacity required to hedge against the volatility of renewable-heavy grids. With \$6 billion in capex committed through 2028, GE Vernova is clearly seeing a gas-fired renaissance, not as a temporary spike but as a long-term trend.

DID YOU KNOW?



Structure of Solid-State-Batteries

Photo Credit: FutureBatteryLab

Solid-state batteries are being viewed as the next major leap beyond lithium-ion technology. In theory, they promise higher energy density, faster charging, better performance in both cold and hot weather, and reduced fire risk. **Donut Lab (Finland-based EV technology company)** claim its solid-state battery delivers 400 watt-hours per kilogram (**W-h/kg**) and can charge in less than 10 minutes and last 100,000 cycles. By comparison, lithium-ion batteries range from 200 to 300 W-h/kg. They take 4-6 hours to charge and can also last 100,000 cycles.

Every winter, FirstLight, owner and operator of the Rocky River Pumped Storage Facility, lowers the Candlewood Lake level in Connecticut. This level decrease is referred to as the “drawdown”. Rocky River Pumped Storage Facility, located along the Housatonic River in New Milford, Connecticut, is considered Connecticut’s largest battery. It has been in operation for 100 years and can provide ~30 MW (megawatts) all day, limited only by the lake level of Candlewood Lake. The original wooden 1,000-foot penstock that connected the power station to Candlewood Lake was replaced in the 1950s and is now a fiberglass pipe. Except from that, Rocky River Pumped Storage Facility is almost all legacy equipment. The two centrifugal pumps, aside from the circuitry that makes them reversible, are original. The generator, although overhauled several times, is original. And the surge tower that sits on a hill behind the plant including the piping that connects it to the turbine, is original.

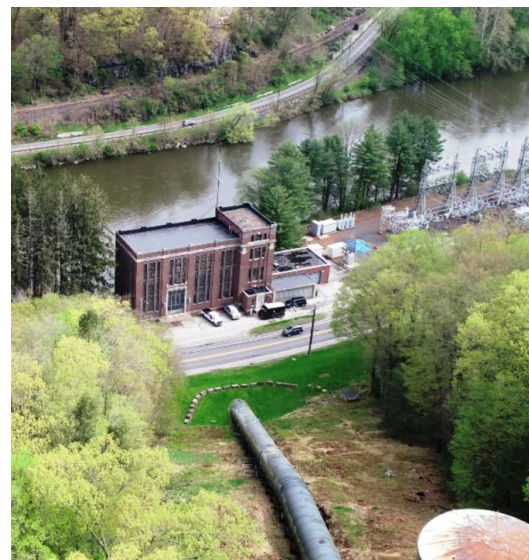


Photo Credit: firstlight.energy.com



Antora's Thermal Energy Storage
Photo Credit: Antra.com

Thermal Energy Storage System (TESS) is a subset of an Energy Storage System. A TESS stores energy as heat or cold for later use, much like a battery. A key subcategory of a TESS is its SHS (sensible heat storage) feature, where either a solid or liquid material is used to store the energy, sometimes referred to as a thermal battery. One California-based company, Antora, uses solid carbon as the raw material for their thermal battery or SHS, which is charged rapidly when electricity is cheap. This resistive heat can reach a glowing-hot temperature up to 2,400 °C. The energy can then be discharged as heat for industrial use or converted directly into electricity by taking the light that is emitted for the carbon block and convert it via thermophotovoltaics into electricity.

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